

Norman Eason's “Maintenance and Asset Management Information Systems”

When does the implementation of a new software system end?

Get the answer to this one wrong and problems follow, as explained in this chapter

Chapter 10

Evolution

As we saw earlier in this book, when a maintenance or asset management system is being implemented by a vendor for a user organisation, a common mistake is for both to consider the installation of the software and the loading of the static data as **the project**. All costing and time measurement is aimed at the successful completion of these tasks. This is invariably due to the prevailing culture of software implementers – a culture that has existed ever since the start of software as a commercial or industrial activity – which considers **their part**, the software part, to represent the major milestone of any project. This has led to a common belief that it is the **only** milestone and, in fact, the *raison d'être* of the project. As we shall see in Chapter 14, this attitude can lead to major problems in the perception and the successful implementation of projects.

System Implementation

Organisations that recognise the fact that the project actually stretches well beyond the implementation phase are very much in the minority in relation to the very many organisations that are installing maintenance and asset management systems. Many otherwise capable and successful organisations continue to take a short-term attitude to software implementation.

Does your board have sufficient awareness to comprehend and monitor software activities?

Perhaps a briefing is in order?

The situation defies logic, because it is against the obvious original requirements of the system as it was defined when it was originally justified. It results, however, from a number of factors. These include the relative lack of understanding of maintenance and asset management at the board level in most companies – even in large, internationally known organisations. This lack of understanding often extends to software awareness. I'm not suggesting that board members must have extensive knowledge of software processes. I would, however, expect them to have sufficient awareness in order to be able to comprehend and monitor software activities themselves and not rely on an 'expert' to tell them what is going on. This separation from software knowledge, and often also from involvement, results in an attitude which is more akin to the control – or otherwise – of a black art than of a process which is aimed at improving a business operation!

Now, if you combine this lack of knowledge of software processes and deliverables with a lack of knowledge – and interest – in maintenance and asset management, then you have a situation that is much worse than is apparent from either of these individual failings.

In this situation, projects are measured by deliverables which are either tangible, quick to achieve (quick wins) or easy to understand. Thus a project that starts off in the correct manner very often slides into a condition where effective control is lost.

As identified in Chapter 3, if the system and its data are not effectively managed after the

Are you always at the 'starting gate' but never running the race?

Many organisations implement new systems every four or five years because of the wrong attitude to implementation

implementation of the software, the data is likely to deteriorate, the respect for the system decreases, and the staff become demotivated.

Many organisations that arrive in this situation blame the software and its supplier, obtain approval to purchase a new system, and start the process over again. I know of several organisations that have implemented new systems every four or five years because of such an attitude.

Now if an organisation recognises that the completion of the implementation of the software does not represent the completion of the project, it will also recognise that the project timescale will extend significantly beyond the point at which software is implemented. This is because of the time that it will take to obtain the information that will determine whether or not the system is a success.

I have never yet come across an organisation that justified a software system purely on the ability to develop, install and load data onto the system! Part of the justification – and surely the primary objective – must be the eventual ability to successfully use the system and to derive benefits from its use. This takes time. It requires rigorous procedures for the ongoing management of the static data that was input at the implementation of the system, for the amendments and additions to that data, and for the dynamic data that is entered and updated by virtue of using the system.

Once this data has been entered, successfully managed, and its life cycle has been controlled (see Chapter 3), the success of the project should be able to be monitored by examining the information received from the system.

After installation questions that you need to ask—and answer

Compared to the initial stages of acquisition, implementation is BORING—it lacks the buzz!

Was it the information that was anticipated when the project was first mooted and an application was made for funds for its development and implementation?

If there is any shortfall in this information, what were the reasons for this and how can the information be improved?

Questions such as these enable the success of the project to be judged. Only once these questions are able to be asked – and answered – can the project be truthfully assessed. To try to assess the overall project earlier is to misunderstand the objectives, to be led by the perceived importance of parts of the project, or to succumb to internal politics. These politics invariably measure results by ‘quick wins’, which are not always beneficial in the long run, but which pander to individual agendas. We shall be considering this problem again in Chapter 14.

There is another reason for the aversion of organisations to this later part of the overall project. It is inevitably **boring**. It is much less exciting than the buzz that accompanies the procurement of software, the configuration to the organisation’s requirements, the transfer of the static data from the previous system, and the testing, acceptance and sign-off of the implementation. This surely is what it’s all about!

It certainly seems to be the stage at which abilities are judged and upon which career progressions are made. No wonder that it is the part upon which everyone – management and staff alike – concentrates! How often have individuals either been promoted or left an organisation for a better

As in golf—“follow through” is essential to a good shot.

Yet how often are the ‘professionals’ who were involved at early stages of the project taken off for other tasks leaving implementation in the hands of the less skilled and the less motivated?

job after the successful completion of the software implementation stage of a project? Yet that is only a part – albeit an important part – of the overall project. The remainder can be boring – it certainly will not be as interesting as the earlier implementation part – but it could be said to be the most critical part of the overall project. Without professional attention to the management of this latter part of the project, the overall objectives of the project are unlikely to be achieved and all the previous effort – and cost – will have been wasted.

Yet how often are the ‘professionals’ who were involved at the early stages of the project taken off in order to apply themselves to other tasks worthy of their skills, leaving the remainder of the project in the hands of less capable – and poorly motivated – staff?

Long Term Considerations

Let us assume that an organisation recognises that the project is not complete when the software has been implemented and the static data has been installed in it. It manages this data, and the dynamic data that is added by the workforce, in a professional manner and eventually it is in a position where it can say that, measured against the original requirements upon which it was justified, the project can be judged to be successful. All organisations that find themselves in this position will agree that there are some aspects of the project that they would do differently, given the chance to do it all over again. Despite these misgivings, would they now consider the project to be complete? Has the project achieved all of its objectives? And, most importantly, were the objectives themselves correct?

Implementation in Organisations falls into three categories—which one are you?

Here we must examine just how far organisations go with the implementation of such systems. Bear in mind that we are now considering those organisations that have displayed much more foresight than the norm by measuring the success of their projects against the original justified objectives rather than by the successful implementation of the software. These organisations can be divided into three categories.

Category 1. The first of these defines a new system to emulate their existing system, whether this is a manual system, a previous single software system or a group of software systems. In this case, a successful system means the emulation of a previous system with, perhaps, some modern features. Such a system has merit, but its cost of implementation must be measured against its predicted life, which may be much shorter than anticipated.

Category 2. The second organisation defines a new system in a way that considers the current needs. It also takes advantage of the facilities of the selected software package to improve their methods of working and acquisition of data, and incorporates as many future requirements as they can think of in order to extend the use of the system. This, obviously, is a much better strategy than that of the first organisation. But has it gone far enough? Remember that we are considering here the implementation of a new asset, an asset that has not only the capacity to improve an operation, but also has the capacity to disrupt future activities. The information system is the foundation for one of the organisation's most important and critical assets – its data.

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In more advanced systems, such as those used in an asset management environment, this is also connected to - and can affect - other important corporate data.

How far can the user organisation predict the requirement for maintenance and asset management data and the nature of this interaction? This begs the question of whether it is possible to predict what the organisation's business will be like in the future and what type of organisation it is likely to become. How can anyone predict that far? Isn't that a reason for not going too far with the maintenance or asset management system? Isn't that a reason for **failure**?

If you cannot predict what your business is likely to become or what type of organisation yours is likely to be in the future, who can? What about your software vendor? I'm not suggesting that he has a better crystal ball than you. What I am suggesting is that, in the field of maintenance and asset management, every organisation is on an **evolutionary** path.

Everyone, however, starts using a maintenance or asset management system at a level that is dictated by their history, culture, etc. Also, their progression in the use of the information system will depend on a number of factors that have already been discussed in this book. Unless an organisation is truly world-class, it will start off, and continue to be, somewhere along this evolutionary path. It therefore has some experience to offer to those at a lower evolutionary level and should be prepared to learn from those at a higher evolutionary level.

The role of the software vendor in the evolution of the system

Now a good software vendor should, by the innovative nature of his product and his ability to understand complex requirements, be able to attract world-class users to his system. In his efforts to ensure the continued use of his system by these world-class users, he should have extended its capability to adapt to the progressive needs of these organisations.

Also, he should have incorporated the many different ways in which such progressive organisations have to record, store, relate and use their information into his system. This should be backed up by documentation, training and consultancy experience. It would be reasonable to expect these options and facilities to trickle down through each level of maintenance and asset management activity that is supported by the vendor's product. Thus any organisation that starts to use the system should have the ability to progress in their use of the system as far up the maintenance and asset management structure as they are likely to require.

The use of the system should not therefore be targeted to achieve a planned set of functions and an identifiable analysis of data. It should enable this analysis to help define what type of maintenance or asset management system the user organisation is capable of progressing to, what data and information is required in order to achieve this, and what new facilities of the current system should be used. All this should be able to be achieved with the help of a good and capable vendor. After all, it really is in his interest to provide for this – think of the case studies that can be derived from it!

“An adequate information system must lead executives and managers to ask the right questions, not just feed them the information they expect.

That pre-supposes first that executives and managers know what information they need.”

*Peter F. Drucker
“The Information
Executives Truly
Need”
Harvard Business
Review on
Measuring
Corporate
Performance*

Category 3. The third category of user organisation covers those that recognise **that a maintenance or asset management system is a vehicle for handling the evolution of the organisation.** It provides data and information to **enable** changes in operation and to **handle** these changes. It is able to be adapted to cater for these changes and its vendor should be able to advise on and assist in the evolution of the system and ensure its effectiveness as an information resource.

Organisations evolve in different ways. Their **capacity** to evolve is different from one organisation to another. And their ability to analyse and use the resultant data and information will most certainly vary across a very wide spectrum. Yet the requirements of evolution are rarely considered either at the specification stage or during the implementation of these systems. This is such an important aspect of system ownership that it merits reconsideration when system procurement and implementation are addressed in Chapter 14.

Key Points in Chapter 10

- It is a common mistake to consider the implementation of a maintenance or asset management project to be complete once the software has been installed.
- It is common for directors to take a remote approach to the implementation of maintenance and asset management information systems. This is usually because they do not understand software and either do not understand or are not interested in maintenance or asset management.
- Projects are usually measured by deliverables that are either tangible, quick to achieve or easy to understand. Maintenance and asset management information systems do not fall easily into any of these categories.
- A project that starts off in the correct manner very often slides into a condition where effective control is lost.
- The funding for a project is never justified purely on the basis of installing software and transferring data; it is based upon the ultimate benefits that the organisation will accrue from the project. Yet many organisations consider a project to have been completed long before this stage is achieved.
- The most talented and highly-motivated staff are often taken off a project once the software has been implemented, leaving the remainder of the project in less capable hands and thus risking its deterioration.
- Many organisations have their new maintenance or asset management information system emulate their existing system. This can limit the life of their new system.
- Prediction of future requirements is difficult, but vendors should be able to help. They should have existing users who are more experienced and who have used the system in a more advanced manner. Thus new users should have a progression path.
- A maintenance or asset management information system is a vehicle for handling the evolution of the organisation.

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Maintenance Systems are never the first system to be computerised—how that impacts the choice and ease of implementation is discussed in this chapter

Chapter 11

Interconnection

When we consider the interconnection of maintenance or asset management systems with other software systems, two important facts must be borne in mind.

The first of these is that in any organisation, **maintenance was never the first application to be computerised.**

The second fact is that, whatever progress is made in the computerisation of an organisation, **the requirements of maintenance are seldom taken into consideration in the definition of the computing strategy.**

It is to be hoped that those organisations that have truly adopted an asset management strategy will have now corrected the second situation.

We are, nevertheless, left with the fundamental problem that maintenance and asset management information systems will always have to communicate with other software systems. What is more, for the foreseeable future, maintenance and asset management systems will have to communicate with these other systems **on their terms!**

The ease of interconnection depends on the attitude that is taken to maintenance and asset management

It is not difficult to understand – although it might be difficult to accept – why this should be the case. The problem stems from two basic traits in industrial society; the status of maintenance and engineering, and the predominance of financial measurement.

Maintenance Relationships

I am sure that I do not need to elaborate on the problems associated with the status of maintenance and engineering in society. The problem varies from country to country. It is a cultural thing and suffers from a total absence of logic; but perhaps this is my engineering bias rising to the surface!

Depending on the country, the attitude to engineering varies from total disrespect, through grudging respect to, in a very few countries, similar respect to that of a doctor or a lawyer. And maintenance activities have always been a couple of steps below that of engineering! It is only recently that higher degrees have been offered in maintenance and asset management and that young engineers have considered maintenance and asset management to be a suitable career.

Why do we have such a variation in the attitude of countries to what is in effect the same activity?

The answer must be in upbringing, education and perception; in essence, that word **culture** again. And perhaps here again the German word *weltanschauung* – how you see the world – is a better way of describing the problem.

As we saw in Chapter 9, cultural differences are fundamentally important in the selection of information systems for maintenance and asset management. Now we see it affecting the

Maintenance may be a 'minor' system—but the great number of other systems that it needs to interconnect with presents more problems than most

relationship between maintenance and asset management information systems and the other software systems in an organisation. Because of the perceived low status of maintenance (in the more enlightened organisations, this does not necessarily apply to asset management), any communication between maintenance systems and other software systems has tended to obey the rules of the other software systems and not those of the maintenance system. Interconnection thus becomes a problem for any new maintenance system. In fact, the problem is even greater for asset management systems, as we shall see later on in this chapter.

Maintenance and asset management systems, as 'late developers', have to communicate with those software systems that are already established in an organisation. This may be a considerable problem for any software application that is considered 'minor' in the hierarchy of systems in any organisation. However, when you consider the sheer number of systems with which a maintenance or asset management system has to communicate in order to be effective, the problem becomes potentially much greater than is common for other 'minor' systems.

Maintenance and asset management systems must communicate with finance, production, stores, personnel, purchasing, design, quality, safety, security, transport, and documentation. They must also comply with the requirements of very many external agencies, primarily with regard to health, safety and the environment.

When you look at the true interconnection of a maintenance or asset management function, it is not dissimilar to that required by a chief executive – except that it is invariably from the bottom up rather than from the top down, and is considerably lower-

“When conflicts arise, financial considerations win out.”

*Ray Stata, CEO,
Analog Devices*

paid! Thus we have the three problems of **late development** – when all the rules have already been made, **relatively low status** – which makes it difficult to influence or change these rules, and **multiple relationships** – which makes you wonder if the effort is worthwhile! No-one said that it was going to be easy; but no-one said that it was going to be so difficult either! But it gets worse! Consider the predominance of financial systems!

Financial Dominance

Whereas it would be difficult to think of an organisation that started using computers in the maintenance department, it would be equally difficult to think of any organisations that **did not** start with the application of computers to its financial operations. Whatever else is computerised in an organisation, there will always be a financial software system in place. This is now a given in most organisations and there is a valid case for arguing that this should be so. Finance, after all, is the motivator for virtually everything that happens in an organisation, so why shouldn't it lead in everything, particularly in the introduction and application of new technology? This would undoubtedly be the argument put forward by the Finance Director, and possibly by most other directors in a company. However, there is a real danger of taking too blinkered an approach to finance.

Finance is important, but the operations that contribute to the success or failure of the financial aspects of a company have requirements of their own that may be neglected if finance is made the prime driver of these activities. The best example of this is in maintenance where, if finance is the prime motivator, then the cost of the maintenance operation will be predominant. Measures of the success of the maintenance operation would include

“In most companies, the accounting system implicitly defines the information architecture. Other performance measures are likely to be informal – records that operating managers keep for themselves, for instance – and they are rarely integrated into the corporate-driven financial system.”

*Robert G. Eccles
The Performance
Measurement Manifesto
‘Harvard Business Review
on
Measuring Corporate
Performance’*

the time taken (and therefore the cost) for each job and the materials used on it – in other words, the traditional approach towards maintenance! As we have seen in earlier chapters, this does not take into consideration the contribution of maintenance to the effective operation of the plant and thus to the financial benefit provided by that plant to the company. It is essential to get the balance right. Just as it would be wrong to continue to do maintenance because it was always done that way, without taking notice of its effectiveness or the need for doing it, so also it would be wrong to suppress it purely on the basis of its cost.

Bottom Up versus Top Down

If we are therefore to pursue an asset management approach within an organisation, then it is essential that, although financial requirements should obviously be taken into consideration, the asset management software works to the advantage of the company. Furthermore, it is essential that its interconnection with other application software is appropriate to the ongoing requirements of the company. This requires a **bottom up** approach to the need for interconnection. If the reverse approach is taken - a **top down** approach - then the danger arises that the effort will be concentrated upon the **perceived requirements** of the maintenance or asset management system. Also, the needs of the existing systems rather than those of the maintenance or asset management system will dominate the interconnection requirements.

A bottom up approach, especially one related to an asset management information system, optimises the operation of the maintenance or asset management activity and the requirements for communication with every other software system. As we have seen in Chapter 2, this would be carried out

“Who in this organisation depends on me for what information? And on whom, in turn, do I depend?”

*Robert F. Drucker
The Coming of the New
Organisation
‘Harvard Business
Review on
Knowledge Management’*

with expert knowledge of the asset management operation and, because of the defined capabilities of asset managers, with knowledge of the corporate and interconnection requirements, including those of finance. This approach is much less likely to miss key interconnection requirements and will provide a cohesive integration of the asset management operation with other activities in the company. It is also more likely to cater for the ongoing requirements of the business and the changing relationship of asset management to these requirements.

Best of Breed versus Integrated Systems

So we have now considered the predominance of financial systems and their effects on the software structure of most organisations, and we have also seen the logic of a bottom up approach. We must now examine an area that is becoming very contentious in the procurement and implementation of maintenance and asset management system. This is the decision on whether to procure and implement a **‘best of breed’** system or an **‘integrated’** or **‘enterprise’** system. First of all, it is necessary to define these terms.

Best of breed

This is the term used to describe systems that excel in a particular application area, such as maintenance or asset management. The background to such systems is normally **extensive knowledge of the application area** and considerable experience of implementing successful system with clients who have progressed in their ability by virtue of their use of the system and the help provided by the vendor. The key aspect of the system is its ability to take the user far beyond his existing capability in relation to the application and its effect on the business of his company. These

Dealing with an enterprise system

systems are usually targeted at the maintenance manager or asset manager level.

Integrated or enterprise systems,

These systems, on the other hand, are corporate in nature and are almost invariably targeted at board level. They are usually derived from a financial system and have evolved to include Human Resources, Stores, Purchasing, etc. It is very much a top down approach and its major selling point is that all applications are integrated and have the same 'look and feel'. Thus there are no problems with the integration of applications and presumably training and documentation are considerably facilitated by the uniformity of every part of the system. Such systems are sold on the basis of this uniformity and the lack of interconnection problems.

It is very tempting for a director, faced with a corporate procurement decision, to believe that this integrated or enterprise approach would solve his problems. He could implement his major applications first of all, knowing that when the time comes to computerise his maintenance or asset management operation, he has virtually only to order the maintenance module from the catalogue. If he is not too familiar with the real requirements of maintenance or asset management, then that is exactly what he will do. And whether or not he achieves this will depend upon the status and effective voice of his maintenance or asset manager. This is a top down approach; it appears logical from Board level, and the Information Technology Department will undoubtedly back it because of the obvious benefits in regard to interconnection and support.

But isn't this approach contrary to all we have considered in this and previous chapters? Haven't

“Technology and markets are changing so quickly that it would be impossible to create a corporate master file, an encyclopaedia where every needed fact, every policy, every conceivably valuable piece of knowledge can be found with just a few clicks of a mouse.”

*Thomas A. Stewart
‘Intellectual Capital’*

we recognised the very wide diversity of requirements in different organisations? Haven’t we seen that these different requirements will also vary due to the stage that the organisation is at when it starts to use the system, and will also vary dependant upon its ability to use and benefit from the system? And we have also come to the conclusion that if maintenance is to be fundamentally effective in an organisation, then it must really become an **asset management** operation. This, in turn, is far from a minor operation that can be tacked on to a portfolio of application software. We have still such a long way to go before best of breed systems are able to cater for all of these different requirements in an effective manner that is easy to use. To accommodate these requirements, as well as providing total, seamless integration, at an affordable cost, is a tall order that has more likelihood of success on promotional literature than it has in any implementation. Maintenance and asset management information requirements are not simple and it is wrong to think of them as options of a larger system.

The problem of interfacing and integration must, however, be faced by ‘best of breed’ systems. This used to be a much greater problem than it is at present, or will be in the future. Older, legacy systems, written in various software languages and running on different operating systems, have largely been replaced by common languages and operating systems. However, some of these older systems still exist and are likely to continue for some time. These tend to constitute one of the arguments for the implementation of integrated systems rather than best of breed systems. Communication with even these systems is, however, not the problem that it used to be and the suppliers of ‘best of breed’ systems are well used to implementing such interconnection.

Either you can adopt sophisticated, complex systems to try to manage the complications, or you can simplify everything.

*Ricardo Semler
'Maverick'*

It is worth repeating the point made in Chapter 2 that asset management systems, by their nature, require considerably more integration than maintenance systems. We considered earlier in this chapter the need for maintenance and asset management systems to obey the interconnection rules of the existing software. With an asset management approach, the needs of the asset management information system must be stated and the **ownership** of each data item must be established. This will cause the interface with other software systems to become one of 'give and take', rather than perpetrate an attitude of maintenance management systems being made to 'take what it is given'.

Standard Interfaces

It was a wish of mine around a decade ago that standard interfaces would be developed between maintenance and asset management systems and the other major software systems in an organisation. This should now be even more feasible with fewer and more standard operating systems and languages. The prime requirements are now the definition of the data that is to be transferred, its ownership and the rules for transfer. It requires considerable enthusiasm and involvement from both user and vendor organisations. Perhaps it will happen one day! This approach would considerably simplify the interconnection problem and lower the whole life cost of ownership of software systems in the maintenance and asset management fields – and the same approach could easily be applied to other software applications. Only by such universal development will software, its inter-relationships, and the data and information managed by all the interconnected systems be able to be understood by more than the relatively few people who developed

it. If we do not make such systems simpler and more easily understood, the capacity for errors due to misunderstanding will shorten the lives of the software and of the overall systems and will reduce the effectiveness of the software, the systems and those who use them.

Key Points in Chapter 11

- Maintenance was never the first application to be computerised in an organisation.
- The requirements of maintenance are seldom taken into consideration in the definition of the computing strategy.
- Maintenance and asset management information systems have to communicate with other software systems on terms defined by these other systems.
- Maintenance and asset management information systems must communicate with finance, stores, personnel, purchasing, design, quality, safety, security, transport and documentation.
- The maintenance and asset management interconnection problem stems from **late development, relatively low status, and multiple relationships**.
- When conflicts arise, financial considerations win out.
- In most companies, the accounting system implicitly defines the information architecture.
- When considering the interconnection of maintenance or asset management systems with other corporate software systems, it is essential to take a **bottom-up approach**.
- A maintenance or asset management manager must determine who in his organisation depends on him for what information and on whom, in turn he depends for information.
- **Best of breed** systems are those that excel in a particular application area, such as maintenance or asset management.
- **Best of breed** systems are targeted at the maintenance or asset manager.
- **Integrated or Enterprise** systems are normally based on financial systems and promote seamless interconnection between corporate applications and a common 'look and feel' throughout their use.
- **Integrated or Enterprise** systems are almost invariably targeted at board level.
- Maintenance and asset management information requirements are not simple and it is wrong to think of them as options of a larger system.
- Asset management information systems must have a 'give and take' relationship with other systems rather than a 'take what is given' relationship.
- The prime requirements for interconnection are the definition of the data that is to be transferred, its ownership and the rules for transfer.
- Either you can adopt sophisticated, complex systems to try to manage the complications, or you can simplify everything.

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With the maturity of methodologies comes a new area of divergence to be considered when adopting a new or upgraded asset information system

“It is easy to come up with new ideas. The hard part is letting go of what worked for you two years ago, but will soon be out of date.”

Roger Von Oech

Chapter 12

Methodologies

This last Area of Divergence – Methodologies - is the new one. It wasn't considered when I defined the original six areas. It wasn't a factor then as it had little effect. There were methodologies around at the time but they, along with information systems, were relatively immature. Now, as with information systems, methodologies have matured and there is now a substantial industry surrounding the publication, training and implementation of a considerable number of methodologies – all aimed at maintenance and asset management.

It is not my intention to provide either positive or negative judgement on any of the past, current or emerging methodologies connected with maintenance or asset management. None of them will even be mentioned by name. This is partly because I do not wish to indicate a predisposition or otherwise to any of them. It is, however, mainly because I believe that methodologies should be treated in a similar manner to one of the other Areas of Divergence – Technology.

Technology is very much a moving feast. We also saw that the diversity of possibilities in using technology at any one time is extensive and that this could change significantly during the installed life of a maintenance or asset management system. If we overlay this technological spread and its change over time with another Area of Divergence – Evolution – we can see

that the ability to ensure that an information system is correct and appropriate for any organisation will require a combination of vision, analysis and decisive response.

While I would not wish to suggest that the development, implementation and use of methodologies in maintenance and asset management is in any manner comparable to the pace of change of technology, there is a real argument for treating them both in a similar manner when considering the needs of an information system.

Each methodology undoubtedly has its merits and has particular applicability to certain types of industry. Nevertheless, the likelihood that a particular methodology will meet all the requirements of any one industry throughout its life is small. Every industry has a natural progression in its requirements for methods and information. Its need for these, its ability to use them and its progression in their use will be different for each organisation. It is also possible that an organisation will outgrow a methodology either by moving on to the next logical step in its development or by embracing a much newer and current replacement methodology.

Serial and Parallel Progression

As well as this serial progression in the use of methodologies, we also have a parallel progression. There is no reason why methodologies should necessarily be mutually exclusive. They may be used either wholly in parallel or parts of one (or many) could be used in conjunction with a core methodology. We thus have the possibility of combinatorial and serial use of methodologies in support of an ongoing learning and improvement process for maintenance and asset management. All of this has to be supported by an information system that can relate to any changes resulting from movement of any of these factors!

“If you’re going to ask a division or the corporation to change its strategy, you had better change the system of measurement to be consistent with the new strategy.”

*Robert S. Kaplan &
David P. Norton
Putting the Balanced
Scorecard to Work
‘Harvard Business
Review on
Measuring Corporate
Performance’*

Methodologies therefore qualify as a fundamental Area of Divergence for maintenance and asset management systems.

So how should methodologies be handled by these information systems? First of all, it is important to understand at what stage these methodologies interact with the overall maintenance or asset management scenario. It is totally wrong for vendors to promote an information system as being compliant with one methodology or another. Such an approach is aimed at those systems procurers who have heard about a particular methodology being praised or publicised and thus believe that they should adopt it and, by inference, procure a system that identifies with the methodology. This demonstrates a willingness to move with the trend but does not necessarily indicate the application of expertise or logic.

Methodologies and the Maintenance Strategy

Rather than introduce the requirements of the methodology during the specification and procurement of the information system, it is far more appropriate – and essential – to consider the methodology (or methodologies) **at the time that the maintenance or asset management strategy is being defined.**

Here I must digress slightly to highlight a situation that is widespread in the selection of maintenance and asset management systems. Although it would appear to be totally illogical, many organisations – and I have come across many large, well-known and respected organisations that fall into this category – proceed with the procurement and implementation of a maintenance or asset management system **without first defining their maintenance or asset management strategy!** Such organisations

“If one does not know to which port one is sailing, no wind is favourable.”

Seneca the Younger
4BC – 65AD

inevitably take the view that the information system will either dictate the strategy (and, because of the reputation of the vendor, it must therefore be good and worth adopting!) or that the information system will be so flexible as to be able to adapt to the requirements of whatever maintenance strategy is ultimately defined. This is a far from uncommon occurrence that will be covered – along with other equally surprising approaches – in Chapter 15.

Once the maintenance or asset management strategy has been defined – utilising whatever combination of methodologies is appropriate for the vision and duration of the strategy – then the specification of the information system can take place. This process is described in more detail in Chapter 14.

Thus methodologies, albeit indirectly, influence the procurement, implementation and use of maintenance and asset management information systems. The divergence of types, application and evolution of all appropriate methodologies must be investigated and understood at the maintenance strategy stage in order to successfully implement and use these systems.

Key Points in Chapter 12

- Every industry has a natural progression in its requirements for methods and information.
- An industry's need for methods and information, its ability to use them and its progression in their use will be different for each organisation.
- Organisations can outgrow methodologies.
- Methodologies can become obsolete.
- It is possible to have combinatorial and serial use of methodologies in support of an ongoing learning and improvement process for maintenance and asset management.
- A maintenance or asset management information system must be able to cater for combinatorial and serial use of methodologies.
- The use of methodologies should be considered at the time that a maintenance or asset management strategy is being defined and should not be left to the stage at which an information system is being selected.
- Definition of a maintenance or asset management strategy is essential **before** the specification and selection of an information system.

Chapter 13

Traditional Approach to Product Development

Although at the time of writing there are some signs that the situation may be changing, as far as most vendors of maintenance and asset management systems are concerned, the development of their systems continues in the same manner as for the previous two decades. The technology has changed dramatically but the underlying motivation continues to be the same. The process is one of **evolution** rather than **revolution**. Although there are undoubtedly beneficial attributes of an evolutionary approach, most people would agree with Darwin that this is a lengthy process and one that is perhaps not particularly appropriate for the development of computer software.

Evolution versus Revolution

The tendency is for products to evolve from one version to the next according to either the requirements of the latest important user or the announcements from competitors. I have seen many products change in this way, resulting in a close match to the new major user's requirements or to the latest 'must have' feature. These, however, have often been provided at the expense of facilities that were important to existing users. Time and again, existing users of systems are faced with the problem that new versions of a product work in a way that will not support their specific requirements. Many users change vendors at this stage, despite the cost involved. For those who stay with their original vendors, using the older version for as long as it continues to be supported, there is likely to be an accompanying deterioration in their relationship with their vendor.

Yet this need not have been the case. As we saw in the previous chapters, there are many differing factors

In the absence of learning, companies – and individuals – simply repeat old practices. Change becomes cosmetic and improvements are either fortuitive or short-lived.

*David A. Garvin
Building a Learning
Organisation
'Harvard Business
Review on
Knowledge
Management'*

that really must be considered in order for a developer to satisfy the very diverse requirements of his chosen market. That he has not considered these Areas of Diversity and incorporated them into his product is **his** problem and should not be the user's problem. The diversity of requirements of the marketplace has been known and accepted now for almost two decades. If they have not been transferred into a wider capability within a vendor's product, then there must be a reason for this, other than the wish to satisfy the market. Does the vendor wish to target only a small part of the market that is encompassed only by the functionality of his product? And is this market further limited by the **manner** in which these functions interact? Because we all know that there are several ways in which a process can be implemented and that for any one organisation there will be business, organisational and statutory constraints on the way that things are done. Or does the vendor really intend to target **all** of the available market and has some other reason for not incorporating these Areas of Diversity in his products?

Let's examine these other possible reasons. Here I must state that I am not attempting to blame those vendors who fall into the category of evolutionary developers; I am trying to make prospective user organisations aware of what motivates these vendors to take this course of action.

The vendors will have identified the maintenance and asset management software market as one in which their applications and software skills could be profitably applied. Software development is extremely expensive, as also is the cost of marketing and selling the product. If a software product was originally developed according to a specific maintenance stratagem, then it is a long and costly process to re-write it in order that it can be capable of accommodating many different methods of working.

“Never reorganise except for a good business reason. But if you haven’t reorganised in a while, that’s a good business reason.”

*John Akers
C.E.O of I.B.M.*

Thus, no matter how popular a product has become, the fact that it has not been designed to accommodate a user’s particular method of working will mean that it will eventually become unsuitable for that user organisation. This is despite any customisation that is carried out prior to implementation in order to meet the user’s immediate requirements. Really effective analysis and development would have incorporated the user’s ongoing operational options as part of a generic approach to the problem. And here is the rub. This analysis and development is often not done because it is not in the vendor’s **immediate interest** to implement it. Vendor organisations are like most other organisations; they must continue to exist, make a profit and hopefully grow so that their value increases. And they do so by making the most of their existing assets, the most major of which is the software that has cost them so much to develop. They seldom take a totally lateral approach to their market and to their business.

Motivation

So what would you do if you were on the Board of a vendor organisation whose marketing manager has just requested that the existing software should be scrapped and should be replaced by a new system; one that is going to be much more complicated, will be more difficult to develop, will take much longer to develop, and will, of course cost much more to produce? You will want to know why the existing system cannot be extended to include the needs of the major user organisations. You will want to know why, to your knowledge, none of your competitors have taken such a drastic step (although you will never know whether they are in the process of developing such a product). And you will want to know how much further mileage can be obtained from the current software.

“When a new product comes to market, it changes the market, often in ways that are unknowable beforehand.”

*Dr. W.
Edwards Deming*

It will take a very strong and brave marketing manager to convince his Board that the extremely high expenditure will be worth it in the long run. He must assure them that he will be able to persuade new and existing users that it will be in **their** interest in the long run and that it will be worth the likely additional cost of the product and the wait for it to be brought to market.

Thus established vendors are in somewhat of a cleft stick. They have to continue to satisfy existing users while at the same time meeting the usually short-term requirements of their Boards. They are hampered by these constraints to a much greater extent than new software organisations entering the market for the first time. These new organisations, however, have to cope with the establishment of their credibility in the market and their possible lack of experience of the nature and requirements of the overall market. However, because they may be able to take a more radical and revolutionary approach and are not hampered by the problems facing more established vendors, it is quite possible that they could totally change the way that information is controlled in maintenance and asset management and thus completely alter the market.

Thus, for different reasons, the odds are stacked against a **revolutionary** approach to the development of a generic system that will take into consideration all the diverse but real requirements that are described by the Areas of Divergence.

User Aspects

The user organisations, however, are not entirely blameless in allowing this situation to continue. As in all other areas where computing has been applied, the users and prospective users of maintenance and

asset management information systems tend to follow fads. They tend to accept marketing material and presentations based on factors other than those which would have resulted from an in-depth appraisal of their own needs, the difference in these needs from other users (especially those in similar organisations but with different cultures) and the functional and operational differences of the range of products on the market. As we shall see in Chapter 16, it is astonishing how ill prepared users can be in their attempts to select software. Although many of these procurement projects can take years to investigate and implement, and employ substantial numbers of technical and I.T. personnel, the exercise is often based on decisions or assumptions that are totally erroneous. I have been asked to examine many of these projects and unfortunately, when these errors have been identified, there is often little that can be done to correct them. Thus the project gets completed and never achieves the criteria upon which its funding was originally justified. However, that realisation usually comes long after the software implementation project has been completed, the vendor has been paid, and the project team has been disbanded!

Here we have perhaps the crux of the problem; short-term viewpoints on the part of both the vendor and the user, both feeding on each other and combining to prevent a long-term solution to the problem. Only by taking a **revolutionary** approach to the problem will either or both be able to break out of this straightjacket. As I have said before in this book, maintenance and (especially) asset management information systems are fundamentally about the capture and use of information that can be used to improve the quality and effectiveness of the operation. They must therefore be dynamic and adaptable to suit the changing needs of each user organisation, no matter from which stage they start and how capable the user organisations are

at using the resultant information and changing their processes to suit. This requires considerable foresight on the part of both the user and the vendor. The user's foresight, however, can only be expected to take him a short way into the life of his installed system, as nobody can fully predict the future. The vendor, however, should have the ability to see further, based upon his experience with other more advanced users. While he would not be expected to accurately predict the exact route that each user will take along the path to improved operation, he should be in a good position to define and incorporate all the possible options into his product. He would thus be able to truthfully claim that his product is generic. With these facilities available to him, he should then be in an excellent position to advise each user organisation on the best possible route to follow.

Only when a vendor recognises that for each user the entry conditions for using the system, the way in which the system will be able to be used, the ability to learn to use the system and the rate and manner of growth in the use of the system will make that user organisation unique, requiring individual treatment, can that vendor be considered to have adequately addressed the maintenance and asset management market. He must then incorporate this understanding into his product.

Key Points in Chapter 13

- Despite availability of new technology, development of maintenance and asset management systems has continued in much the same way that it has for the last two decades.
- This development is predominantly **evolutionary**, i.e., it is based on changes to the immediately previous version, rather than **revolutionary**, in which case it would be based upon a radical new approach to the spread and diversity of the market.
- Evolutionary development is usually driven by the needs of the latest important user or by the latest announcements of the competition.
- Product evolution that is driven by either or both of these factors usually results in dissatisfaction amongst existing users.
- Vendor organisations have known the diversity of user requirements for almost two decades.
- It is important for user organisations to establish why a particular vendor has not comprehensively addressed the diversity of user requirements within his product.
- Inclusion of comprehensive functionality within a vendor's product is important, but is insufficient; he must also address the different ways in which these functions interact.
- It is extremely difficult and costly to incorporate a new stratagem into an existing software product.
- Incorporation of all possible scenarios represented by Areas of Diversity is possible in modern software, but requires a re-write of a maintenance or asset management system.
- Software re-writes are expensive, lengthy exercises and have long pay-back periods.
- Software re-writes are difficult to justify to Boards of Directors.
- Software re-writes are seldom done and the evolutionary process continues.
- Radical software is possible from new vendors, but these new vendors may have to overcome considerable credibility problems.
- Radical new software, if it can overcome its birth pangs, may be the way that the market will move.
- User organisations often enter the procurement exercise in a very unprepared manner.
- Procurement projects often reach a stage when they will never be able to achieve the objectives upon which their funding was approved and the realisation that this has occurred takes place much later.
- Many of the problems in the procurement and implementation of maintenance and asset management systems are due to short-term viewpoints by both the vendor and the user.
- Maintenance and asset management system must be dynamic and be able to cater for **any** functional requirements or the manner in which these functions interact. The ranges of these are predictable by the vendor.
- Only when a vendor recognises that for each user the entry conditions for using the system, the way in which the system will be used, the ability to learn to use the system and the rate and manner of growth in the use of the system will make that user organisation unique, requiring individual treatment, can that vendor be considered to have adequately addressed the maintenance and asset management market. He must then incorporate this understanding into his product.