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End of the beginning: The fizzle of the Computer Revolution

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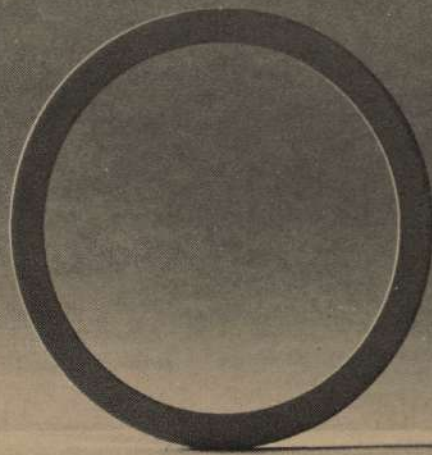
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*The End
of the
Beginning*

*The Fizzle of the
"Computer Revolution"*

by Arnold E. Ditri and Donald R. Wood

*The End of the Beginning –
the Fizzle of the “Computer Revolution”
is available as a 32 page spiral bound brochure
and colored slide presentation.*

Foreword

For the last four or five years, the national media have bombarded us with dire warnings about what has been characterized as “the era of radical change.” Many of us have become dulled to the realization that what is being said so often, and often so ominously, is usually true. We tend to treat the notion of exploding change as a tired cliché of speechwriters.

Our runaway technology has indeed mounted a massive assault on some of our most treasured traditions and value systems: our concepts of morality, of work, of human organizations, of education, and even of life itself. Yet only rarely, as when we are stacked up with a dozen other planes over an airport already obsolete before it is finished, do we actually perceive the evidence of change ourselves and identify it for what it is.

Passive awareness is one thing. Perceiving the implications of change with accuracy is quite another thing. Change has a way of disguising itself to look like something else. A campus disorder, a new corporate conglomerate, a computer installation, a smoggy day, can be dealt with separately, as unrelated problems. But they are not unrelated.

There is an inextricable kinship linking such disparate phenomena of change together. Each, and all, are manifests of the truth that our generation has already experienced more radical change than any other generation in human history. And we have seen only the beginning – if we stop to see at all.

Change is nothing new. What is new is the changing pace in the pace of change. After observing the first five decades of the 20th century, Walter Lippmann recently wrote of the sixth: “We are in

the midst of the most radical revolution in the history of mankind. That revolution is changing the way men live, not only their work and their houses, their food and their communications and pleasures, but even the structure of the human family, and the chemistry of the human personality.”

It is the contention of the authors that if we are indeed in the midst of a revolution, we would do well to try to perceive the specific telltale signs and omens of change in the daily problems that confront us. When we can identify a problem as a problem of change, with its roots in that “revolution,” we should be able to act accordingly – and quickly enough to keep in tune with our changing times.

Certainly, not the least of the imperatives of change is understanding new tools and how to use them constructively. As a tool of change, the computer has become almost symbolic of the dimensions of exploding newness. These pages concern themselves with that tool and its impact on American business life.

There can be little doubt that one day the computer will achieve its potential in American business, helping us progress at the new speeds that the new times and new realities demand. Yet, as these pages postulate, there is no room for doubt that, until now, the realities of its application have fallen far below that potential.

These pages are an examination of what happened and what might correct the errors of the past. It is the authors’ hope that they may help provide a useful guide to action toward the abundant benefits possible when this startling technology will achieve its full potential.

A.E.D.
D.R.W.
July, 1969

I

THE COMPUTER: A SYMBOL OF CHANGE

It took the airline industry almost 40 years to come of age. It has taken the computer industry somewhat less than fifteen. Computer technology crept into our business lives very slowly in the Fifties; and then a few years later we found it suddenly beginning to turn tradition upside down in almost every facet of modern industrial society.

In just a few short years, questions about whether or not a company should acquire a computer system have virtually disappeared. Today's questions are more nearly "How big a computer do I need?" or "How do I make my computer system work better?" In a hundred percent of the top five hundred companies, and virtually all the rest of American business of any size at all, the systems function has already become as necessary, as much an irrevocable factor of daily business life as marketing, distribution, or production. This instrument (and the extraordinary new notions about the running of a business which come with it) is no longer a luxury for those few who can afford it. It has become a necessity for competitive survival.

The Beginning: Its Potential

From the beginning, perceptive businessmen perceived the enormous potential of the "analytical engine" which could organize information virtually at the speed of light. They saw that it provided a new kind of incredibly fast control over the mushrooming complexity of running a business organization. A far-sighted few saw that this startling new technology could, and would, eventually affect everybody and everything in a business — vertically, from worker to president and horizontally from finance, to production, to personnel, and so on.

The Beginning: Its Results

It would be heartening if it could be claimed that what happened during the coming-of-age period of this new technology was commensurate with what could have been accomplished. But

when one carefully studies the actual facts, and not the publicity, one is forced to the realization that, despite the billions of dollars already spent on computer technology, and the millions of words written about the "computer revolution," the "beginning" was actually a fizzle.

One does not have to scratch very far below the surface, in company after company, during those beginning years, to find one story after another of runaway costs of EDP, of interdepartmental antagonisms it created, of wasted efforts, of misguided applications, of systems installed months and years behind schedule at double the originally anticipated costs, with marginal benefits after all the effort and expense. As one dismayed manager said, speaking of his systems group, "their eyes are bigger than our stomachs."

A prominent consulting group has stated that two out of every three computer installations in the country to date have been disappointments. Yet while this may be true, there have been remarkable achievements in computer and systems technology during the beginning at AT&T, at Boeing, at Chrysler, at Westinghouse, to name only a few.

So while it may be correct to say that the computer revolution has been a fizzle, it has been so in comparison with what might have been achieved, had we known in the beginning what we know now.

The End of the Beginning

With the benefits of today's perspective, it is evident that the computer revolution has now come so far along that we need not accept excuses for its immaturity. It is time for the systems function to stand up and be counted as a responsible grown-up in the business community, competing for company resources with every other business function, in a business like manner.

If the disappointments of the beginning were natural growing pains of a brand new kind of tech-

nology, those days are over. We've come to the end of the beginning.

After the End of the Beginning

From here on out, the systems function must

become deeply and efficiently integrated into the fabric of the management of virtually all business. A management capable of effecting such integration must be a management capable of adapting to changing times. It must be a management of change.

II

THE MANAGEMENT OF CHANGE

What are the criteria which distinguish a management capable of adapting to the demands of a society exploding with change? Obviously, there are no simple, universally applicable answers. But it has been our experience that there are certain common characteristics present in companies that are effectively — and continually — adapting to change.

A State of Becoming: A First Imperative

In his book, *The American Challenge*, French journalist Servan-Schreiber noted that truly contemporary American management is one dedicated to becoming, not merely being — a management preoccupied with new ways of doing business which do not now exist, but must exist if a business is to stay ahead of the times. A dedication to a state of constant becoming is a quality one finds everywhere one finds successful adaptation to the new. It is a first imperative for the management of change.

Prudence in Innovation: A Second Imperative

No matter how great the pressures for change, even the most contemporary management can never forget its fundamental responsibility to maintain order and to avoid reckless innovation. Progress, as Whitehead has noted, is the maintenance of order amid change, and the creation of change

amid order. An effective contemporary manager must not only know when, but also how to create controlled change. In any innovation there must be objectives, planning, methodology, system, and results. Prudence in innovation is a second imperative for the management of change.

Management is People: A Third Imperative

No matter how much innovation a manager of change may have established, he must always remain sensitive to his company as a living organism. He can never forget that management is always of people and between people. His judgments and decisions must always include considerations of the people who furnish him his facts, as well as the people his decisions may affect. And he must never forget that he himself is a person — with human insights and intuitions and wisdom no technology can ever duplicate.

It has been our experience that wherever one finds a management successful in adapting itself to change, one finds it highly sensitive to its people. Remembering that management is people is a third imperative for the management of change.

Machines are Machines: A Fourth Imperative

The more a computer becomes involved in a management's plans for change and innovation, the

more important it becomes that such management carefully distinguish between the world of the machine and the world of people.

It is critically important to remember that the computer is a square. The only work it can perform must be absolutely logical, unambiguous and precise. Computer programming must be impeccably logical and precise — or the machine will print out “garbage.” While the machine may perform many millions of operations in a second, each of those operations involves one simple yes/no decision: signal or no signal. Neither in logic nor electronics is there such a thing as “maybe.”

“Maybe” is a purely human notion, which the square machine and its square programming simply have no way to cope with. Human judgment requires more than reasons; it often involves an irrational mixture of reason, vision, intuition, fore-

sight — and sometimes even courage. The computer can help human decision-making only in that part of our thinking processes which is purely rational.

And so, as the management of change increasingly involves itself with the computer and the systems function, a fourth imperative for effective management of change is remembering that the machines are simply machines. Some factories can be run by machines. Organizations cannot.

Management of Systems

Before we address ourselves to specifics of the management of the systems world, we must first be clear as to exactly what that world is. Is it a world by and of itself? Is it a world in which the computer sets the rules? Is it a purely technological function? Or can it be turned into a business function?

III

THE NATURE OF SYSTEMS

The very first step in an examination of the systems world urges one to leave the term “EDP” behind, as an obsolete acronym belonging back in the beginning. The world of the computer has moved into infinitely more complexity, sophistication, and significance than mere electronic data processing, where it began. Today — and certainly tomorrow — the computer is involved in new levels of interaction of people with each other and machines and is bringing sophisticated new systems to that interaction. So we suggest that henceforth we use the term “systems” to describe that process, as well as the profession of the men who work with and manage it.

The Business System

Men have always had systems, of course, whether they identified them as such or not. Most of

them grew out of habit and practice, in an ad hoc way. But as the 19th century developed the concept of big business — big steel and big railroads — more formalized and explicit systems began to appear. Taylor came along with his concept of time/work studies and the systematic scheduling of men and machines to increase production efficiency.

Then came the mass production revolution, which was followed by the systematic development of the distribution and sales function. Increasingly, as business, industry, and government grew in size and complexity, the need for and use of systematic planning and operation grew.

The trend to systems thinking got a tremendous boost during World War II. But always, it maintained one striking characteristic. Each system was confined to a single function of the business. A production system was designed by production

people to control production men and machines. A marketing system was designed by marketing people to increase sales efficiency.

Each system was embedded in the functions for which it had been created. If it generated information, the information was primarily for internal use, inside its own house. Accurate information was very hard and costly for top management to get, and often came in too late to be of any value except historical reporting.

The Information System

Then the computer arrived, with its new capability to process huge amounts of information at lightning speeds. And with it came the notion of information systems, and the somewhat radical notion that if we could achieve adequate control over the systems of information, we could achieve much greater control over the things the information described. If a company, for example, developed a fast, computerized way of reporting sales, that sales information — perhaps delivered to headquarters the same day — could favorably affect the efficiency of inventory control and production tomorrow.

This notion, in turn, in the early Sixties began to make evident an even more radical and more significant quality of information systems — largely overlooked in the beginning — which is becoming increasingly apparent: the idea of integrating all the information in a company into what is sometimes called an integrated, or total system. For the new information systems linked the old self-contained systems of things together through information flowing back and forth between them. Systems of things that had been strangers to each other now became cousins in a family of systems. The integrated information system combined that

family into a single house: the company itself.

As the Fifties passed into the Sixties, it became evident that the more a business combined small information systems into a big one, the more benefits the entire company would receive from each and all. Computer manufacturers reacted with generation after generation of new computers which made available larger and larger capability of handling the ever-more-complex integrated systems requirements. The impact of what started out, in the beginning, as a mere accounting tool was being felt with growing force in every area and echelon of business.

Missing: Management

As the beginning ended, the nature of systems had undergone a total and massive revolution. But even the progressive companies, in which the revolution was happening so fast, did not learn how to assimilate this radically new function into established organizational structure.

As it became increasingly apparent that the new systems technology could benefit everybody in the company, it should have been equally apparent that this technology required careful management. Curiously, to most managements, it was not apparent at all. Our study of many companies during those beginning years reveals a surprisingly consistent pattern in the way in which the new systems function was treated by most of American business.

We suggest that it is worth taking a moment to examine that pattern, to find in it those lessons which can help us write a prescription for health in the management of systems tomorrow — after the end of the beginning.

IV

THE LESSONS OF THE BEGINNING

Curiously, the analogy of a heart transplant relates with surprising accuracy to the addition of the systems man into companies during the beginning. One of the most frequent problems encountered by doctors who have attempted such transplants is that when a foreign heart is placed in the body of a patient, organs of the patient's body often refuse to function normally, as they did with the old heart. It is a kind of rejection mechanism.

The Men From Mars

Let's pause for a second and survey the problems posed to the new breed of systems men responsible for "transplanting" this new technology into a corporate body, which was usually unaware of who or what the systems men were, and to a large degree in the beginning, unwilling to accept their new ways.

No Tradition

Unlike the older and established functions of the business, there were no traditions — no accepted ways of doing things upon which the systems man could base his actions and conduct. There were no established working relationships between the EDP functions and the rest of the company. There were no guidelines by which to evaluate success or failure — or even to determine what success or failure really was.

Agents of Change

What the systems men had to offer was change. For one thing, they were usually disconcertingly young — often not yet in their thirties. For another, no matter where in the company they went, their machines and approaches were something radically new and difficult to understand. Many in the company saw these agents of change as a threat to their jobs, others saw a threat to their established, successful ways of operation. Still others were simply suspicious of newness and change, perhaps rightly so. The reactionaries surfaced.

Technical vs. Management

There was another serious problem, which unfortunately is still very much with us. The new systems men were technologists, experts in a new kind of technology applicable almost anywhere in human organizations where there is an information flow. Their background was in technique, not business. Yet they were given important management responsibilities.

Language

The new EDP men largely spoke and thought in a new language, derived from the scientific method. Often old-time managers suspected — and no doubt with some justification — that they enjoyed being esoteric and hard to understand. Their language had brand-new nouns and verbs and expressions. There was a large and serious communications gap that somehow fenced off the EDP people from the rest of the company.

Given these considerable obstacles in the beginning, in some ninety or more percent of American industry, the systems men and their computers were essentially excluded — rejected — from the bloodstream of business life. Willingly or not, they were fenced off in their own private world, like men from outer space.

To suggest that the source of what went wrong was entirely the fault of the men in EDP would be a major mistake. Virtually anywhere one found disappointments or failures in the EDP function during the beginning, investigation would inevitably reveal that the real source of trouble was not only in EDP itself, but in shortsighted managements, basically unable to see the importance of assimilating EDP into their organizations. There were many instances of continuing systems failure, year in and year out. In such cases, somebody should have been fired. But very probably, it should not have been the systems manager.

No Direction and Control

During the beginning years, management failed

to provide true direction and control of the systems function. They failed to demand accepted management practices from the systems group. They failed to demand planning. They failed to insist on a discrete operational methodology. They failed to demand the same ROI evaluations they demanded from the other functions of the business.

No Managerial Competence Demanded of EDP

While accepting EDP as necessary, most managements failed to insist that the supervisory personnel in EDP be as trained in management competence as in the other areas of the company. They gave management responsibilities to EDP technicians without either demanding management competence from such technicians or placing sound managerial personnel in these capacities.

Abdication of Concern

Essentially, management simply abdicated any basic concern or responsibility for even trying to understand, let alone guide this new and difficult business function. In company after company, managements failed to perceive the rejection mechanism at work, and so took no effective counteractive measures. Even though they knew (or at least suspected) how beneficial this new technology could be to them, they refused to accept the obvious fact that it was their responsibility to make it beneficial.

Even today, we hear story after story of systems directors in major corporations still completely free to authorize purchase of whatever they feel they need for new hardware and new software, with no management checkpoint whatsoever. The systems manager of one very heavily computerized company has told us that while he is free to spend millions of dollars a year on computer equipment and personnel, with no approvals required, another officer of his company, charged with the distribution function has to get Executive Committee approval each time he wants to buy a few lift trucks for his warehouses.

It is interesting to realize that like the systems function today, other functions (engineering, for example), also grew unheeded by management, until management recognized their importance to the profitability of the company and made them manageable.

The Lessons to be Learned

If there is a single conclusion to be drawn from the foregoing, it is simply that what has been prevalent is less a story of bad management than a story of no management at all. Wherever the systems function was a fizzle in the beginning, management must take a large share of the blame.

Yet from what did not happen, we can see clearly what could have happened — and what can happen from now on. What was so largely missing was organized, planned interaction between the logical processes of the systems world and the people processes of management. What was lacking was a system for creating that interaction and making it effective in a growing, evolutionary manner.

Management can be of ever-increasing value in helping systems people become more and more aware of, and concerned for the people whom their systems affect, and how to deal with them.

The systems function can be of ever-increasing value to the manager by increasing his awareness of options; by broadening his understanding of consequences, by maximizing the accuracy and speed of delivery of the facts he requires for sound decision-making, and perhaps most important of all, by removing from his daily responsibilities the welter of yes/no detail decisions the machines can make so much faster.

It is the contention of what follows, that these benefits will come only from guided and disciplined interactions, in work situations, between the systems group and the rest of the company. It is an evolutionary process, which we call systems management.

V

SYSTEMS MANAGEMENT

As we shall use the term, "systems management" is the act and process of making systems, and systems people, work effectively for the total benefit of a business. And considering the sophisticated complexity of the systems world, it is a surprisingly simple way to impose system on the management of systems.

When we use the term "systems management," however, we are not talking about a theory of management. What follows below is a prescribed and proscribed, specific step-by-step methodology — which works.

The key to effecting true systems management in any company is in three basic management decisions which must be made before the rest of the machinery of systems management can be put into operation:

Management Step No. 1: Make Systems a Business Function

The first step in systems management is a decision only top management can make. It is disarmingly obvious, yet rarely practiced. It is simply a decision that the systems function will no longer be permitted to be something outside, and special, and different from the rest of the business. It must become a business function.

Once that decision has been made, there must be a corollary insistence that the men appointed as managers and supervisors in a systems department will no longer be mere administrators of technologists, but true managers. And if they have inadequate management competence, that competence must be developed — through schooling, training, and particularly management attention, until the men responsible for systems have learned to think and act as managers first, technologists second.

Management must insist that henceforth the systems people become sensitive to the fact that a company is a living organism, and that good management is good management of people. Systems people must develop the necessary respect for in-

tuition and hunch and feeling in the people they deal with.

While this first step may seem to be obvious, it never occurs to most companies. It is rare indeed that one finds a senior management that has decided, and insisted that the systems function become a business function.

Management Step No. 2: The User/Project Technique

The second step in successful systems management is even more significant. Yet if one stops to think about it, it is even more obvious.

What we call the user/project technique is simply demanding that each and every project undertaken by the systems group be a business venture first and a technical venture last. Any project undertaken by the systems department must result in a specific business need, requested by a user somewhere in the company.

What do we mean by a user?

A user is a manager, somewhere in the company — perhaps in production or accounting, or marketing, or some other function of the business. Quite probably, he has had little direct experience or understanding of the many benefits which computer technology could bring to his area of operation. Yet if he is a good manager of change, he is always hunting for ways of becoming, of finding new avenues for bettering his management performance, to reduce his departmental overhead or increase its productivity. Systems applications might help him achieve these performance objectives, if a way can be found to make him aware of the many benefits the technology could provide.

Part of the user/project concept (as detailed in Section VI) is a specific technique for providing the user with that awareness, and with a growing interest in systems activities, so that he himself may become an increasingly strong advocate of systems innovations in his area.

But an equally important part of the user/pro-

ject technique is that even when the user becomes an enthusiastic advocate, and wants to initiate a systems project in his department, he can not simply call in the systems people and request it, if it involves any significant cost. As is detailed below, he must go to management for approval to undertake those costs.

Management, therefore, becomes a required checkpoint in all systems activities; it is management which is the control. Even more significantly, each systems project submitted by a user for approval must justify itself in management's eyes as a venture sufficiently worthwhile as a business venture to be awarded a share of the company's resources.

This, in turn, means that before asking for approval, the user must carefully evaluate the risk involved in any project he may advocate, and compare that risk with the benefits the new system will provide. For the user will have been made aware that if management authorizes his project, it is he who must produce the benefits he claims the project will deliver.

This second management decision – to make any and all systems activity emanate from users throughout the company, with systems as support and management as an approval checkpoint on every project – considerably strengthens the first decision to make systems a business function.

Additionally, however, this second management step creates an avenue for continuing systems-management interaction, by reducing that interaction, in each instance, to a dialogue between two people: the user and the systems man; each learning from the other.

There is, however, a necessary third decision management must make, and insist upon. They must additionally insist upon establishment of methodology, which makes the first two steps work.

Management Step No. 3: A Systems Methodology

Essentially, this third step involves the imposition of a system for the management of systems projects, which works with any user; in any area of the company, in any phase of development of a system.

In any area of a business, if a process is not structured, it is not predictable. If it is not predictable, it cannot be planned and scheduled. And if it cannot be planned and scheduled, it cannot be truly managed. There must therefore be a known, explicit methodology: a structured sequence of the way things happen, of the way they develop, in a fixed, orderly, and predictable fashion.

From the beginning of the project to its completion, there must always be:

- *a logical standard sequence* of events which is followed consistently in all systems projects.
- *fixed phases* of that development, with established periodic approval phases by fixed hierarchies of approval.
- *established standards* for performance within each designated phase, a norm, which is deviated from only by conscious decision and upon which successful performance can be evaluated.
- *measurable end items*, finished products, which can be understood and evaluated by both systems managers and management of the completion of each phase of the project.

This third management step is of course a necessary partner to the first two. It is the way to make them work. And a company that decides to make these three decisions – to make systems a business function, administered on a user-oriented project basis, with a fixed methodology of development for all systems projects – has moved a long way toward effective systems management.

VI

THE PROJECT MANAGEMENT PROCESS

What we call the Project Management Process is the specific methodology we have developed for the management of all systems applications in a company, no matter where in the company such applications may occur, or how large or small they may be. Its structured sequence of fixed phases for the accomplishment of a systems project has been polished over many years of actual experience in dozens of companies here and abroad; it is a tested and precise sequence of work steps.

No two systems projects in the same company are ever alike, just as the needs of no two users will ever be alike. For all its discipline, therefore, the Project Management Process must be flexible — adaptable to any set of circumstances. Yet despite its necessary flexibility, the Project Management Process is an established, effective *modus operandi* for any systems project. It works.

Planning vs. Doing

While essentially our methodology for project management divides the sequence structure into what we call the planning phase and then the doing phase, it is worth noting that the amount of time and effort expended in planning and in doing may vary significantly from project to project. Planning deals essentially with abstracts which do not yet exist. Doing, by contrast, is the shirtsleeve work of bringing approved projects to fruition.

We use a rule of thumb to estimate the amount of detailed work the planning phase should get: it should be directly proportionate to the size of risk involved. A relatively small five or six thousand dollar systems project may get very little detailed planning, for it involves little risk. In a five or ten million dollar project, where the risk is enormous, it is possible that much of the hard detail work of preparing user specifications normally done during the doing phase, will be included in the planning. This provides the user and management with details proportionate to the size of the risk involved.

For these reasons, the amount of work performed in each of the steps listed below may vary considerably from project to project. It is entirely possible that the second or third planning step which we describe below can be eliminated. Yet whether the risks involved are great or small, the structure — the methodology and sequence — remains the same.

Planning Step No. 1:

First User / Systems Encounter

The “first encounter” between the user and a representative of the systems department may be a single meeting or several across a period of time. While the initiator might be either the systems man or the user, it must be clear in these first encounters that systems is a support function.

In this first encounter, the objective is to discuss the anticipated change — its technical feasibility, broad benefits, and approximate costs. When the discussions are over, the user and systems man may have agreed that the idea was unsound — and decide to do nothing more. Or they may have agreed that the idea has merit and the user may authorize the next step in the process.

Planning Step No. 2:

Preliminary Systems Study

Now the systems representatives — with frequent ensuing dialogue with the user — make a preliminary study which, like an architect’s first sketch, attempts to determine if the project selected seems really feasible, and approximately how much it would cost.

The amount of preliminary planning made by the systems people is commensurate in its detail with what they believe to be necessary to permit the user to decide whether or not to continue after this step. In essence, this study is a loose feasibility study which devotes itself to four basic factors:

- the real need for such a project in the user’s area.

- the business benefits the application would provide to the user's department.
- the timing requirements of the applications: can it be implemented in time to provide the benefits needed?
- the risk involved versus the dollar and non-dollar benefits involved.

*Decision Step No. 1:
User Evaluation*

Upon completion of the preliminary study by the systems department, it is now imperative that the next planning step send the ball back to the user's side of the court. We call it "user evaluation" of the preliminary study. It is worth repeating that in this – and all subsequent – decision steps, the decider is always the user.

In essence, the user's appraisal of the preliminary study asks: is this a sound business venture? If I go ahead with it, is it a sound management decision for me to make for my department? Are my people ready for it? Can I afford it, both in terms of cost, and the time, including management time, which it will take to complete?

At this point in the process the user/manager has essentially three alternatives:

- he may decide he does not like the project and stop any further work on it.
- he may decide he already has enough information to go to management for approval to immediately start the "doing" process.
- he may decide he still wants more detailed, more verified, more complete information.

Even if the user chooses one of the two latter alternatives, he is not yet fully committed to the project.

*Planning Step No. 3:
Systems Planning Study*

When a user has decided that more detailed planning is required, he and the systems representative then conduct an in-depth systems planning study of the project's feasibility. That study, when completed, might be compared to a cardboard model, made by an architect, of a building under serious consideration.

In much more detail now, it examines:

- the technical feasibility of the project.
- the costs they will incur and the benefits they will generate.
- the number of man-months of programming and software preparation required.
- the complexity of the conversion from what exists now to what will be when the system is complete.
- the impact on the people in the user's department; the amount of training they will require to convert to the new system.
- the monthly cash flow that will result from the project.

*Decision Step No. 2:
Management Approval*

Upon completion and submission of the systems planning study (or as noted above, perhaps before it) a point comes when the user feels he has enough detail to be able to decide to go ahead or not. Once again, the user may decide not to proceed. If he decides to go ahead, however, the project management methodology insists that at this juncture, the project must be submitted for management approval for allocation of the company's resources.

It is important to realize that management is not being asked to decide upon a highly technical proposal, couched in the jargon and expressed in the charts of the systems world. It is being asked, instead, to evaluate a business venture within the company, presented in business language, with measurable and specific business parameters of benefits and risk.

If management is required, in a given meeting, to choose between many users, certainly the return-on-investment factor indicated in each project being advocated will weigh heavily in awarding approvals. Yet a people-sensitive management may approve a project with a smaller return on investment than others, because in its judgement the people in that user's organization are far more ready for its implementation than those in another with a greater ROI.

It is impossible to overstate the significance of this fixed phase in the project management meth-

odology. For as noted earlier, by inserting it we are including all systems technology and activity as part of the decision-making portfolio of senior management. If a project they approve requires a substantial amount of systems programming and/or new equipment costs, it is senior management now, not an unbridled systems department, which has decided to spend the money – or not, in an orderly, business-oriented manner.

If management approves a user project, it will of course be the systems organization which will be responsible for the effective control of its costs. Yet, very significantly, the benefits which will be achieved will be realized by the user's organization. It will be the user who henceforth must administer the project, just as he must for any other of his departmental operations. It is the user who must justify the costs of the project by producing in his organization the benefits the system promises.

The Move from Planning to Doing

What has been operative thus far in this methodology of systems management is a kind of "creeping commitment" by the user and his management. It invites increasing user involvement, increasing advocacy of the project to which he feels more and more committed. As noted above, planning, even detailed planning, takes place in a preliminary (less than final) atmosphere. Doing is the hard nitty-gritty of final, irrevocable detailed decisions and actions. Doing is the hard part. One might say that when the doing begins, the project honeymoon is over.

Doing Step No. 1: User Requirements

The first significant doing step involves detailed analysis – by both systems and user personnel – of what is really involved in turning the project into reality. The systems people make final detailed analyses of systems which now exist in the user's organization. They must also specify the actual details of the new system which, when superimposed over the old, will deliver the benefits and savings promised in the planning.

During this first doing step, the user's organization becomes increasingly involved. For their man-

ager will have told them that once the system is installed, it is up to them – and him – to deliver the benefits. The earlier in the doing they become committed, the better.

Doing Step No. 2: Systems Specifications

When the requirements have been analyzed, it is now time for the user and his systems colleagues to make final decisions about the specific functions the system will perform. Systems specifications are prepared which spell out exactly what functions the new system will achieve for the user. In architectural terms, the systems specifications are similar to the preparation of detailed working drawings for every single function of a building under consideration, from plumbing to lighting.

The systems specifications, like such blueprints, detail exactly what the new system will contain, including such factors as:

- reports: content and frequency.
- files of information required.
- user controls over the system.
- economics: one-time and continuing costs; specific benefits.
- outlines of new user procedures and policies.
- machine utilization details.

Essentially, the systems specifications list what processes the new system will use, and how, and when, submitted to the user in a single complete document.

Decision Step No. 3: Final Use and Approval

If upon careful study of this more detailed document by the user and members of his organization, they become discouraged by its costs, or the insufficiency of its benefits, the user can still decide to cancel the project, and to notify management of his decision.

This is his last decision step, however. If he accepts the specifications as documented, the period of "creeping commitment" has ended. He is now committed to go forward. His decision to accept the specifications is literally a three-way contract: between the user organization, the systems organi-

zation, and top management. This moment in the methodology is not unlike approval of an architect's final blueprints, and the beginning of construction of a building with specified details and costs and functions.

The project is now firmly under way.

Doing Step No. 3: Implementation Planning

Now both user and systems organizations must examine in careful detail how the new system will affect the present system and the user's organization. Their objective, at this phase, is to minimize the resistance, and the confusion inherent in the wrenching changes which conversion to new systems almost always brings with them. In this phase, they plan ahead for the impact of the new system. "People considerations" are critical in implementation planning, for unless the user organization accepts the system willingly, its effectiveness will be seriously impaired.

Doing Step No. 4: Program Specifications and Programming

The next doing step is the most detailed step in the entire project management process. It can begin either after or in parallel with the Implementation Planning work. It is the drawing of program specifications of what each computer program should accomplish for the system, and exactly how. Then the programmers sit down to begin actually writing the various programs the system will require. This step, obviously, is entirely a function of the systems organization.

Doing Step No. 5: Conversion and Training

Even while the computer programs are still being written and debugged, the systems organization and the user organization together must begin the backbreaking task of throwing out the old and getting ready for the new. Included here is the process of converting manual information files into machine readable form — file conversion.

During this same period of time, user personnel must be trained to use the new system, according to procedures identified earlier in the implementation planning phase — in the use of new methods, new procedures, and occasionally new machines.

The user, in most cases, is responsible for training his own people — for three reasons:

- he knows his people best.
- reluctance by his organization to accept the new system is highest in this training phase.
- he must have sufficient knowledge to do this job, or he will never be able to take the next step of installing and managing the new system.

Doing Step No. 6: Systems Test

With the programs now written and individually debugged, the files converted, the user personnel trained and psychologically adjusted to accept the new system, now comes the time to test it — to begin to make it work. Testing is one of the most critical parts of the entire Project Management Process. One of the important testing mechanisms is a process we call "fail testing." This a technique of trying specifically to make the system fail, finding the difficult flaws — not the obvious little corrections — which will still be in the system and which must be found prior to final conversion.

The user must insist on visible proof of readiness before he considers the testing period over. Frequently, wise users prepare test data to feed through the system to convince themselves that their system is ready for conversion. But in no case will final conversion take place before systems men and user agree that it is time.

Final Doing Step: Conversion and Feedback

When the moment of readiness arrives, it is time for final conversion from the old to the new — not unlike actual moving from old quarters into a new building.

Yet even after the system is launched, problems are bound to arise. Trouble is inherent in change. Yet if the training has been adequate, everyone who will be involved in the system should be already informed as to the kinds of problems they are likely to encounter. A formal reporting mechanism should identify for all concerned:

- existing problems at any point in time.
- who is responsible for correcting them.
- what is being done to fix them.

The new system, now, becomes a part of the user organization. The project management process has ended; a new system has begun, like a transplanted heart which is functioning without fail.

Yet while the new system is launched now, in a sense, it is never finished. As it operates, it evolves. It feeds back into itself improvements, and improvements upon improvements, to make it ever

more efficient and dynamic and useful to the user. One might say that the end of the project is only the end of the beginning of the system.

The above is only a brief outline of the Touche Ross methodology of systems management and specifically of project management. (Its operational details fill several large books.)

VII

SYSTEMS MANAGEMENT: AN EVALUATION

The Project Management Process

Essentially, we have described a process for bringing management to systems. In brief summary, systems management postulates that there must be a continuing evolutionary dialogue between management and the systems experts, achieved by making the systems function a business function and orienting that function to individual user needs on a project-by-project basis, subject always to a disciplined structured methodology.

Why are these techniques so terribly important? First, because Project Management Process insures that all concerned will have a clear understanding beforehand of what the systems project will involve by providing a basis for effective initial planning and scheduling. Both systems and user management people accept specific responsibility for accomplishing each activity of the project in a specified period of time. For too long systems projects have been unique events, with little apparent structure or direction.

Secondly, top management can measure the progress being made toward completing each activity. Detailed status reporting can now meaningfully identify variances from planned accomplishments

with reasons for the variances and the corrective measures being taken. In effect, management is truly able to provide direction and control — manage.

And most important, the Project Management Process provides a framework for establishing and building traditions — accepted ways of doing systems projects upon which all concerned can base their actions and relationships. Since all systems projects proceed through the same basic methodology, with approximately the same basic steps involved during each phase, each new project provides new insight (from successes and mistakes) into the management of systems. Over time, for example, an “estimating history” can be accumulated of the time required to perform each step in the process. It is upon an accurate and current “estimating history” that well planned projects are based and scheduled.

Quality Assurance

The disciplined systems management methodology we have proposed provides something new — and rare — in systems applications in business today: quality assurance at each phase of a

systems project, from first encounter through to conversion. By demanding both user and management review and concern in each phase of the process, the methodology builds in quality assurance checks, which assure management that the systems function is being properly managed at every moment in the development of a system.

For example, most systems are designed very carefully in the early stages, to insure efficient use of the computer equipment. Usually, however, as the detailed work begins — programming, testing, etc. — all care vanishes in the scramble to get the system installed and working.

The result of this unsystematic, undisciplined rushing is highly inefficient use of the computer and the people who are involved with it. This may not have been a serious problem in the era of the small, inexpensive system. But in tomorrow's world of systems costing millions of dollars per year, the last 10% of efficiency is very desirable indeed.

VIII

CONCLUSION

Conclusion

And so we come to the beginning of the end of these pages. If a company can bring management to systems and system to management through the user-oriented techniques and project management process we have suggested, the prognosis for the health of that company is excellent for the coming years of increasingly accelerating change.

Perhaps the best way to end is with an anecdote

Patience and Sensitivity: A Caveat.

Perhaps most important of all, systems management works, and is working in some of the biggest and best managed companies in the country. Yet to make it work effectively, requires both time and patience. Most systems people in business today have not yet found their work subject to effective management practices, and many will find such new measurement techniques strange and uncomfortable. It is extremely important that top management be sensitive to their unfamiliarity in their new role as managers and businessmen.

Similarly, experience has shown that there is bound to be resistance and suspicion of innovation by people in the user organizations. To break down these normal psychological barriers in both the user and systems organization, takes consideration, sensitivity to human foibles, and above all, time.

of a client of ours in the distribution business, whose on-line inventory control system has developed so effectively that in the past year, two of its competitors went out of business, aware that the job of catching up is just too difficult. In that one anecdote is perhaps the best summation of all we have said in these pages. For in it, the bell which tolls the end of the beginning is ringing loudly and clearly to us all.