

# 3 Management information systems and computer services

## Management information systems

3.1. The management information systems provide information to managers in the bus companies to support their decision-making and enable them to carry out their tasks. The function of a management information system (MIS) is to provide the decision-maker at all levels of management with the best information available to the organisation appropriate to the nature of the decisions for which the particular manager is accountable.

3.2. Although the information should relate to the activity systems which are to be controlled, it is usually convenient to create management information as a by-product of systems which are necessary to process transactions; for example, information about revenue from individual routes, and even information about passengers carried, may be obtained as a by-product of collecting fares. Similarly, management information related to stock control stock turnover, aggregate service levels is 'top tier' information from a system whose basic function is to record stock issues and receipts.

3.3. A management information system normally acts as an aid to three categories of management activity:

- (a) strategic planning;
- (b) management control; and
- (c) operational control.

Information is normally organised into reports of three types:

- (a) regular reports;
- (b) exception reports; and
- (c) special reports.

3.4. *Use of computers.* The general trend in all organisations is for the core of MIS to be based on computer systems supported by databases, ie collections of primary data organised in a form immediately usable in any part of the organisation. For this reason we consider aspects of the management of computer services later in this chapter. The bus companies' computer systems are largely concerned with processing costing information. The data are not organised and held in such a way as to facilitate analysis. The computer's main contribution to the provision of management information is in the creation of the profit and loss statements, which analyse the companies as a number of separate business entities down to depot level. Even to provide these reports a considerable amount of manual work is needed.

3.5. We considered the information available to the Managing Director, to the Board and to senior managers, ie at Area Manager/Chief Engineer level, in both traffic and engineering. Specific examples are based on the Ulsterbus Northern area and the Ulsterbus Engineering Department.

## Provision of reports

3.6. The Managing Director receives many of the reports received by senior management, and some special reports and ad hoc reports on specific items as required. Table 3.1 shows the frequency and function of the reports on stage carriage activities normally received by the Managing Director. All these reports, except one ad hoc and one monthly management control report, also go to the Board.

TABLE 3.1 Reports\* received by Managing Director, categorised by frequency and function

Frequency	Number of reports by function**			
	Operational control	Management control	Strategic planning	Total
Ad hoc	-	1	-	1
Weekly	-	-	-	-
Monthly	-	3	-	3
Quarterly, four- or six-monthly	-	2	-	2
Annually	<u>1</u>	<u>4</u>	<u>6</u>	<u>11</u>
Total	1	10	6	17

Source: MMC analysis of Ulsterbus/Citybus information.

\*Where reports have been identified as used for both strategic planning and management control, or both management control and operational control, they have been categorised as strategic planning and management control respectively.

\*\*Includes only reports on stage carriage activities; excludes minutes of meetings.

3.7. Taking account of reports provided by Head Office as well as local systems, Table 3.2 shows the frequency and function of reports typically reviewed by Area Managers. Table 3.3 shows the same information for the Chief Engineer, Ulsterbus.

TABLE 3.2 Reports\* received by Area Managers, categorised by frequency and function

Frequency	Number of reports by function**			
	Operational control	Management control	Strategic planning	Total
Ad hoc	3	4	-	7
Weekly	10	2	-	12
Monthly	5	11	-	16
Four- or six-monthly	-	7	-	7
Annually	<u>2</u>	<u>7</u>	<u>8</u>	<u>17</u>
Total	20	31	8	59

Source: MMC analysis of Ulsterbus/Citybus information.

\*Stage carriage service reports only. Based on analysis of Northern Area Manager's reports.

\*\*Where reports have been identified as used for both strategic planning and management control, or both management control and operational control, they have been categorised as strategic planning and management control respectively.

TABLE 3.3 Reports\* received by Chief Engineer, Ulsterbus, categorised by frequency and function

Frequency	Number of reports by function			
	Operational control	Management control	Strategic planning	Total
Ad hoc	1	-	-	1
Weekly	3	-	-	3
Monthly	6	18	-	24
Quarterly, four- or six-monthly	1	5	-	6
Annually	<u>2</u>	<u>6</u>	<u>7</u>	<u>15</u>
Total	13	29	7	49

Source: MMC analysis of Ulsterbus/Citybus information.

\*Where reports have been identified as used for both strategic planning and management control, or both management control and operational control, they have been categorised as strategic planning and management control respectively.

## **Traffic**

3.8. Traffic consists of 23 depots in five groups (one in Citybus and four in Ulsterbus areas). Within it there are a number of identifiable activities of the bus service itself: manpower acquisition and allocation, bus acquisition and allocation, revenue control and so on. We examined the information systems which provide management with the information they use for planning and controlling them in some detail. From our detailed examination of the MIS in Traffic we made a number of observations.

3.9. We noted that the MIS do not provide the Area Manager with formal reports on the market and market share. That is, he does not have available an estimate, in any terms, of what the total potential for passenger bus journeys is, against which the number of bus journeys taken by the public could be compared; or, put another way, on the company's success at getting people who might ride on a bus to do so. Such information might be obtained by a number of possible measures, for example:

- (a) count all journeys, by whatever means (car, bus, train, bicycle, walk etc) actually taken;
- (b) survey those making journeys by other means to find out if they might have chosen the bus, and why they did not; and
- (c) survey to find out what additional bus journeys (ie over and above those journeys made by any means) people might have made if additional bus services were available.

3.10. We further noted that Ulsterbus has little regular information about the passengers its buses carry (with one notable exception), and that Citybus has even less because of its flat fare system. The exception is that of the pupils carried on sessional tickets. In this case the information is comprehensive. The survey which Ulsterbus had carried out annually to establish the number of underutilised school buses had provided some information of this sort but had been discontinued.

3.11. We also noted, however, some qualifications to these points. First, Ulsterbus managers (and, to a lesser extent, this applies to Citybus as well) stressed the role of Depot and Area Managers to be 'Mr Ulsterbus' and keep in touch with, and be part of, the community, responding to need as necessary. They also pointed out that inspectors and drivers acted as 'eyes and ears'. Second, the companies have very recently had market surveys carried out as part of the development of a new marketing strategy. Third, they have had the benefit of the considerable amounts of information about transport requirements and movements in traffic contained in a number of published reports, notably the Belfast Transportation Strategy Review, a Study of Northern Ireland Railways by a firm of consultants and the Study of Airport Services. Fourth, 'Wayfarer' can provide Ulsterbus (but not Citybus) with useful information both about passengers and about adherence to timetable, as we discuss in paragraph 3.14.

3.12. We also noted that the companies do not provide routine reports on route costing and profitability. We discuss route costing in paragraphs 4.19 and 4.20.

3.13. The companies provide profit and loss information down to Depot Manager, but do not provide comparison with budget targets. Separate comparisons can be made with the previous year's results. This information is described in paragraph 4.18. Generally we noted that the reports did not compare performance with standards or targets. Exception reporting takes place in an informal way. We were told that Area Managers delegated most aspects of the day-to-day running to Depot Managers, who were expected to draw attention to exceptional problems. Depot Managers themselves rely largely on personal contact to run their depots.

### **'Wayfarer'**

3.14. An important change to the information available to traffic managers in Ulsterbus is coming about because the company is introducing a new ticketing system. 'Wayfarer' is a system based on electronic ticket registers. As each ticket is issued, the electronic register records details of the time

and the stage. When the driver hands in his money, all these data can be transferred via a special reader to a floppy disc. Wayfarer thus provides, in a readily analysable form, extensive data on passengers. We were told that the company intends to exploit Wayfarer's potential, to provide management information on punctuality and route loading (see Chapter 10).

## **Engineering**

3.15. Engineering departments in the bus companies consist of two central workshops, one in Citybus and one in Ulsterbus, and depot workshops of varying size. Within the engineering departments there are a number of identifiable activities, which are described in detail in Chapter 7. We examined the MIS which are used to plan and control the departments' activities and made a number of observations.

3.16. Generally, reports provided by the MIS are concerned with reporting past performance and providing information about the present position, rather than forward planning. An exception to this is the PSV and overhaul programme. The purpose of this is to ensure PSV dates are achieved, not directly to enable a calculation of forward load. Generally the control systems operate on negative feedback principles sensing changes as they take place and then reacting to them, rather than anticipating them.

3.17. The forward loading of the workshops through planning overhauls and routine work can only provide an element of load stability, and unexpected changes in the overall amount of the work and its content can create short-term overloads. There is little in the way of formal shop loading systems to manage these, and the main responsibility for doing this lies with the foremen in the workshops.

3.18. Formal information systems in the engineering departments thus concentrate on providing information about how successful the workshop systems have been over previous periods in carrying out their tasks; and providing feedback to enable reactions to production problems as they occur. Quality control and costing information provide such information. We noted that these reports were in many cases extensive, with substantial detail, giving figures, for costs running to many thousands of pounds, to the nearest penny. We also noted that, for all reporting, there was little use of exception reporting; and few reports showed performance against targets or standards. The departments did not have available any unit costing information whereby, for example, the cost of rebuilding an alternator could be compared internally and with potential outside suppliers, and which could be used as the basis for providing standard costs to depots for carrying out the same task at different times and in different workshops. We discuss this further in Chapter 7.

3.19. The computerised stock control system has a number of acknowledged deficiencies, but has successfully been used by the companies to reduce stock levels. Priorities have been identified for its future development. We examine this system in more detail in Chapter 7.

## **Objectives and targets**

3.20. We noted, in the reports received by senior managers, an absence of targets or standards against which actual performance might be compared. The absence of reporting against budgets is a particular example of this more general feature of the companies' management reporting. In this case the reports provide previous years' figures for comparison. We also noted that there is no formal system of objective-setting for managers, which might give Area Managers, for example, a coherent set of objectives which would match corporate objectives for business development. On the question of budgetary control the companies told us that the idea of Depot Managers building up their own budgets had been considered but rejected up to now because it would involve a lot of training to enable them to participate effectively in the budget construction and monitoring process.

3.21. We put it to the companies that management information should be related to the management task, and that reports should compare performance against standards and targets which themselves were related to management objectives. We were told that the companies were aware that

they should do more to ensure that this was the case, and that they believed that the facilities offered by the new computer would help them overcome some of the practical difficulties which had obstructed progress up to now.

### **Computer services**

3.22. Ulsterbus and Citybus have a small Computer Department, with a staff complement of five, including the manager, who reports to the Company Secretary. The computer supports 30 local and two remote terminals, and is operated on one shift. The two remote terminals are at the Falls Road workshop, used for stock control. There are also some micro-computers in the company, mostly used for Wayfarer analysis.

3.23. The present computer was installed in 1983, when many of the programs running on the previous computer were converted to run on the new machine. Further applications have since been introduced. Since 1986 the present Company Secretary has concentrated on pulling together the existing accounting systems to enable costing to be handled as far as possible by the computer. Previously there were a number of costing programs whose outputs had to be aggregated by hand to produce the cost analysis. In a general sense the primary objective of the companies' policy has been to achieve cost saving through application of computers, with the achievement of benefits in the form of better information as a secondary, subordinate aim.

3.24. At the time of our inquiry the equipment was running close to or at full capacity. Although some jobs could be left to run in the evening, we were told that there was a limit to how much this could ease the capacity shortage. We were told that the capacity of the existing computer had been a constraint on the development of new systems for about two years, and during our inquiry the companies were obtaining new hardware.

### **New hardware**

3.25. The contract with the manufacturer of the existing computer included the provision of some consultancy time. In the 18 months before the companies asked manufacturers for their proposals to replace the existing computer system, they had used this consultancy time to obtain a view of their future needs. Some investigation of application software packages had also been undertaken by senior managers. We were told that the companies recognised that the choice of any new hardware should be preconditioned by what software packages could run on it. We asked what brief had been given to manufacturers preparing proposals for the companies' computer upgrade. We were told that the companies' existing supplier did a lot of groundwork, and that it was a document prepared by this manufacturer which was used as a basis for the other contenders' quotations.

3.26. We were told that the selection process could be regarded in two phases. The first phase had involved inviting manufacturers to provide written proposals of a general nature, laying out how their equipment and facilities could best serve the companies and providing a budget price. On the basis of this, it was established that converting the companies' software to run on the machine offered by one of the contenders was a significant task and this company was not further considered.

3.27. In the second phase, the manufacturers examined systems which the companies were running or expected to run in the near future. In the course of this phase the companies' existing supplier linked its proposal to that of a software house specialising in software for its equipment, and it was this software house which was finally successful with a bid to provide both the hardware and software. For the systems which were considered in this phase, but which were not already running as production systems, the bidders estimated the computing task involved. This enabled proposed and existing systems to be sized to provide, after allowance for future growth, the basis of the specification.

3.28. The bus companies did not prepare a formal written specification for the companies tendering, identifying what requirements they were to meet in their proposals. Instead, they relied on the contenders' surveying users' requirements, and on individual briefing sessions with each of the

two bidders in the final phase. The prices quoted included the price of software packages, mainly for financial applications, and maintenance, although the software packages included in the two quotations differed in the applications covered. We were told that the suitability of the available software packages, and the ease of conversion of the companies' existing software, were the most important considerations in the final decision.

## **Software**

3.29. Up to now computer applications have been developed for sections within the Company Secretary's Department: costing, pupils' tickets, stock control and payroll. The bus companies have one analyst and one programmer.

3.30. Most programs have been developed in-house; and apart from utilities such as the word processing package, little use has been made of proprietary packages, although a local software house was commissioned to develop the stock control systems. Within the Company Secretary's Department there are acknowledged deficiencies in the scope of the computer systems; whilst outside the Company Secretary's area there are virtually no computer systems.

3.31. In the few months prior to our inquiry, the companies started to try to deal with this deficiency. A Computer Steering Committee was set up, under the chairmanship of the Company Secretary. We were told that the following, from the minutes of the first meeting, could be regarded as the terms of reference of the committee: 'to assess the total computing requirement of the company in general'.

3.32. We were told that the Computer Steering Committee was seeking ways of using computers to improve efficiency, produce more useful management information and also look for cost savings. The committee has produced a list of computing requirements, to which all departments contributed. The priorities are:

- (a) a new payroll system;
- (b) personnel system; and
- (c) financial systems.
- (d) Other, second priority, systems, where investigation was ongoing, were: engineering applications, desk-top publishing and electronic clocking in.
- (e) Other items on the list would have a lower priority attached to them.

3.33. We asked what guidelines would be expected to be met when making investment in hardware and software. We were told that the policy would be to undertake small things in-house, and buy in software for larger things such as fleet management. The decision process would be: to identify the need for the application; to discuss it in the Computer Steering Committee; to prepare a paper for discussion in the committee; and, subject to that discussion, to prepare a paper on a specific proposal for the Board. Such a proposal would be decided on its merits. There were no particular criteria against which such a proposal would be judged. It was expected that payback would be examined; but return on capital employed would only be used as a criterion for judging whether or not to proceed with investments of £250,000 or more.

## **CONCLUSIONS AND RECOMMENDATIONS**

### **Management objective-setting and performance monitoring**

3.34. The bus companies are relatively small enterprises, with short lines of communication and an informal 'hands-on' style of management. They rely largely on direct supervision and individual inspection, rather than on many reports, for direction and control. This has worked well, and the

companies should not take our recommendations on management information systems as encouragement to abandon their current style of management, or to burden managers with large numbers of expensively-produced reports. On the contrary, we recommend that every effort should be made to keep such formal management reports to an essential minimum.

3.35. We believe that the devolved style of manpower management adopted by the companies is well suited to the nature of their operations, but we regard it as an essential concomitant that management performance should be carefully monitored. We recommend that the companies should introduce a management performance appraisal system, including the setting of objectives and monitoring their achievement on an annual basis. Such a scheme should initially be applied to staff down to Depot Manager and equivalent functional levels.

3.36. The present lack of management objectives is reflected in the information system. Generally, reports do not compare performance against budgets, standards or targets. This applies to all reporting in the companies, not only to financial reporting (see paragraph 3.13). Reporting also tends, particularly where computer reports are produced, to be extensive and diffuse, rather than concisely directed to the performance of the manager's task. We recommend that, once systematic management objectives have been set, the companies should match the reports to managers' tasks. We do not believe that this will involve increases in clerical effort, and it should save in the volume of computer printouts.

### **Traffic information**

3.37. A notable deficiency is the lack of information about the numbers of passengers carried. The introduction of Wayfarer has created opportunities for remedying this. Reports developed from this system so far are mainly for operational control purposes. We recommend that Ulsterbus should now define the management control information (perhaps using graphics) needed by Depot and Area Managers. We make detailed recommendations on this subject in Chapter 10.

3.38. The companies considered that the use of route costing in the circumstances of Ulsterbus and Citybus, as a main means of control, had a number of practical and theoretical drawbacks. However, we are glad to note that in future the companies intend to employ route costing as part of their information system. We address this in more detail in Chapter 4.

### **Engineering systems**

3.39. The engineering departments need better comparative information on how much things (eg engine overhauls) cost. There should be a system of unit and common costing for the engineering departments. We address this further in Chapter 7.

### **Computer services**

3.40. One of the companies' problems in the past, affecting their management reporting, has been the difficulty of retrieving data for analysis once period reports have been created. This has led to some managers' requesting copious monthly printouts in case they might need the data at a later date. The companies have ordered new computer hardware and are purchasing new software. They told us that they have as an objective the provision of a straightforward and user-friendly service to operating departments. We recommend that they should plan carefully to ensure that full use is made of modern database techniques and of the computer enquiry language which has been purchased.

3.41. We identified a number of functions, to do with the application of computers in the companies:

- (a) advising the Managing Director on how computer applications can best support corporate strategies;

- (b) recommending, annually, to the Managing Director, for submission to the Board, a medium-term computer development plan;
- (c) recommending for the Managing Director's approval major computer projects (hardware and software) based on an analysis of costs and benefits;
- (d) defining the format for proposals for computer projects, which should include an implementation plan; and
- (e) overall monitoring of the medium-term computer development plan, and of individual projects, and recommending action if called for.

It is important that there should be a strong input from the users of computer services into these functions, and we recommend that the companies should ensure that this is so. We were told that responsibility for these functions had been given to the recently set up Computer Steering Committee, which should help to achieve this. The companies will have to be careful that, in allocating tasks to this committee, they do not permit it to usurp the authority and confuse the responsibilities of line managers.

3.42. We cannot say whether the companies made the best choice of new computer hardware. In our view, the selection process was insufficiently disciplined and relied too heavily on the groundwork undertaken by the companies' existing supplier. We recommend that in future a specification, covering all aspects competing proposals are expected to address, should be drawn up by the companies at the commencement of the selection process, and proposals thus judged against predetermined criteria.

3.43. The companies told us that they expected to meet most of their future software requirements from proprietary packages. This should be the best approach.

3.44. Small enterprises like Ulsterbus and Citybus cannot be expected to have in-house a full range of specialist computer expertise. We recommend that they should consider, when appropriate opportunities arise, the benefits which the use of outside suppliers such as consultants and computer bureaux might provide.