

Software as a Long Term Investment

by Birket Foster
M.B. Foster Associates Limited

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1. Know Your Business
2. Chart Your Systems
3. Select Your Priorities
4. Choose Your Software
5. Review Your Software Implementation Plan
6. Conclusions

These are the main sections of this paper, and form the basis of a framework for planned acquisition or creation of software to support a business. The role of the information systems department is a support role. The objective of the information systems department should be to deliver the software which supports the business decisions made by the organization. The key is to do this in the most cost effective way possible just as any other section of the business would perform their role. By ignoring the "Black Magic" aspects, which used to be associated with the data processing profession, and concentrating on treating software as a long term investment, better business decisions will be made. The software investment is to be made in the same way as justifying a new piece of equipment. Based on the long range business plan the costs and benefits, as well as the return on investment is to be calculated for each software project. Since the plan is long range the investment can take into account the long range information needs and grow with the company.

1. Know Your Business

The history of data processing is full of unsuccessful projects, continuing projects and ever-changing projects. If many of these situations were examined it would be found that the data processing department was not aware of the direction the organization was going in, nor of the information needs of the users of the system.

In order to treat software as an investment you have to examine the corporate business plan. Software is supposed to support the business operation. To be able to support the business the software must be there ready to run when it is required. The longer time frame that the business plan covers, the more likely that the long range information needs can be taken into account.

If the business plan calls for doubling the volume of sales over the next two years, the software should be capable of handling the increased volume of transactions necessary to support it. The solution in some cases is to buy a larger machine, more terminals, more disk or more memory. The hardware expansion should be phased in in increments appropriate to the business's growth. Even with the expansion of the hardware, there might be software limitations. The modifications to the software to adapt to the increased volume might not be necessary if the software is designed from the start with an eye on expansion.

The information systems department (ISD) must be included in the corporate planning sessions. The corporations which intend to survive in competitive marketplaces have to be able to use the data they can collect in innovative ways to make better decisions. By including the ISD in the planning sessions, the systems to deliver this information can be identified, designed and implemented with the overall corporate plans and objectives in mind.

2. Chart Your Systems

As part of the planning exercise the organization can identify the systems required to run the business. The systems fall into the three categories identified by Peter F. Drucker - Operational, Managerial, and Strategic information systems. The operational systems are the ones which do the tasks required for day-to-day operations such as purchasing, invoicing, order entry etc. These systems will exist to a greater or lesser extent in any organization. The systems may well even be manual systems or a combination of manual and automated.

The next level of system is managerial which is usually a summary of the information captured at the operational level. The management decisions are made based on this information. The key to getting this information collected is to know the decisions that the management will be making and ensuring that the data is captured. By examining the corporate wide information needs the ISD will be able to determine the best way to organize the data to support both the operational and managerial decisions.

Certain of this level of information may come from outside corporate boundaries (for example Credit Rating information) and must be integrated into a corporate data plan. Each of the various systems must be identified and then the major functions identified. A matrix type arrangement for identifying the users of the data, the providers of the data can be quite helpful. Each system description should include the manual as well as automated flows, the sources and destinations of any data, including the flow into other systems. The volumes of data, the timing and the expected growth over time should also be included.

The highest level of information is that which supports the strategic planning. Most of this information will come from outside the corporation and will be married with highly summarized information (trends) from within the corporation to assist in the long range strategies. This level of information is also used in the goal setting process.

The key to developing the systems to support all these levels of data is to design the data structures carefully. There are several authors who have written about how to implement the structures. One of the books which we have found most useful is "Strategic Data Planning Methodologies" by James Martin. The basic fundamentals behind this book are easy to follow and the book can be used by both Data Processing departments and User management. The matrices which are developed in the course of the analysis can be used to assist in the maintenance of the system as well as to assist in the documentation of the system.

The step-by-step approach developed by Michel Kohon (Supergroup july/aug) will assist in using the matrices in the most effective manner.

3. Select Your Priorities

Knowing where the current systems stand is the first part of the battle. Now the problem becomes to chart the plan for getting the information systems in place to be able to support the business plan. As with any other business decisions the problem of limited resources will apply. There will be choices to be made in terms of allocation of funds, use of manpower, availability of equipment and all of this will be constrained by time factors. From the list of necessary systems a priority should be established. This is a business decision and should be made to get the best return for the dollar.

When selecting the priorities choose your options carefully.

-Remember to weigh the risk involved in developing the system.

If the system is critical to the business remember to allow for the resources to ensure successful completion. The users are considered to be a critical resource in all systems development projects and in software selection and package implementation. By narrowing the scope of a project an incremental approach to implementation can be taken. Since the plan will have identified all the necessary functions and data this approach will allow a creeping commitment with results coming earlier as sections of the system are completed. When accounting for the risk include user time, training time, testing time and all other costs associated with the implementation. If this is not done the cost of the project, and the cost/benefit analysis as well as the true investment at stake will not be properly defined.

-What would be the time to redo the system if this was required?

It is possible that even with prototyping the system originally envisioned will not be the system required. If this is the case the incremental approach will allow the minimum investment of resources and the maximum flexibility in development options.

-What would be the effect on normal business operations if the system is late being delivered or fails completely?

Just in case it would be helpful to have a contingency plan ready and to know what job functions will be affected. What system will be used if the scheduled implementation dates slip? Given expected volume, computer resources available and manpower, would the

normal business operation be able to continue with business as usual? How long could this be kept up at what cost?

-What is the upper management commitment to this system. The commitment should flow from the long range planning exercise and must be there if the system is to be a success.

If upper management is not convinced of the importance of a system, the resources required to complete its implementation may be hard to acquire. To deliver a system aimed at other than upper management is to invite trouble. The management of an organization must determine the entire nature of the business including the priorities for the Information Systems Department. Since the ISD is a support organization let the management call the shots on the priorities and choose what should get done when.

-How does the system effect the overall plan? Are there other activities which depend upon this systems completion on-time?

The more systems are implemented in parallel or in small segments serially, the more important project management will be. The importance of any system to the rest of the information system plan must be recognized and the appropriate resources allocated. The higher the risk the more precautions to ensure success should be taken. By recognizing the potential risks, the contingency plans can be put in place to assist the implementation schedule.

-Have the long term integration plans been taken into account? Have all the bridges been identified?

Most systems are not standalone in a corporate information plan. Be sure that the analysis has identified all the interfaces. If the system is evolving, be sure that the "bridges" to get from one stage to the next have been identified. All implementations should be thoroughly planned to ensure that normal business operations continue with minimal disruptions. Each stage of implementation should take into account the future of the system so that redoing or retrofitting is minimized.

When selecting the priorities remember that the objective is to get the best return on investment in the shortest possible timeframe.

4. Choose Your Software

The software can either be made or bought. Today it is usually more effective to buy packaged software than to attempt to create systems from scratch. Most applications have already been created for the HP-3000 and can be purchased and maintained for a fraction of the cost of doing them in house. Software

selection is often best when the user is the driving force. The following points should be borne in mind:

The long range plan may call for systems which have to be integrated. Make sure that the systems is capable of fitting into the plan.

Beware of multiple vendor situations especially if the systems have to be closely coupled. On the other hand a single vendor should have available all or most of the systems you require for the long range plan. Buying a fantastic GL with no interfaces to other systems may be more of a hinderance than buying a good GL with good interface definition.

All costs including hardware, conversion, software tools, training and manpower should be identified so that the estimated cost of a system can be budgeted for and the real return on investment measured. These real costs should be used as feedback into any cost estimation process. (We should learn from mistakes).

With the market trend towards micro computers comes new opportunities to allow the user better data manipulation capabilities. If the best opportunities for cost effective systems involve a combination of micros and minis then the software will have to fit several different criteria. Software projects on a micro are quite often completed by using the available packages or by using fourth generation tools. The cost invested in a micro based project can be considerably less than on a mini, but the user must be made aware of the risks and must be willing to take on tasks such as backing up data, which were previously the duty of the data processing department.

The most important trend in the computer technology today is the micro-mainframe interface. This calls for any application which is being designed to take into account the needs of all levels of users. The reports at the senior management level require highly summarized data with short retrieval times. The databases designed to accomodate this level of reporting will have to allow for summarized information. The reason for the popularity of such packages as Lotus 1-2-3 or the other Visi-clones is that the results of what-if analysis are available almost instantaneously. The new data structures will allow for the transfer of the information needed for these kinds of analysis with the minimum of difficulty. Choosing software combinations which allow for this activity will become increasingly important.

Other trends which will affect the way software is chosen are micro-networking and Unix like operating systems. The combination of

these trends leads to some very powerful configurations. The rumour that HP may have developed a 48 or 64 bit operating system should clue those looking for long-term software investment to be aware of what is the transportability of their systems. The use of languages such as "C" or Pascal may come into vogue to ensure this compatibility. Using 4th generation languages to create programs in these languages will become more important. Even COGNOS (formerly Quasar Systems) is beginning development in "C" with an eye to the future. As processors become more powerful and memory and disk storage less expensive it makes more sense to aim for systems which are easy to maintain and quick to build. Prototyping is the way of the present, the way of the future is for the user's to assist in customizing the templates for applications provided by the software tool suppliers.

Networking micros will free the mainframe (mini) from many tasks and its role will become that of a database machine. In this role it will provide data to the user's and handle the number-crunching power required for such activities as month-end invoicing etc. By 1989 over 25% of the micros are expected to be portable. These are already showing up with portable hard disk (the Eagle Spirit and the Compaq portable with 5MB) are just part of the new generation of micros. (It is interesting to note that both Bytec makers of the Hyperion micro and Compaq are using their in house HP 3000's in conjunction with the micros to help run their businesses.)

The software development will be done with an eye on the long range corporate plan, using packaged software and 4th generation development tools (sometimes called productivity tools). The objective is to make the investment in software easy to maintain and flexible to the changing corporate requirements.

5. Review Your Software Implementation Plan

Your plan is your guide but must be reviewed from time to time to make sure that changing circumstances have not changed the corporate priorities. By implementing on an incremental basis the risk is minimized. From time to time systems which are underway will have to be scrapped. The fact that systems are prototyped will speed the implementation process but will not change the fact that the system development team must be aware of the business and its long term goals and objectives. A continuing string of prototypes or partially developed systems won't buy success. Do it right the first time is still the motto even in today's world of application development.

If the need for a system changes the development group must be made aware of the new priority as soon as possible. A plan is not cast in concrete and should be adjusted as needed. The development should be user driven according to the business needs of the organization, in accordance with the long term goals and objectives. These needs should be addressed as a business decision in each case and changed as a better return on investment of resources becomes evident. By using the step-by-step method or similar results oriented, short run project philosophy the risks will be minimized.

The overall plan should be reviewed regularly and changed accordingly. The investment in information systems must be considered carefully and forced to deliver quantifiable results. The investment should be made cautiously remembering that as the business changes so will the information requirements. The basic (general) information requirements should be satisfied first as they are unlikely to radically change over the course of the years.

6. Conclusions

The recent recession has caused many organizations to rethink their entire way of doing business. The value of accurate and timely information has been recognized. The cost of delivering this information is becoming a major part of organizational budgets. The short run fix is too costly a solution as many organizations have spent too much time developing and redeveloping the same system. The cost of planning a long range information strategy is much less than the cost of maintaining a continuous development environment. The cost of implementing a system includes the user involvement, the systems department involvement as well as the hardware cost. More often the investment in planning will be placed in corporate budgets and fully costed.

The "Small World" will have its impact on the way organizations operate. For this reason software which can interface micros with mainframes (minis) will become a necessity. In some cases it will be possible to run a software package on both the micro and the mini. In most cases the transfer of data will be most important.

The use of database machines (such as the one Eugene Volokh is working on) will become more and more important. Accompanying this trend will be the use of more powerful software to be able to retrieve data in the format required quickly. DISC's IMSAM product allows very rapid retrieval of data using a variety of methods. This speed is due to the use of a B-tree structure, something which has been showing up in most relational databases.

The long term will be the framework for each implementation which takes place. Whether

the software is made or bought, the user will be more involved than ever and upper management will want the best bang for the buck. The information service centre of a corporation is going to have to compete for the organizations budget dollars just as every other department. Necessity is the mother of invention, so you can bet there will be a great deal of imagination applied to how to extract the most out of every bit of data available to the organization. The systems department will work a lot more closely with the users. Its a small world it just goes a lot quicker, but it's evolving as it should.

Birket Foster is based out of Ottawa. He was instrumental in developing and implementing

the initial marketing strategy for Quasar's QUIZ product. He is chairman of SIG-SOFTVEND the special interest group for software vendors. His company provides marketing planning and support to software vendors and software selection services to users. THE CATALOGUE, a comprehensive publication describing the third party HP3000 software is published by M.B. Foster Associates Limited. This paper was word processed using a HYPERION Personal Computer which uploaded it to an HP3000 using its built in software and modem. The HYPERION was designed and built in Ottawa to be IBM-PC compatible by the BYTEC group.