# Xerox Corporation: Sales Force Automation[1]

Paul Allaire's blueprint for Xerox Corporation developed a new business process architecture, between April and June of 1994 as shown in Figure 1. Phase two focused on the conceptual design of the processes between July and December of 1994. Phase three, the detailed process design, was carried out between January and May of 1995. Phase four, the actual development of the MTC process, began in May, 1995.

Figure 1: The Xerox Business Process Architecture
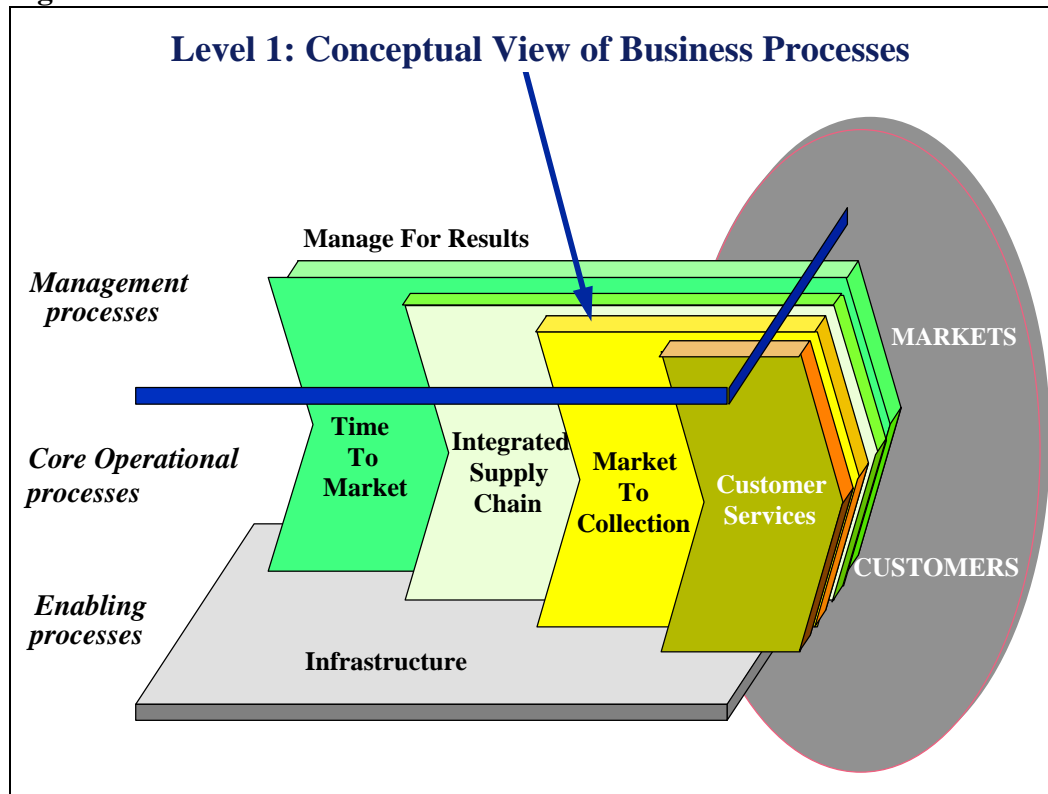
The four core business processes, *time-to-market* (TTM), *integrated-supply-chain* (ISC), *market-to-collection* (MTC), and *customer service* (CS) represented a new approach to meeting customer needs. To support this re-engineering effort, a business process management (BPM) group was established under Pat Wallington, Xerox's chief information officer. Ankorath Unni, a BPM consultant, explained the early developments:

> The initial strategists for process design and visioning included the COM (corporate office of management) with Paul Allaire, his executive vice presidents, chief of staff, human resource manager, and chief financial officer. The divisions have their presidents who are partners with the process owners and Pat Wallington, the chief information officer.

Allaire, the chairman and chief executive officer of Xerox, met every three months with his business process owners to get updates on their progress in implementing the new architecture. Evelyn Wilk, a BPM manager, explained the role of the business process council:

> Early on, the business process council agreed that what was inside the boundaries of an individual process was managed by that process owners. The agenda of the business process council meetings address the seams. During the integration meetings of the past two weeks, timing of the processes interactions was discussed. TTM got organized this year and has a lot of people working on that process. Both TTM and MTC are top priorities. If products aren't coming out, we can't sell. MTC can be great, but we need product to sell. For MTC to accomplish its goals, it needs to mesh with ISC at a specific point in time. CS is also operating, but MTC is doing a lot of the customer relationship activities. What contact, 800 numbers, are being handled by MTC. The business process owners recognized that systems integration was needed.

Business process implementation had been slower than expected. Wilk described some of the delays:

> As a result of the Xerox culture, people like to study things to death. Now that the architecture is defined, we are going to the next lower level to define the sub-processes. This approach should help us make decisions about where to focus our improvement and reengineering efforts. If the study says you must take action, people would rather do another study than take action. For example, CS is documenting the 15 processes at their next lower layer. My colleague has identified two processes that offer breakthrough opportunities. Those two processes are the only ones that need further definition. Let's not spend any more time or resources studying the other processes. Spend your budget to make something happen. People don't like that.

> Colin Powell made a lot of decisions as general using limited information. He said in an interview that he was comfortable with 40 to 70 percent of the information. If he made a decision before 40 percent of the information was available, it was too soon. If he had 70 percent of the information, waiting longer would probably lose the opportunity. I translated that into Xerox and suggested that 80 percent might work. You can't get 100 percent. You can get enough information to decide where to target your efforts. That is a Xerox constraint. They want 100% of the information. That might have been all right before Xerox had competition, but not today.

Market-to-Collection Developments

MTC was made the number one development priority in 1993. MTC was considered to have the highest payoff for Xerox reengineering efforts as shown in Figure 2. Unni explained:

> Paul Allaire was concerned about where we needed to work first, and where we could get the greatest payoffs. It was a question of priorities. MTC stands out from a payoff point of view so other processes are behind MTC in their development. Most of 1995 funding went to MTC. TTM is about a year behind MTC. In ISC, inventory management was re-engineered to bring down the inventory levels to the benchmark level.

> Funding is the biggest form of control for these initiatives. The major business process initiatives are part of Pat Wallington's IM budget. Much of the budget comes from outsourcing savings. When you get rid of legacy systems, you get savings. You can invest those savings in infrastructure, developing new processes, or re-engineering processes. A large portion of the budget also comes from the operating division. If the US division uses their own money, they can do as they wish. But they need to be concerned that their may be a new corporate process developed next year that will obsolete what they have done. That provides some incentive to understand the architecture.

Xerox management wanted to incorporate the best practices across the company. Core practices had been developed within the POTC (*proposal-order-to-collection*) process, MTC's predecessor. Unni explained:

> Phoenix, Denver and Boston had gone through POTC and are advanced over other districts in using laptops and the databases. Early programs were developed in Cincinnati, Phoenix, and Denver. We put technology, i.e. laptops, in Cincinnati. We completely reorganized the Phoenix sales organization. Denver developed a pilot MTC process. Those districts are all doing better and their managers have gotten bigger jobs. Pilots will be started soon in the UK and Canada.

Figure 2: Strategic Analysis of MTC Re-engineering

MTC benefits -- both project and process --must achieve and sustain increasing productivity requirements.					
Productivity ($ Millions)	**1994**	**1995**	**1996**	**1997**	**1998**
Validated MTC Benefits[a]			23	176	225
Validation In Process[b]			5	24	50
Sub-Total Productivity over 1995			28	200	275
Validated MTC Expense % Revenue	**19.1%**	**17.8%**	**17.6%**	**16.3%**	**15.8%**
Additional Productivity Required					
MTC Under Review/Future			----------- TBD --------------		
Unidentified/Task			----------- TBD --------------		
Strategic Contract Guidelines	**19.1%**	**17.8%**	**17.2%**	**15.6%**	**14.5%**
Productivity Gap	--	--	(1.3)pts.	(0.4)pts.	(0.7)pts.

[a] Using 1995 as base year and before adjustments for revenue growth

[b] Assumes validation at 50%

The primary focus of MTC was the company's future approach to sales. Unni explained:

> MTC is where we touch the customer and can improve customer satisfaction. In 1995, the primary question was, "How are we going to sell in the future?"   The answer had to be agreed upon by the divisions since they sell our products. The divisions need to specify the way in which their products are going to be sold, what information is needed, and where that is going to come from. Technically, the divisions have out-sourced selling to the U.S. customer operations, South American customer operations, and European customer operations.
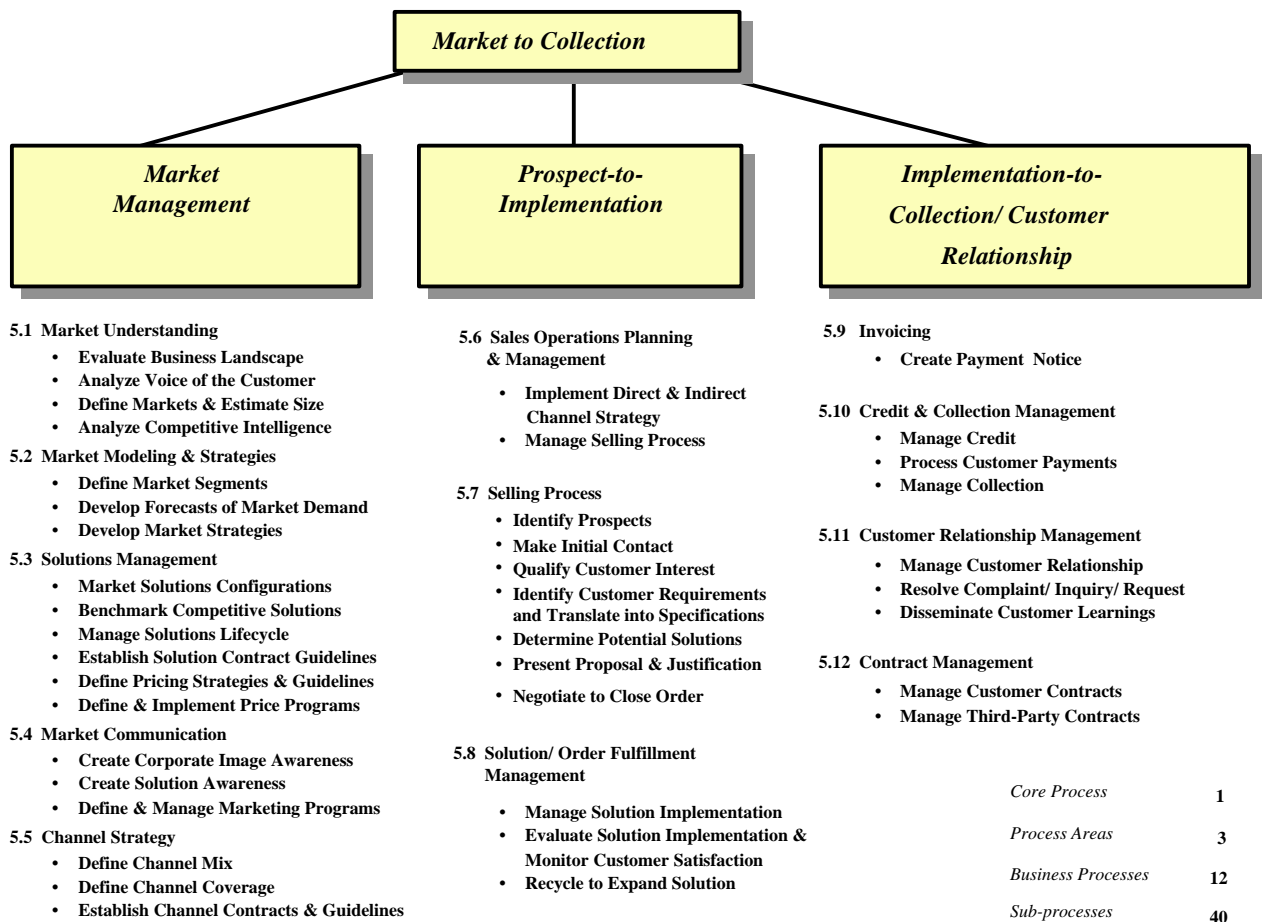>
> What does it mean to organize by business process? The process owners only have process design and implementation responsibility. Execution is done by the divisions. Otherwise, the whole sales organization would be MTC. If we did that, we would be organizing by business process. That would mean that every activity in the process would be done by MTC. ISC comes closest to that. It has worldwide implementation and execution responsibility even though countries and entities have to carry out certain tasks. TTM will come to that, but they don't have a worldwide organization and don't know every design that is being developed. MTC will be the worst, because we sell in 120 countries. How can

you make MTC into one organization that takes care of all the processes within it? Where do we stop organizing by process? Do we have to take it down to every sales activity? How do you do that? I am supporting finance as part of the MTC process. Finance is done in 120 countries also. How do you organize it? They argue that we are doing it wrong because Bill Pittman, MTC process owner, doesn't have implementation responsibility.

MTC expanded POTC by including the front-end configuration of the customer's solution, pricing issues, and back-end customer relations as shown in Figure 3. James Vogel, human resource manager of MTC, described the process.

There are three facets of MTC. There are nine divisions within Xerox that develop products. They have responsibility for market segmentation. They work with the people in research and designing to develop new products. In market management we'll get product and price information downloaded from the divisions so sales reps can do a lot of their work at home. That prepares them to go into the customer. From prospect to implementation, we move from strategic to tactical information. D&B information will kick in and new business will be given to them. They will have a list of established and new accounts in their PC. They can plan their activities and managers can coach them. This will add creativity and allow you to send information about similar proposals.

Figure 3: Market-to-collection Business Process

Market to Collection

Market Management	**Prospect-to-Implementation**	**Implementation-to-Collection/ Customer Relationship**

5.1 Market Understanding
- Evaluate Business Landscape
- Analyze Voice of the Customer
- Define Markets & Estimate Size
- Analyze Competitive Intelligence

5.2 Market Modeling & Strategies
- Define Market Segments
- Develop Forecasts of Market Demand
- Develop Market Strategies

5.3 Solutions Management
- Market Solutions Configurations
- Benchmark Competitive Solutions
- Manage Solutions Lifecycle
- Establish Solution Contract Guidelines
- Define Pricing Strategies & Guidelines
- Define & Implement Price Programs

5.4 Market Communication
- Create Corporate Image Awareness
- Create Solution Awareness
- Define & Manage Marketing Programs

5.5 Channel Strategy
- Define Channel Mix
- Define Channel Coverage
- Establish Channel Contracts & Guidelines

5.6 Sales Operations Planning & Management
- Implement Direct & Indirect Channel Strategy
- Manage Selling Process

5.7 Selling Process
- Identify Prospects
- Make Initial Contact
- Qualify Customer Interest
- Identify Customer Requirements and Translate into Specifications
- Determine Potential Solutions
- Present Proposal & Justification
- Negotiate to Close Order

5.8 Solution/ Order Fulfillment Management
- Manage Solution Implementation
- Evaluate Solution Implementation & Monitor Customer Satisfaction
- Recycle to Expand Solution

5.9 Invoicing
- Create Payment Notice

5.10 Credit & Collection Management
- Manage Credit
- Process Customer Payments
- Manage Collection

5.11 Customer Relationship Management
- Manage Customer Relationship
- Resolve Complaint/ Inquiry/ Request
- Disseminate Customer Learnings

5.12 Contract Management
- Manage Customer Contracts
- Manage Third-Party Contracts

Core Process	1
Process Areas	3
Business Processes	12
Sub-processes	40

Michael Wiseman, BPM's senior consultant, had been working on MTC development for two years. He described the MTC process:

This is the domain of MTC. Very little of the front-end is being developed. Step 5.1 is marketing understanding.   Step 5.2 is market modeling and strategy development.   Step 5.4 is market communication and image awareness. Step 5.5, determining the final solution, is the biggest box. Step 5.6 is sales operations planning and strategy. We are innovating in 5.3 which is solutions management and the development of the a solutions catalog.

Our primary concentration is in innovating the selling process, 5.7, which means laptop selling. The SFA tool release 1 that was rolled out dealt with the first two steps of a ten-step selling process: identifying prospects and making initial contacts.   In our vision, we wanted this to provide pop-up opportunities by scanning business news and sales feedback. Step 5.8 is solutions and order fulfillment.

Back-end steps are just beginning.   Step 5.9 is invoicing. Step 5.10 is credit & collection management. Step 5.11 is customer relations management. Step 5.12 is contract management. These last two areas include welcome center operations for Xerox using 1-800 telephone numbers for inbound and outbound marketing and problem resolution.

Performance measures, shown in Figure 4, varied across the MTC process. Wiseman explained:

We have identified metrics at the MTC level and for the individual design teams. We are developing a grid of metrics with an overlay to determine which ones are independent of integration, and which ones are dependent on which scenarios.

Figure 4: MTC Related Metrics
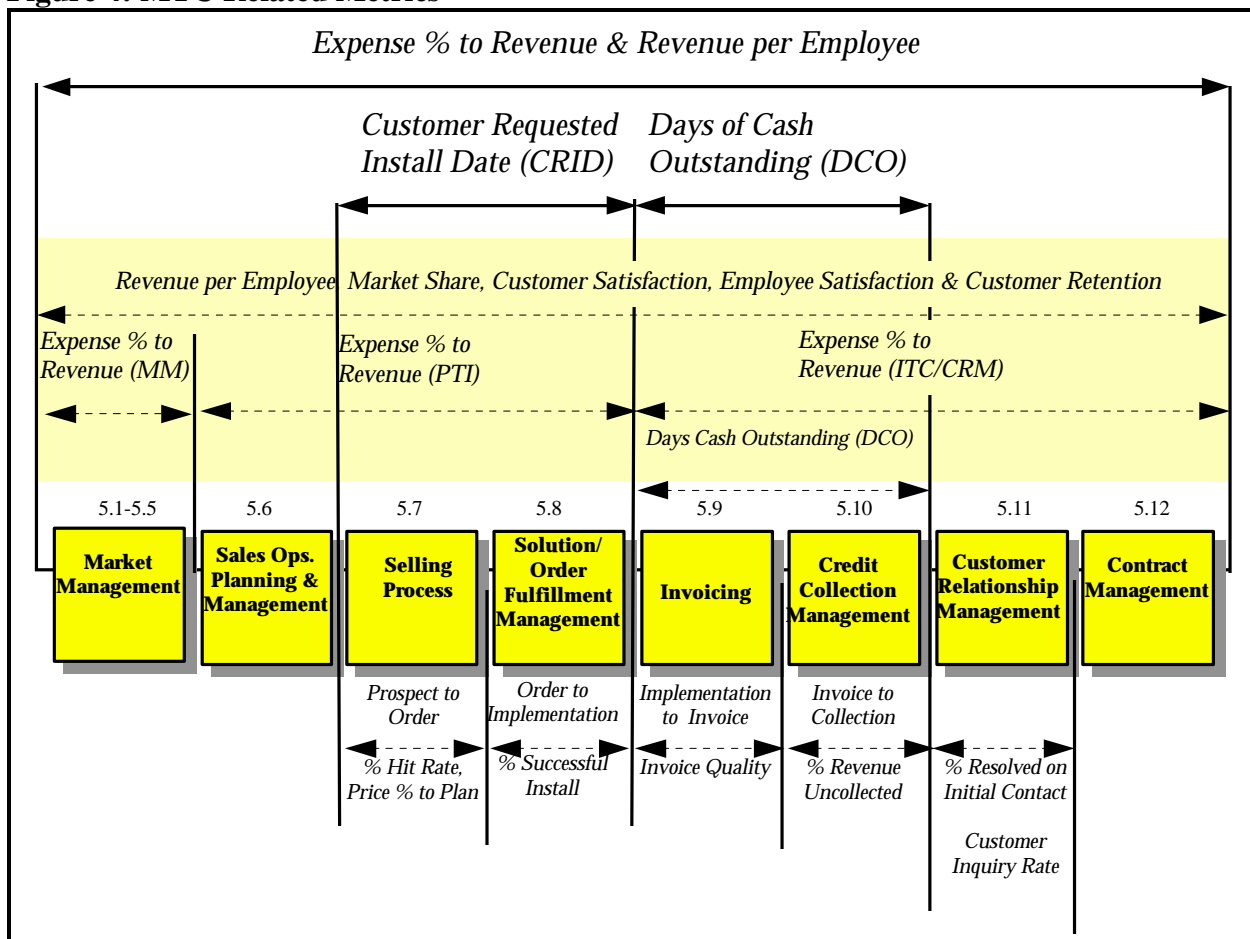
The move towards process management was forcing a basic change in the Xerox culture. As Unni explains, it had imposed a new discipline on the organization:

> The top down view or discipline starts with the architecture. We enable it with people and technology. We are very much in our infancy. We strongly believe in managing by process. The HBR article described a number of CEOs that believe you can only manage by process, not by people. Most companies are represented by processes. We have come a long way since the beginning of data processing. We were all data people back then. For the last 25 years, we automated procedures. We set the specs and gave it to a programmer to translate into code. We never looked at it holistically from a company point of view. We always took care of lower level people by automating procedures. We were concentrating on the efficiency part, not the effectiveness. We made if faster. But productivity coming from that investment over the past 10 years has been minuscule.

> At our BPM conference the other day, we had a guest speaker from IBM. She described their MTC process, what they are doing, how they are re-engineering their sales process. They have an architecture, but it wasn't being used for integration purposes. She pointed out that engineering people were making too many configurations. They were having trouble figuring out what configuration was right for what customer. Some configurations weren't selling, although they had already been manufactured. It resulted in inventory problems and selling problems. The information was not being shared about what configurations go with which customers.

Outsourcing of Software and Systems

To finance Xerox's process development efforts, existing systems were out-sourced to EDS Corporation. Mike Chambers, director of marketing and sales automation systems, explained:

> Xerox has four entities, the U.S., Canada, Europe and ACO (South America). When I joined Xerox a year ago, we had seven projects going on worldwide. As we reviewed the IM2000 strategy, Pat Wallington directed the corporation to stop developing systems within the various organizations. Global design and development was then established here. Only system and data maintenance exists in the business units or CODs, and EDS is responsible for that. EDS does not maintain or modify the software. After stopping development in the CODs, the centralized IM group modifies software as people need changes. In Europe, we rely on the central IM group at Rank UK. They also rely on EDS since a lot of their capability was transferred to that group. Canada has a central IM group that utilizes some EDS support. In South America, there is no central IM group. My colleague and I are the central IM group for South America. Each country has some IM capability. Not every country was out-sourced to EDS in South America. Brazil was out-sourced, but Argentina was not. Not every country uses IBM or mainframes in their legacy systems. Trying to deploy in Argentina is a major task that is different than deployment in Brazil. The same thing is true in Europe. They have 23 countries and seven regions in which legacy programs and problems differ.

The centralization of global design and development operations required the building of an organization and people. According to Chapman:

> I have only been with Xerox for 18 months. I came from an environment that created sales automation and customer service systems. They brought in a lot of people like me without any Xerox background. My boss came with similar experience to mine. He runs this building. We added a lot of technology people, like people with Sabre experience from American Airlines, or infrared experience from trucking lines. When I first walked in the door it was a pretty sad state of affairs. The best programmers were Cobal and visual basic people. There wasn't an object oriented person in the place. There were several people looking at configuration management and engineering processes. Since then we hired 200 people and hired 100 contract people. We are very conscious of head count, so there is a ratio between consultants and Xerox employees. Anderson Consulting is the MTC partner and they have about 50

people on the project. We have about 20 EDS people on it. In total, over 400 people are working full time on the MTC project. Of those, 120 are from Oracle.

Most of the market-customer database (MCDB) came from Rank Xerox in the United Kingdom. According to Chapman:

> There was a real battle last year in deciding our data base strategy, deciding whether to use SAP, Oracle or build it ourselves. Anderson supported SAP and it almost came to a fight between GP&IM and the Anderson people. Pat Wallington decided to go with Oracle. You can't make structural changes to SAP and we know that we have to encapsulate our data base. We will see if Oracle can do it. Another concern about using Oracle is data replication services. The US alone has 37 CBUs. What do you do for a national file server? Do you keep it distributed?

Wiseman continued:

> We contracted with Oracle Corporation to develop and support the worldwide billing and contract management package. Specialized consultants and Xerox people are also going to do development for the object oriented, Windows-based front-end. EDS, the corporation contracted to run the legacy systems, has to make the accounting data flow into the general ledgers which differ by country. You then have the design teams within MTC that are trying to carry the design into reality.

> There are a lot of new people entering the implementation phase and that creates a lot of confusion. All this integration is tough. Legacy people know how it really works, including details that were not comprehended in the vision phase. They know the functionality and data issues that were not considered in the design phase. The Oracle people, who are trying to make a profit, want to shape the requirements to fit their current application. Oracle had a product and pricing data base that could take care of JC Penney's price range and promotional pricing needs. At Xerox, however, we give quantity and contractual discounts, plus we offer various financing and payment plans like price-per-copy. We need the Oracle data model and applications to meet these needs. They need to take a clean sheet approach to pricing and contracting. We have asked Oracle to include pricing rules as part of the data base rather than building it into software. Some rules may be simple, like one controller runs only two DocuTech machines. Some rules are more complex. If you buy DocuTech to run on Novell with Appletalk, you need version 3.7, not version 3.5, and cable #57. Oracle is having trouble with this. They claim to have rule-based experts, but we haven't seen them yet. They are telling us that we don't need those people until December. American Express and the American Airlines are using rule-based pricing. DEC has the most advanced approach. Nobody has been totally successful with it.

According to Unni, EDS would also manage the new processes:

> The idea behind outsourcing is that maintenance is not a core competency that Xerox needs. EDS is maintaining the systems and databases. An EDS person doesn't need to be knowledgeable of the process flow. The technician only needs to run the process at the end of the day. Once a new system is implemented, it becomes a legacy system and should become a legacy system for operation by EDS. Technically, maintenance is needed, but I don't know who will do it. Legacy systems should be replaced. Systems today should last only about five years. At this point, however, we are not retiring legacy systems as fast as we thought.

> We can't get rid of legacy systems until the new system are in place and we have a database. As a result, the old systems are not coming down. Since the new systems don't correlate with the old systems, we can't retire the old until the new is complete. That is the price you pay for top down re-engineering. From the bottom up, I could re-engineer a single systems and replace the old with new. If we just do continuous improvement, we will get small gains, but not gigantic gains.

Joyner continued:

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Virtually all of the application programmers have been out-sourced. EDS picked up these people. We are left with the staff functions in finance, human resources, quality, and planning. The institutional knowledge went with these people, some of who had 20 or 30 years with Xerox. In many cases the systems were undocumented. The relationship between EDS and Xerox has matured in several ways. From a business standpoint, every time there is a call to EDS, we get a $60 charge. You have to provide your budget center number to determine who pays that charge. EDS is in the business to make money. They aren't a charity and I can't blame them. What impact that has on MTC is not clear.

Oracle was playing a central roll in developing the global data base which was required for process implementation. As the level of detail moved down in the organization, the existing process database was reaching its capacity. According to Wilk:

Our current architectural data base is structured by process and flows. It is getting too complex for the Access data base that sets on our server. Everyone can query it, but not change it. The repository is locked and access is limited. It is like a library with check in and check out. It is like visual-recall library services, and was written by the same people. We recognize that this will have to go into an Oracle data base.

Chapman continued:

The biggest lesson we learned is that it takes two to three times longer than planned to get the data scrubbed and converted to a usable legacy form. We were pessimists to begin with, and we were still 200 to 300 percent off. USCO people thought it would take, at most, three months to do three CBUs. It took five months to do one, and its not really clean yet.

Populating the database is another issue. We have a global data warehouse that runs on our mainframe. We have found this data to be better than data coming from legacy systems, since it has been scrubbed a bit. We are about to have all the countries move their data to the global data warehouse following our specifications.

The data base that we'll will be using on the back end is in place now, but only 80 of the tables are being populated. There are 270 total tables. Rank Xerox had 80. Canada had 85. The US had 75. The Canadian data was very clean because they had been using their system and everyone had been responsible for getting their data cleaned up over the last two years. USCO hadn't even run the Dunn & Bradstreet tape since 1994. We got thousands of errors when we ran it where establishments were unknown. It took several weeks to find those errors. It took us five months to get one CBU loaded to the point where we could actually go into a pilot phase.

Sales Force Automation Software

The sales force automation (SFA) tool was the primary implementation of the MTC sales vision. According to Unni:

The workflow used to build the SFA is at the "how to" level. Most of it is composed of documents. SFA will probably automated 70% of that work flow. The SFA is the name for a set of software tools. Some people have trouble with that name since we don't automate people. We don't automate the sales force, you automate sales processes. We are asking for suggestions for a better name.

The requirements have increased as we developed the SFA. We still haven't decided whether to use CD ROM or telecommunications. How much should the sales force carry? CD ROM is quite heavy and takes a lot of space. I use the network most of the time. It is much faster than the PC's processor. Our internal network will have 70,000 users in Xerox as we move from a UNIX environment to Windows. Xerox already relies heavily on the network. When it is down, everyone goes home. We are still determining

what technology to ultimately use. The infrastructure people are looking at it. We will develop the tool and offer it for use. Divisions can decide to use it or not.

The development of the SFA was the primary responsibility of Mike Chambers. By providing the sales force with notebook computers loaded with Xerox's new sales productivity software, the company was hoping to develop a new competitive advantage. The selling process starts with contact identification and making the customer contact. The SFA software used a standard Windows toolbar for easy use. Under the diary, appointments can be seen and scheduled. Under leads, firms with similar needs can be listed for future calls. A click on a customer account file will list the contact person, equipment and information that has been stored. A double click on the equipment item provides detailed information such as contract and lease data. If it were Xerox equipment, all details would be completed. Comments can be added about the customer's attitude and needs. Such detailed information used to be in individual heads. Release 1.0 did not include all of these capabilities. It included automatic downloading of messages from the network. Technical tips and sales leads could be easily communicated through electronic mail. According to Chambers:

> I was the project manager for the first phase of the SFA. There were two halves to the implementation, getting the market-customer data base off the ground and installed, and getting the front end of the SFA software finished. We did that ourselves. It manages the sales-cycle, including a diary and calendar for the sales rep. Now I am in charge of its deployment. After building it, we have to get it into the field. We are in pilot mode in Boston, the UK, and Toronto. The training has gone well and the feedback is good. We estimate that their will be about a 30 percent productivity improvement once we get people on this system.
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> Canada had rolled out the predecessor to this a year ago and their people are already PC literate have been doing some of things that we are doing with the SFA. The USCO has spots of PC literacy and areas of non-literacy. We are using a mixed mode. The Boston-Lexington CBU had a mixed bag of literacy. Denver is very PC literate. We chose a third area of non-PC literacy.
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> The new selling process that has been re-engineered is ten steps. Anyone can come up with between six and 11 steps. We decided on ten and got everyone to agree on the process. The different subsystems are all tied to the sales cycle. That is how it was engineered. The back end stuff will put pricing on line. Today, they have to go off-line to a 3270 emulation and IBM mainframe to pull down a pricing plan that they are familiar with. While proposal generation was done in the first release, contract generation is not. We will generate contracts in release 1.7 or 2.0. Invoicing and credit checking is all second generation and will come out next year. Our current release will probably be out there until the end of 1996.

After the initial customer contact, the sales cycle continues as shown in Figure 5. James Vogel, human resource manager for MTC, explained the importance of the global data warehouse:

> The underpinning of the SFA is the global data warehouse. It is a universal network that we are trying to build. We have engaged our own BP&IM corporate group, and contracted with Oracle, EDS and Anderson Consulting. These four entities are working together to develop this new engine for this new system. That is a massive undertaking. We have over 50 different systems, small to large sizes, in the US operations. They will be integrated on the same global data network.

Figure 5: The SFA Interactive Process
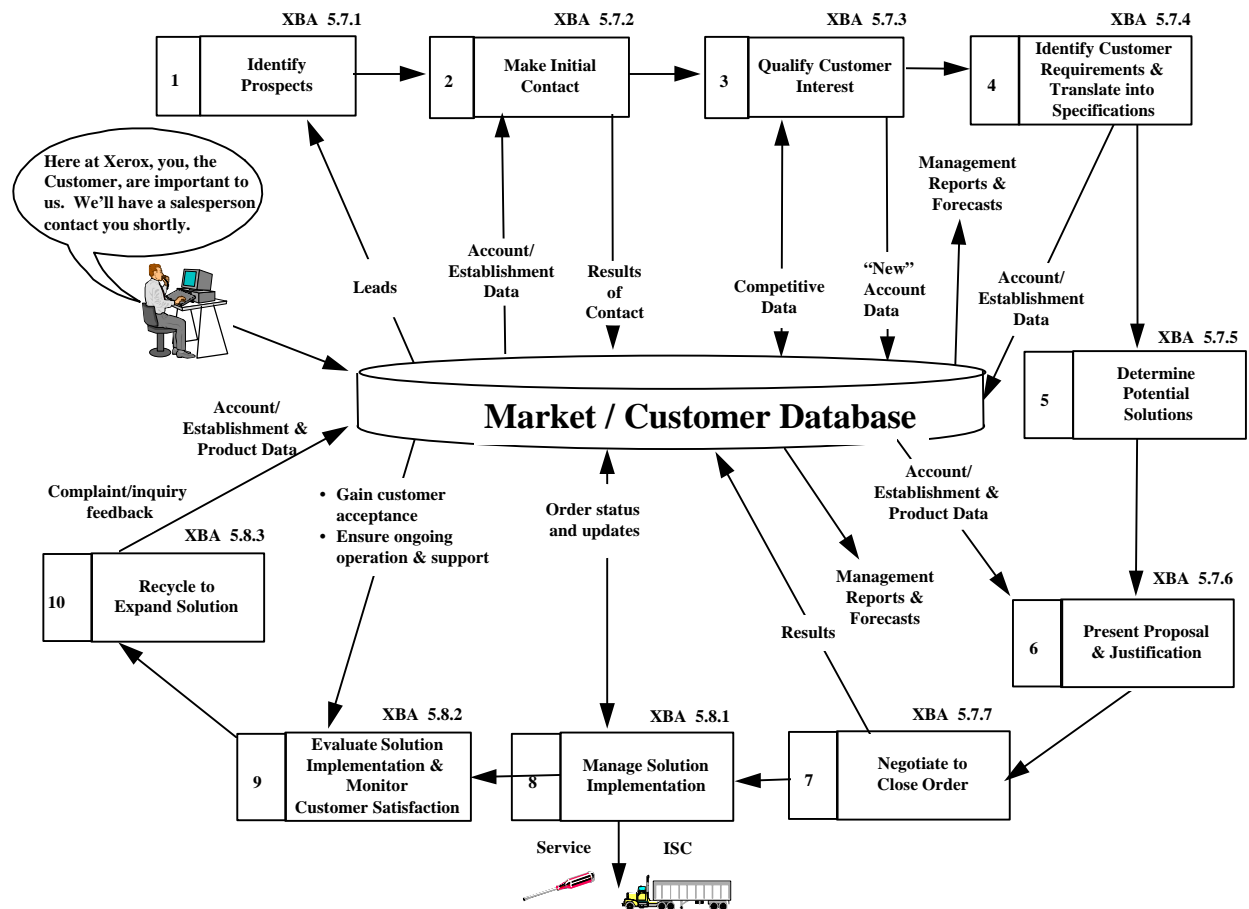
SFA development schedule is shown in Figure 6. The second release was to include a pricing module, show inventory availability, and more. Customer proposals could be prepared and submitted. The SFA was expected to include a proposal generator to simplify this process. It would allow old sales proposals to be easily modified or edited. Completed proposals could then be faxed directly to the customers. Joyner discussed the actual goals for the completed SFA:

> The COM has expectations that codes, like customer and product IDs, will be developed and that the database will be fully populated in the release 2.0 by July of 1996. As far as we know, there has been no work done in that area yet. You should be able to call up an order or have the order created error-free. The order should be predicated on the terms and conditions of the contract. That establishes the pricing and options. The configurator should walk you through and configure all of the component pieces. There shouldn't be any errors in part numbers. I should only have to key in the quantities. The pricing data should be there. The customer data, billing address and installation address, should be there. Xerox service people should be able to get information on competitive equipment that is on a site where we have installed equipment. As we introduce the laptops to the sales force, there is a formal program to teach them how to use it. There are people who are tied to paper, but they will be gone in time.

Figure 6: Development of the SFA Tool
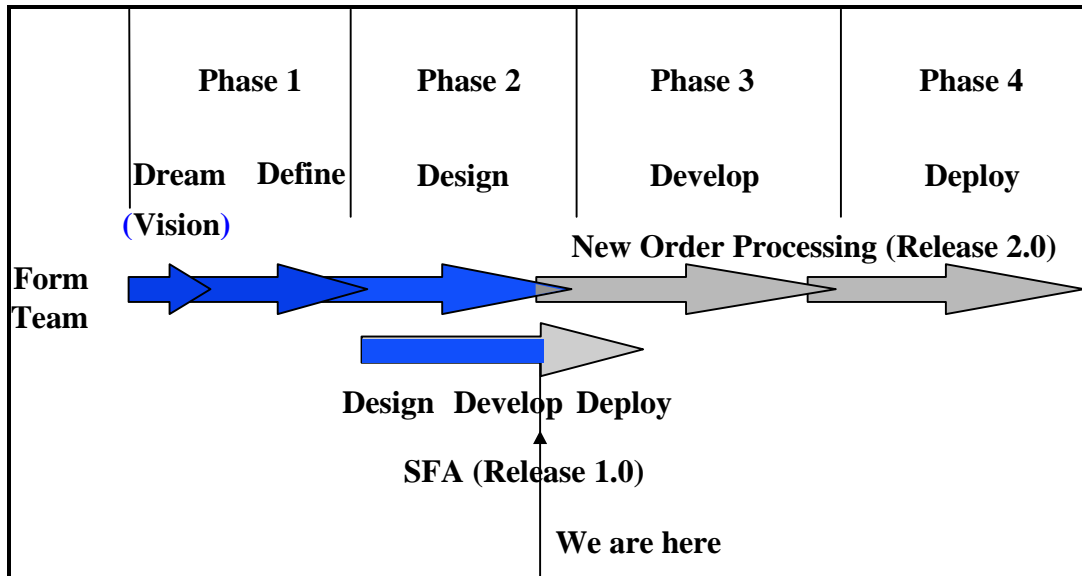
The most significant impact of the current efforts would result from the introduction and dissemination of release 2.0. There were still some significant elements to be completed. According to Wiseman:

> In phase four, we rolled out version 1 of the laptop sales force automation (SFA) tool that includes customer data and sales call management. Version 2.0, to be implemented in phase five, will include potential solutions like configuring solutions, pricing solutions, and providing the terms and conditions of the contract. One team is working on the configuration. Without proper configuration, it won't be billed or installed properly.

The development of the SFA had high visibility and a tight development schedule. Chambers continued:

> How do you test a product like this? We have had 10 to 12 people on a full-time testing team since February . We are just now getting into an automated testing process. Everything was done with business scenarios before. Every time you came out with a business change you had to run the entire suite of tests. We uncovered nearly 2000 bugs in the software to date by only 25 people. Part was database, part was differences in data, part was the programming language and sequel calls. We still have performance issues. We don't know if we have done a good job with the sequel programs. I have moved this to a group that is adamant about automated testing, so that will change quickly.

> SFA is a tough project. We want to make 75 countries feel good about a piece of software. In the address field, we had to take account of every possible address in the world. We had to make it easy to convert between languages. We set hard specs at the beginning and everyone signed off. There was no scope creep at all in release 1.0 of the project. Things that we wanted to add were listed, but not considered until the end of release 1.0. Now we are looking at what goes into release 1.5, 1.7, and 2.0. There are some architectural changes that they want to make, like adding a date and time stamp to all data changes. That will require added architecture.

> We are now heavily into the second phase, about two and a half months, which is the back end. That is the part that interfaces with the front end, like invoice, collection, and credit. That is the part that we have farmed out to Oracle and what we will do ourselves in developing the interfaces to Oracle. We will have to make the two halves fit. They have to encapsulate our market-customer data base within their package.

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Chapman noted further:

> The MTC process has a team to re-engineer pricing. There are over 500,000 pricing plans in the system today. There reengineering will have 50 and they will give people certain discretion within a range. If they go outside that range, they will have to bump it up a notch for approval, without adding more pricing strategies. It is unmanageable today.
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> One of the big things that is being discussed is configuration. These new products are so complex that they require a network analyst as well as product analysts to figure out what is needed for a specific solution. That makes solution configuration a big part of it. Between Xerox and Oracle, we couldn't do it all. I believe we have decided on Trilogy as the consultant in this area.
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> Our goal is to have all the software developed in object oriented technology using Rational Rose. We couldn't get there without going through a tremendous training phase. Most of the people on these three floors are object oriented people now. Our PowerBuilder programs are not object oriented. We built some basic objects in PowerBuilder, but we knew they would want to rebuild it in C++. We commissioned Rational to build a reverse engineering system between PowerBuilder and Rational but it resulted in too many classes. PowerBuilder may turn out to be our prototyping tool because of every engineering project that we build. The current system is developed in Visual Basic and PowerBuilder because I had people that knew Visual Basic. I had to hire and train people to use PowerBuilder. We went through the same process with C++. We wanted to use it, but we didn't have the people.   We built it in 4GL and plan to come back and rebuild it at some time in the future.
>
> We originally planned to have this run on a 12 megabyte machine. Well we don't have an application that will do that. But we can buy a Pentium with 24 megabyte today that is about the same price as a 486 running 12 megabyte a little over a year ago. As a result, we just revised the specs for a PC to include a minimum Pentium with 16 megabytes of RAM and 1 gigabyte hard disk configuration. That assumes that we won't need CD ROM, but I know we will eventually.   This is a big change from a year ago. The Europeans about died when they saw this. They wanted to know what they were going to do with their 12 megabyte machines. I told them last year to make sure they were up-gradable to 24 megabytes.   A territory will fit on a 750 k hard disk. A sales manage will need a 1.2 gigabyte hard disk.

In combination with the re-engineering activities, management had also attempted to re-align Xerox's sales organization. According to Joyner:

> We redesigned and implemented a sales compensation system over the last several years. It caused serious repercussions. A number of people left. Then they rolled out the technology, that caused more people to leave. Then they had some personnel reductions. Then they went from 56 districts to 36 CBUs, customer business units. That has had a direct and negative impact on USCO sales. Creating a GM and VP of a CBU is the concept of a franchise, giving people full P&L responsibility. Well, we segmented the market by high, medium and low end, and by industry. Now the CBUs are trying to figure out how to make it work. All of these changes have resulted in more people problems. That has resulted in some personnel changes. Of the 11,000 people that have been reduced over the past several years, over 9,000 came out of USCO.

Integrating Business Processes

The business processes were still in their early stages of development. The business process council had taken time to get organized. The process owners were still defining their roles as explained by Unni:

It was not a conscious decision to do only one process at a time. Next year, ISC and TTM will be very active. Last year, we didn't even have owners for all the processes. Now we have people in charge of the actual development of each core process. They are responsible for the core architecture and for ensuring that their procedures are consistent with our design. The process owners meet once a month. Their most important role is in managing the interactions between core processes. The input from *market-to-collection* goes to the *integrated-supply-chain*. For example, most of order management is within ISC, not MTC. As soon as an order is taken, it goes to the supply chain for manufacture or procurement. Those types of integration are the responsibility of the process owners.

Bill Pittman can not be independent, and everyone knows that. They must talk to each other. It takes a long time for these people to learn to work together as a group, to get beyond personality and politics. They have to define the responsibilities of the process owners.

When I left MTC, I told Bill that the interface and integration issues were going to get hit hard one day if they weren't managed. He said he understood and people were assigned to look at the process interface issues. We looked at it from the architectural point of view. Others looked at it from the process element point of view. But communication was weak and reports were not being acted upon.

According to Wiseman, there was still much work to be done.

Within MTC, we are driving design to the ground level. The architectural level includes levels 1 and 2. At level 4 you show the work processes. We identified 200-300 workflows in MTC. Other processes are not that far along. At level 5, elementary tasks are eliminated or redesigned to achieve the reengineering opportunities. This is the only level at which reengineering really happens. The vision considered the use of a laptop PC and selecting the products from a list, assembling the perfect solution, and having successful installation. We developed metrics for the vision. Now we are trying to figure out how to make this happen.

The move to re-engineer Xerox's business processes had also met with some internal resistance. People in Xerox were accustomed to being empowered to take independent actions within their own operations. The existence of a *Xerox business architecture* had limited such independence. According to Unni:

From the process point of view, architectural concepts are difficult for people to understand. They prefer to create their own solutions from the bottom up. They find it difficult to work within the business architecture. In developing new work flows, we need to know where it fits within the business architecture. Where are the interfaces? In re-engineering workman compensation, do we send data to the general ledger? The general ledger is a major re-engineering initiative in finance. We intend to have a worldwide general ledger and chart of accounts. People in workman compensation didn't know that we were doing that.

Because of these interdependencies, the other processes have to do certain things. That is what our current meetings are about. We are trying to identify what dependencies exist between the core processes. To get the full benefit of the MTC process, other process developments need to be completed. We met to decide what those interfaces are, and what we must fund. BPM is handling that interface. The primary purpose of the architecture is to help understand these touch points. We can follow the process for an order, or identify the process flow for a document. Our tool has a spaghetti control feature that is like pulling a strand of spaghetti through this maze. Integration in the processes is a major problem. This is the strategic issue today. Allaire pointed out in the HBR round table discussion that, all these processes have the same customer. They have to be integrated. We have never done it before.

The XBA software was capable of reporting all touchpoints between business processes. Early analysis began to reveal some of the integration issues related to developing the MTC process. According to Wiseman:

Last August, we developed a list of cross-process interfaces between MTC and other processes. This comes directly out of the XBA tool. By drawing the processes in a database, we can list the timing, volume, status and quality of the flows, and use the list to gain concurrence and negotiate to set direction. The diagram of touch points between any two processes can be pulled from the database at any time. The number of dependencies between two processes is shown by the height of the touch point. I presented these three dimensional touch point diagrams to the process owner's council. I showed all of the touch points expected as of the third quarter 1996 goals.

I made a distinction between integration and interface touch points. An interfaces is were you pass paper. Integration is means that two processes share a service and knowledge. The integration issues require special attention. Customer satisfaction requires integration of the "as built" (TTM), "as marketed/as sold" (MTC), "as shipped" (ISC) and "as installed/as maintained" (CS) configuration. That requires a cross-core-process effort. Currently the document solution center and solutions support services manage the procurement, shipping, and delivery of 3rd party products to customers. How will they operate in the future. The financial accounting and management accounting process owner needs to appoint a liaison to work with MTC to ensure that financial information flows are properly planned and implemented. The customer installation "life cycle" needs an "integrative" review to ensure an optimal design across MTC/ISC/CS core processes. I presented this on August 8, but no action was taken.

The integration and coordination of re-engineering activities had not been easy. Wilk explained:

Even with the process council, teams were duplicating each others efforts by building systems that were outside their processes. That is part of the Xerox culture. At one review, people came with 250 processes defined. They were even defining finance and human resource processes. I said that those processes were defined by someone else; they only perform them. They don't have the authority to change the way they fill out expense reports. That surprised people.

In defining the processes, Mike Wiseman has worked on MTC for two years and Bill Cain is working with the TTM people. They both included product launch within their core process. But an activity can only exist once and has one process owner. It can be performed by many people. Our XBA revealed this duplication and it was discussed at the process owners' meeting. The two process owners agreed that managing a product from its inception to the end of its life was part of TTM. MTC manages selling and collection activities, but not product launch. Understanding the boundaries resulted from asking who owned the process. That type of discussion is becoming more frequent as people question whether they just perform a process or own its metrics and definition. That has been a major change. We now have stories about how owners have resolved these issues that we explain to people who are facing the same issues. They also understand the mechanism for resolving such issues.

Independent groups on the east and west coasts even documented the same processes. They sat down together and agreed to use one set and throw out the other. They recognized that the process existed independent of its location. After meeting for several weeks, people were arguing that they were process owners. I said that they didn't want to be process owners since that was a lot of work. You have to figure out all the interfaces and negotiate with all the other process owners. That is a lot of trouble. It is better to be a process performer and be a star for having the best practice. Understanding the difference between control and empowerment is key. We all work within structures and limitation and lack freedom outside those boundaries.

To facilitate the implementation of business process improvements, the goal was to fully document each process by the end of 1995. According to Unni, "We separate the *what* from the

how to. The architecture is the *what*. The 5th and 6th levels address the *how to*. We also separate *doing the right thing*, from *doing things right*. The architecture is *doing the right thing*." To ensure that his management team was giving this effort adequate attention, Allaire used incentives. Evelyn Wilk explained:

> Paul Allaire is an astute man. In putting together the business process owners council, they allocated 30 percent of bonuses to process developments. In the second year, bonuses were linked between process owners and the division presidents to get across the idea of joint responsibility. In MTC, Bill Pittman owns the process but the responsibility for delivering results is jointly owned by him and the president of USCO. This year, bonuses were tied to defining the processes down to level four. Level five is the implementation level. They have currently processes defined down to level 3.

> To document a process, they need a description, owner, key metrics for results and process, notes and sponsor. Is it mission critical? What is the work flow type? That is not difficult, but it has to be done for every process. For example, the customer service core process has 38 process maps to create. This hasn't been done yet. Our phone began ringing once the process managers realized that their bonus was at risk. They only have a little over a month before year-end. This afternoon, managers began calling us for help in completing the documentation.

Business Process Status Review

Xerox's corporate office of management (COM) wanted to know if the budget was adequate to meet 1995's development goals. Their question resulted in a two-week review by those individuals involved in the re-engineering process in October. Bill Joyner explained:

> When IM funding was reviewed by the COM, it became apparent that the price tag was more than expected. They wanted to see a real payback. We know that TTM and MTC are critical. Those are the top two priority areas. ISC and CS fell off the scale. The welcome center will be part of customer services. It has responsibility for the technicians that go out, plus other soft services like releases and updates of software. We are talking about all the services needed to deliver a total solution. The copier "box" only needs a customer engineer. The "total solution" is much broader than our previous understanding. The IM manager in Brazil had a AM-PM policy. You call in the morning, we deliver in the afternoon. You call in the afternoon, we deliver in the morning. They have service people riding bicycles across town. How do you incorporate that at the global level?

After the two-week review, Wiseman described the key issues shown in Figure 7:

> In the last two weeks, integration issues have become important. The key issues included (1) configuration with TTM, (2) ordering from ISC, (3) customer relationships and (4) contract management. MTC expects order type, customer type, market and product codes, and the status of booked, scheduled, staged, shipped, and delivered orders to be available. That must be linked to customer service installation prep work, status, service-call history, machine location, and "as is" configuration. The MTC current-state document in 1993 pointed to all these issues. Reports were written that said we needed to address these issues, but it was ignored. People now realize that integration has budget implications.

> I presented this evaluation of the MTC cross-process interfaces. I started with a "life-cycle view" of MTC starting in 5.3, showing the selling process in 5.7, solutions and order fulfillment management in 5.8, invoicing in 5.9, credit and collection in 5.10, customer relationship management in 5.11 and, finally showing contract management in 5.12. We discussed issues relating to key interfaces and integration. Integration uses shared services and shared data. Question marks show things we aren't sure about, check marks show things we think we have covered, and "X"s show things that won't be completed next year.

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Figure 7: MTC Interface Issues
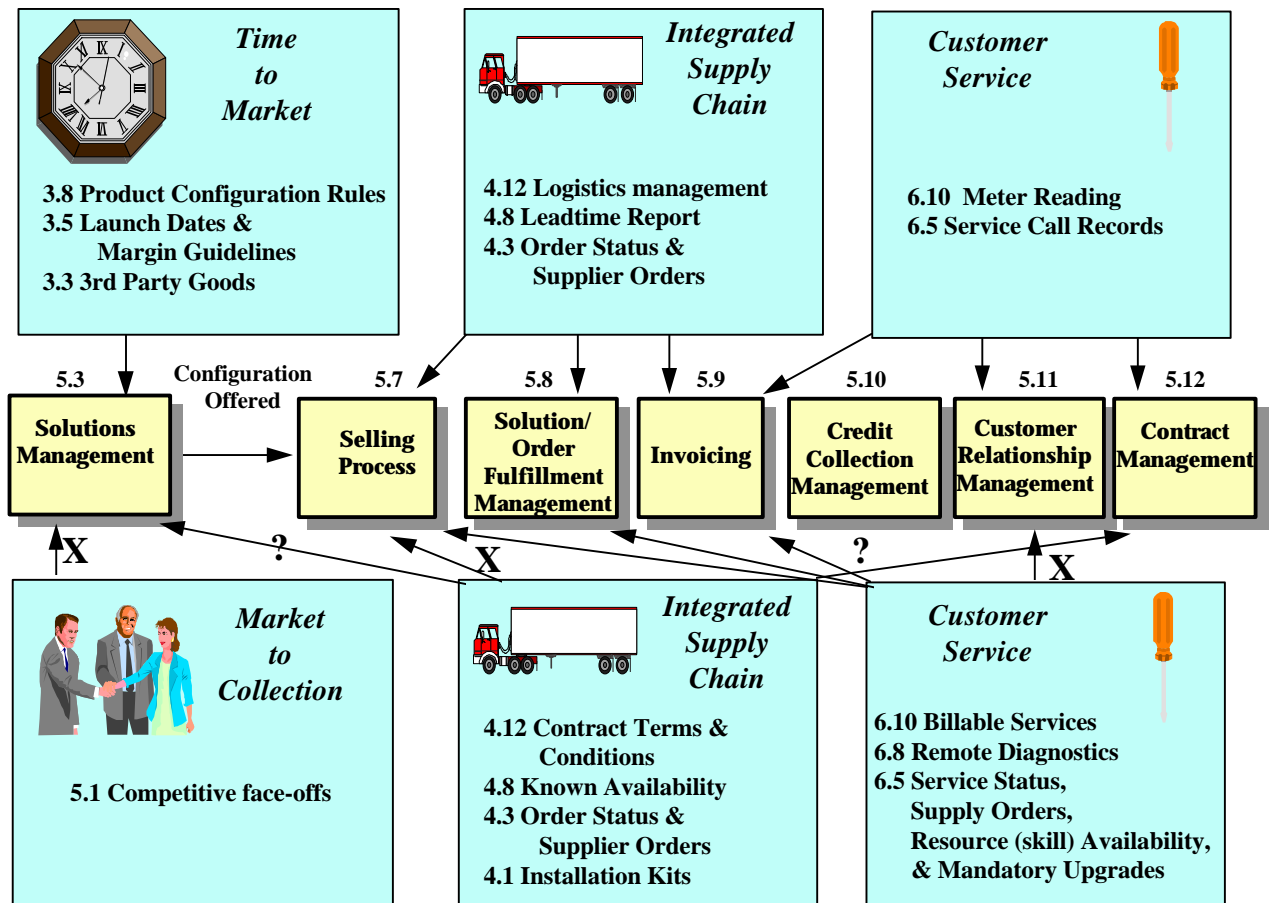
From the *Time -To-Market* core process, we plan to have product configuration rules (3.8), launch dates and margin rules (3.5), and third party products (3.3) ready to support solutions management (5.3). However, from the *Integrated Supply Chain* core process, we don't know if we will have installation kits (4.1) or stop-order, quality-holds and substitutions information (4.8). That means that MTC must design and define "alerts" for the sales force using ISC raw data. Senior executives now understand that we won't know what inventory is available when we make a sale and, therefore, we won't be able to tell the customer when we will deliver it. It looks like supplies won't be ready either. Supplies represent 15% of our sales with the highest margins. We sell $800 million per year in paper. Service availability will probably not be ready either. Everything from *Time-To-Market* for paper will have to be put into the Oracle data base. Today's lead-time report shows the national average and is not meaningful for delivery. That means that we can't know how long it will take to complete a solution installation. We won't have that capability until well into 1997. That "X" will stay there. We identified these same issues when we completed the Denver report in August. In August, it was a problem, but now it has become a crisis in funding and focus. We have lost three months.

Bill Joyner further articulated the development issues:

The conversations between the core process managers have been going well. Below that level, there is limited follow up, execution or completion. It isn't cascading down. We have lots of work lists. Everyone thinks they have been talking, but there are lots of holes. Until they get these interfaces right, they have a long way to go.

There is another family of products that are being rolled out from TTM that revolutionize the configuration process. It is a total modular design for customized orders. That will complicate the parts ordering, since you can order the finished product or order the parts. That impacts ISC and CS. You need the people and infrastructure. Sales people will do their own service work. It has indicators and you just replace modules. Diagnostics will be in the CS.

Configuration is an issue. Right now it is being done manually. That process is owned by TTM, not MTC, and they are on a different development time-line. Now we have to solve this problem. MTC gets an order from the customer that has to be parsed into installation, cabling, documentation, and soft services. It may be five line items that breaks up into 25 items that goes to ISC and CS. The MTC people never recognized that as part of the development process. That has added to the challenge.

As Wiseman concluded:

We have completed negotiations with ISC, but funding is an issue. We are now needing $19 million that was not anticipated. Top management wants to know why we didn't anticipate this need. Finding that money will be a problem. The business divisions are the one's that get taxed for this. They had a problem with the current budget of $94 million.

The availability of service through a welcome center had also been delayed. Bill Joyner explained:

A customer with a problem could easily have to call three or four different numbers to get a response. There are different numbers for an order, for invoice problems, and for service requests. A real dissatisfier comes from having to deal with different numbers and people. Our customers are no different. We plan to build a customer service center. Incoming calls will pull a common data base and do routing and dispatching. One number will get to any information on the invoice. It is the same architecture by country. That budget request was not included in the 1995 budget.

Managing Change

Vogel understood the importance of having organizational sponsorship and transformation efforts with communications and training, and user support. He described the requirements for change:

There are the three aspects, people, process and technology. We are focused on ensuring that the people aspect is fully integrated with technology and process. Paul Allaire sees potential for us to develop a unique solution to provide us with a competitive advantage in a global marketplace. We want to make sure that is something that we can provide and that it can't be readily replicated by competitors. We see the new productivity as a person-centric approach based on our belief that our most unique assets are people and their ability to create unique value. We came in after work was already being done and have been in a catch up game since it will take as long to put human resource activities in place. The cultural change could take two to three years or longer. We have been trying to balance and integrate the three areas.

On the people side, we focus on training and communications. The organizational design is based on customer business units which is relatively new. That began in January of this year. The desire is to move to high performance work groups and work systems where you have a lot of individual empowerment. The driving force is still the customer. What can we do to meet their needs in a realistic way.

When it comes to technology, we are providing a sales automation tool. That gives the rep the capability to use sales force automation technology to access the market customer data base. That will provide them all the information from the divisions or manufacturing, and allow them to upload updated information on

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their territory. The proposal generator and new information on establishments will be provided through the sales force automation tool. The market customer data base is central.

Under process, were are standardizing processes worldwide, starting with the ten-step selling process. The order fulfillment process concerns customer relationships after the sale. The process is flexible to leave the how to the local sales force. This is a macro management process that allows for better management of a sales territory. It doesn't take creativity away from the sales rep, it maximizes it.

You have to realize the magnitude of resistance to large scale change. We keep impressing on top management that you don't do a light switch approach on people, process and technology. You can have the processes and technology in place, but blow a fuse because the people are ready. What is in it for them? Why should they do it? We still have a mountain to clime here.

The real culture shock will come when we move to the virtual office. They have lost many of the older sales managers because they like being in the office with a secretary. In Europe, managers will take another decade to become PC literate. They have no intention of getting rid of their secretaries, since that is a status symbol.

Training had also begun with the introduction of release 1.0. According to Unni:

I put together the education package for BPM, with 200 slides. I will present it in Venezuela for the first time. I will start by showing the business process ownership, documentation, process breakthroughs, continuos improvement, process measures, management systems, and technological breakthroughs. Technology influences process. Process demands technology. You don't want to design a process without knowing what technology is available. You are not going to take existing technology if there is something better. I have a chapter on each area. In process measures, I discuss what metrics are, how you develop them, how you report them, etc. Change management will be at the end. Paul Allaire introduced the management system to describe how we are going to manage the company. If business process is a big part of what gives us customer and market focus, you better pay attention to that. I developed a training course on reengineering four or five years ago that was highly attended. That was because of curiosity. Now it is required. We will have to see if it is as attractive.

The enormous task undertaken to re-engineer Xerox had resulted in a lot of frustrations. Chapman explained one of his most significant lessons:

We have realized that Xerox management, other than IM people, have no real understanding about how to put a software project together. They are real good at setting dates and then wondering why they are missed. We have burned a few people because of that process, but Xerox lives with that and it won't go away. The highest levels of management will set target dates, and then ask why they are not met, instead of asking what it will take. I might say three to four years, but they want absolute target dates for delivery. I think it is also undercapitalized. It is a lot of money, but if you took a system at DEC, for example, that was going to save you a million dollars per day, you might spend $600 or $700 million to build the system. Those are the numbers that I am used to. We are planning to build a systems with estimated savings of a million per day that will cost $300 million to build. I think that is undercapitalized. That story is getting out. Nobody ever thought about how much hardware this was going to take. All the planning over the last three years missed it big time.

Bill Joyner also expressed his frustration with the absence of BPM leadership.

There has been more reorganization lately. You can almost tell who is "in" and who is "out" by who they report to. The BPM group reports to the office of the CIO. We are down to about six people now. Bill Kane supports TTM. They have re-engineered most of the process. Claudette is doing CS. Mike Wiseman is in MTC.   I support ISC. We have been without a manager for over a year. We have had a series of temporary managers. We found out in mid June that Bob Hope was our temporary manager. We did not meet him until six weeks later. We aren't sure what that means. Someone else has been given

integration and engineering responsibilities. Pat Wallington keeps telling us how important our services are, but nobody wants to work in this organization. We keep being asked what it is that we do.