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SAP implementation at Metalica: an organizational drama in two acts

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This play attempts to reconstruct the social reality of key players at Metalica during the first couple of years of SAP implementation. Rather than adopting one perspective about the SAP project, we provide the views of different participants using their own words, arguments and ideas as much as possible. The play is constructed from summaries of systematic interviews which were changed only to suit scholarly objectives and a dramatic presentation. At the request of the company involved, the names and locations in this case have been disguised. Act 1 describes the company's vision concerning the implementation of an enterprise resource planning (ERP) system, a crisis which emerged during the initial phase of implementation and the actions taken to remedy the shortfalls. Act 2 describes the project management, the dynamics between the implementation team members and the organizational implications of an ERP system implementation. The actual performance of the play and a subsequent discussion among the participants enable students to re-create and experience the thrills, frustrations, dilemmas and concerns originally expressed by the people who inspired this account of SAP implementation. Using theatre in an academic environment opens new avenues for critical observation, integrative sense making and experiential learning.

Act 1

Scene 1: The Vision

11 April 1996 – at the weekly meeting of Metalica's executive team in the Pittsburgh corporate office. Spring time. A few scattered cirri cruise in the blue sky and another sunny day blesses the newly dressed trees.

Participating roles: Chief executive officer (CEO), head of systems development, chief financial officer (CFO) and chief trainer.

CEO: Good morning, folks. The first issue on our agenda today is the implementation of SAP at Metalica. (*Sips his coffee*.) As you probably remember, 2 months ago the board of directors accepted the recommendations of the breakthrough team and approved the budget for the SAP project. Two leading members of that team (*smiling at head of systems development and chief trainer*) have joined us today to discuss the implications of the upcoming changes. They will present their implementation plan, address your concerns and answer any questions you may have. (*With a hand gesture, invites systems development head to talk*.)

Head of systems development: (*Cheerfully*.) Thank you. (*In a serious and monotonic tone*.) Let me go briefly through the chain of events which brought us to this point. During the 1980s, government sales played a major role in Metalica's revenues, but since 1989–1990, private market sales have accounted for most of them. We have been forced into a new way of doing business. The long term cost-plus contracts with government agencies have been replaced with aggressively priced sales quotes to corporate buyers from various industries. (*Pumped up*.) It has been clear that if Metalica wishes not only to survive, but also to capitalize on these changes, we should becomes more competitive and more responsive to the market's needs and forces. (*Pauses, and looks towards the CEO*.) In an attempt to clarify how we could achieve this goal, you asked Andersen Consulting to assess the entire company's business processes. Their report was submitted about a year ago and the Breakthrough Team was appointed to review their recommendations and to examine ways in which they can be implemented at Metalica. Andersen's evaluation focused on the discontinuities between our manufacturing and service facilities. They blamed our proprietary information systems for undermining efficient, organizational-wide monitoring and control of the critical business processes. They recommended that we integrate the business process across the functional units by managing value chains from end to end.

CFO: (*Abruptly*.) Sorry to interrupt, but what do you mean by managing value chains?

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Chief trainer: (*Assertively*.) According to the concept of value chains, a business process can be broken down into a set of discrete activities, each of which should add value to the organizational output. Managing value chains refers to the practice of analysing and maintaining the work flow as a set of value-adding activities from end to end with no regard to functional barriers. (*Excited*.) Treating our business processes as value chains can help us to get rid of redundancies and non-contributing activities as well as to gain cross-functional control. Ultimately, these efficiency gains translate into the bottom line and competitive advantage.

Head of systems development: Based on their analysis, Andersen Consulting concluded that Metalica's operations should be reorganized according to the value chain model. However, we currently do not have an information system which can support such an objective. (*Looks around*.) Each of our facilities has its own unique information system, a local set of performance evaluation criteria and a proprietary classification scheme. This variety rules out the possibility of integrating all of our business units into one organization-wide system which keeps track of the business process from start to end.

Chief trainer: (*In a confident tone*.) Moreover, the current information systems are operations oriented rather than customer oriented. Their focus is on how to manage and control the local processes rather than on how to best serve our customers.

Head of systems development: (*Conclusively*.) Cutting to the chase, what we really need is an ERP system. (*Pauses after noticing a few puzzled looks*.) ERP stands for enterprise resource planning. In a scattered and diverse organization such as Metalica, an ERP system can provide managers with the advantage of real-time, multiperspective, organization-wide control over resources and transactions at every level of the company. (*Enthusiastically*.) We have evaluated ERP applications from Oracle, BAAN and SAP (*pronounced S.A.P.*) and found that SAP fits best with our business practice. Although no ERP systems are particularly good at continuous to discrete production, we found SAP to be best able to handle the core business of our company, the alloy product. Furthermore, given the magnitude of the investment and the vast effect on our company, we also feel most confident going with SAP as it is the uncontested leader in the ERP applications market.

Chief trainer: Another critical consideration here was the general shortage of trained professionals having knowledge of ERP systems. Because SAP is the most popular product, relatively more people are familiar with it.

CEO: Would you please tell us more about SAP . . .

Chief trainer: Of course. SAP stands for systems, applications and products in data processing. (*Hastily*.) SAP is the worldwide leader of enterprise-wide client/server business application solutions. It is installed in over 6000 organizations, which include many of the top performers and key Fortune 500 companies. Their headquarters and R&D facility are in Germany and . . .

CEO: (*Abruptly*.) I hate to interrupt you, but tell us more about SAP in terms of the business application we are about to implement. (*Pause*.) For example, how exactly will we benefit from implementing SAP?

Chief trainer: (*Assertively*.) SAP will provide us with an easily accessible common database of real-time, accurate and consistent information about our business. Ultimately, it will enable everyone in the organization to be better informed and, in turn, to make more effective decisions.

CEO: Yeees . . . (*Asking for more details . . .*)

Chief trainer: (*Calmly*.) Today, we have to bridge among all the systems and databases in use. Typically, databases are updated once a day, usually overnight, in batch processing. With SAP, the interfaces are seamless and all information will be updated automatically on the fly. As soon as a transaction is completed, the data will become available throughout the entire organization. Information will be not only more timely, but also more accurate.

Head of systems development: Another aspect of accuracy is data consistency. The real time update prevents discrepancies due to conflicting information which was entered in the interim periods between updates. All modules are kept synchronized at all times via one integrated database which eliminates data redundancy and prevents data discrepancy. As an additional safety net, SAP transactions generate audit trails which show the effect of each transaction on all areas within the system – no more wondering why a certain transaction did or did not occur. Furthermore, SAP uses a standard set of procedures. The uniformity of practice and maintenance also contributes to reduction of errors.

CFO: (*In a provocative voice*.) Is it not risky to have only one database? It seems that any small human error will propagate immediately throughout the entire organization. (*Pause*.) This is a recipe for a disaster. I am not convinced that the gains of central architecture compensate for the risks resulting from single

source data entry. Would you please address this issue and explain the advantages of a common database?

Head of systems development: (*Self-assured*.) In today's system, inventory at the mills cannot be viewed by the service centres which handle sales and customer support. With SAP, all inventory for the company will be contained in a single common database. Having the inventories of finished goods and raw materials visible at both ends will enable us to improve inventory management as well as provide accurate and timely information to the customers. All of this translates into a better bottom line.

CEO: (*Rather wary.*) How exactly will customer service improve?

Head of systems development: When a customer places an order, inventory at both the service centres and the mill can be checked to see whether current inventory or planned production is available to meet the demand. Additionally, new capacity monitoring tools will be available to commit to a realistic delivery date for the customer.

CFO: (*Alarmed.*) I can see the pie in the sky, but I am concerned about the conversion process. Would you run the current system in parallel with the new system until we are sure that it functions appropriately? I hear all kinds of horror stories related to computer systems integration failures and I do not want to have a first-hand experience. Have you prepared contingencies to assure a safe migration?

Head of systems development: (*Deliberately*.) We cannot have a full-scale run of both SAP and the current system at the same time. We do not have the resources for such an endeavour and that is not the common practice. SAP is too complex and must be integrated entirely with all the modules in order to work effectively.

CFO: (*Looks worried.*) That is exactly what I am scared about . . .

Head of systems development: (*Without thinking.*) But, we will not convert all the company at one time. No cold turkey is planned here. (*In an assertive voice.*) We limit our risks with a rolling implementation, in which one business unit is converted at a time. (*Pause*.) We suggest starting with the Hopewell, VA service centre as our pilot. Yes, we will probably have some unavoidable squeaks, especially in the conversion process. But the anticipated efficiency gains are worth the trouble. I estimate that we should be able to provide at least 80% functionality upon initial conversion and we will work out the problems until the system is bug free. Also, bear in mind that this initial functionality will improve continuously thanks to our implementation method. We plan to do one location at a time and, thus, will be able to apply our accumulated experience in each subsequent installation.

CEO: (*Inquisitively*.) What about training?

Chief trainer: (*Energetically*.) More than 600 employees need to be trained. Training will include the basics of SAP, system navigation and employee-specific training on some directly related business processes. Training will be done in small groups and will be provided in each location as close as possible to the roll out time. Training time will range from six hours to several days.

CEO: (*Cautiously*.) How can you train 600 employees in such a short time?

Chief trainer: (*Assertively*.) Basic SAP knowledge will be transferred online via a computer-based training tool. This is not only a very cost effective method, but one which allows us to deliver a consistent message to a large audience in several locations. It enables a self-paced learning environment and assists in personnel examination and certification. For new roles and responsibilities, instructor-led classroom training and workshops will be provided. I will supervise the training process. Given the time constraints and the limited in-house expertise, we hope to farm out most of the training. At this point, we are negotiating with a company which specializes in SAP training and has all the required certification, experience, trained manpower, teaching aids and so on.

CEO: (*Upbeat.*) Okay, so what is next?

Head of systems development: (*Conclusively*.) I believe that we have covered the major bases of the project. We have talked about the organizational benefits anticipated from SAP, about the implementation methodology and about our plan of action. We have also attempted to alleviate any concerns that you have expressed. At this point, we have to fine-tune the project schedule and then we are practically ready to roll. (*Looking at the CEO.*) Any other issues you wish to discuss before endorsing our plan?

CEO: (*Earnestly*.) I think that by now we are all very optimistic about the use of SAP and its benefits. I am really excited about this project. So far, it seems that you are doing a great job in planning the implementation of the Breakthrough Team recommendations and I would like to hear from you again when we are ready to go live. (*Looks around at the committee members and asks*) Any other questions or concerns? (A brief pause.) Okay, before we move to the next topic in our agenda, let us take a short break.

Scene 2: Meltdown

30 June 1997 – at the general manager's office in the Hopewell Service Centre. In the background, a humming industrial fan unsuccessfully fights another hot and humid summer day in Virginia.

Participating roles: general manager and head of systems development.

General manager: (*In a serious tone*.) You have just installed SAP here and my service centre is in a shambles. You have come with the premise that SAP will streamline our business process, enhance competitiveness and contribute to the bottom line. Yet, what we have experienced so far is just the opposite. My people are disoriented and frustrated, our customers are furious and we are losing business. (*Assertively, after a pause*.) We are willing to do what it takes to make this work, but you need to lead the way. I cannot believe you would put us in such jeopardy.

Head of systems development: (*Looks exasperated while interrupting general manager*.) I understand your concerns and share your frustration, but here we are and it not all our fault. We had to let IBM go because they were sending us second-string consultants. We work now with VOBW. They are much better. Yet, they told us we were ready to go live even though it is clear now that we were not. They should have known. (*Pause*.) And we are paying the price . . .

General manager: (*Furiously*.) This is a disaster. (*Sighs and after a brief pause asks*) So what do you suggest? What should we do now?

Head of systems development: (*Assertively*.) We cannot blame the technology for our troubles. SAP is a top notch system which has already proven itself in many organizations similar to as well as those more complex than Metalica. I suggest that we cool it (*grins and wipes a thin layer of sweat from his forehead*) and try to get our act together so we can take advantage of this golden opportunity to streamline the business process.

General manager: (*In a flabbergasted tone*.) What do you mean by getting our act together? It is not us, the service centre people, who need to take a hard look at our actions. (*Points a blaming finger towards systems development head*.) It is you and your team who have failed to implement what you describe as a miraculous fail-safe technology. (*Pause*.) We were just fine before you guys showed up here with the gospel.

Head of systems development: (*Defensively*.) My team is a hard-working competent bunch and we did our share of planning. (*Pause*.) Yes, things could have moved a bit faster, but we really were not ready. We had not even tested the printing of basic invoices and material certifications before we went live. (*Pause*.) VOBW should have warned us instead of encouraging us to meet the originally planned D-Day.

General manager: (*In a blaming tone*.) You cannot just point fingers at others. It is not right.

Head of systems development: (*Apologetic*.) We are doing our best, but we cannot guarantee a flawless implementation. There are too many things beyond our control. Bear in mind that our situation is not unique. A survey completed recently by The Standish Group found that while approximately 16% of MIS projects were successfully executed as planned, approximately one-third were cancelled at some point. The rest were eventually completed, but suffered from crippled features, serious delays and cost overruns. In fact, for every successful project there are two which are abandoned. Unfortunately, this is the state of the industry.

General manager: (*Grumbling*.) So why are we not among the happy 16%? (*Unhappy*.) We will be cleaning up this mess for months. We are just lucky those bad invoices did not get sent to customers. One of them was for $5 million instead of $50 000. It is a good thing our people are so dedicated to our customers, but now they are completely frustrated. You cannot blame them for being upset with a new system which disrupts the business process. Bear in mind that these are the people who face the irritated customers and write off the lost sales which have been caused by the poor implementation of SAP. They expected improvement and ended up with aggravation. We will sort it out, but it seems as if we could have avoided all this completely.

Head of systems development: (*Rather frustrated*.) We used project management tools and broke down the implementation into manageable tasks with clear objectives and time line. We streamlined the business process and put the information systems in place. (*Pause*.) We just ran out of time and did not train enough.

General manager: (*Grim faced*.) This conversation makes me feel like a dog chasing its tail. (*In a firm tone*.) I am very disappointed by the new system, I find your performance inadequate and I seriously doubt your ability to take us to the promised land anytime soon. (*Pause*.) We need an immediate and concrete remedy. (*Pause*.) And do not forget, we are tired. It is hard for anyone to be enthusiastic at this stage, so working with us is not going to get any easier. I do not think our process is very strong yet, but I am not prepared to work on that until after SAP is working properly across the board.

Scene 3: Reorganization

4 August 1997 – at the office of the vice-president of finance and administration in the company's headquarters in Pittsburgh. An early morning meeting.

Participating roles: project manager, head of systems development and chief trainer.

Project manager: (*In a vibrant voice.*) Good morning, people. Following a directive from the executive team on which you have already been briefed, I am taking over the management of the SAP implementation project. (*Pause.*) I am the VP of finance and administration and have a background in finance and accounting. The implementation of SAP has aggravated too many people and we have had a lot of commotion in the organization. Although I am not an information system expert, the CEO asked me to apply my extensive knowledge of our business processes and practices to put the project back on track. Given the magnitude of the task, I have made myself available to oversee the project on a full-time basis and count on you to be there with me.

Head of systems development: (*With a wry face.*) So what am I supposed to do?

Project manager: (*Assertively.*) While I concentrate on coordination, general management and various organizational aspects, I would like you to focus on the technical facets of the implementation. You will report directly to me and you will too (*nods at Chief Trainer*).

Chief trainer: (*Calmly.*) Okay.

Project manager: Tell me about the implementation team. Do we have the right people to pull this job off?

Head of systems development: (*Swallows hard.*) The core implementation team has been expanded in the past three months from six to 14 people. Currently, we have six professionals who deal with system analysis and application development, three technicians who handle hardware and networking issues and five power users from within the ranks who configure the system and assist their peers. (*Pause.*) Can we deliver? (*Titters briefly.*) At this point we are in a better position to do so. (*Pause.*) We are still understaffed in comparison to other companies which implement SAP, but the situation now is much better than it was a few months ago. (*In an assertive tone.*) Having a critical mass of skilled and experienced personnel in the core team as of day one is essential for effective implementation. We have paid dearly for being understaffed and for having some misfits.

Chief trainer: (*Assertively.*) I certainly agree that the core team is too small. Additional people would allow more flexibility in resource allocation, longer training sessions and would make us better able to deal with the unanticipated problems which keep popping up. (*Pause.*) A critical mass of diverse professionals and meticulous coordination are the cornerstones of an effective SAP implementation team. (*Forcefully.*) The scale of SAP implementation is overwhelming in size and no one person can capture and understand it all. It has to be a coordinated group effort.

Head of systems development: Another important consideration here is the integration between the 'IS-oriented people' and the 'business-oriented people' in the team. The IS people manage the technical aspects of rolling from the legacy system to the new system. However, the implementation must be driven by the business people who understand the work processes and practices. (*Pause.*) The business-oriented team members wear many hats and have a pivotal role in the implementation. They identify the opportunities that the new system opens up and communicate them to both managers and fellow workers. (*In a giggly tone.*) They perform as coaches of the new vision, cheerleaders for the line troops and blockers for the systems folks. (*They all laugh in unison.*)

Chief trainer: (*In a thoughtful tone.*) The implementation methodology is also a critical success factor. I suggest that from now on we will adopt ASAP guidelines.

Project manager: (*Perplexed.*) What exactly is ASAP?

Chief trainer: (*In a steady voice.*) ASAP stands for accelerated SAP, which is SAP's comprehensive solution to streamline the implementation of R/3, their client/server-based application. It focuses on the coordination of all the elements which make an implementation successful and attempts to minimize the time required by lengthy customization. ASAP is the last word in SAP implementation and is facilitated directly by Team SAP. (*Tenaciously.*) In principle, we should adopt this methodology with the assistance of VOBW.

Project manager: Tell me more about this methodology.

Chief trainer: The ASAP uses a road map metaphor to convey a detailed project plan as a structured sequence of activities related to the implementation. The road map is comprised of a full description of each step along the way, including check lists, examples and all the technical support. (*Pause.*) Central to the SAP implementation methodology is a phase of

business process analysis which is guided by the value chain model. An essential part of this phase is a process named blueprinting, which entails mapping and restructuring the business process into a set of industry-standard templates. (*Looks somewhat uncomfortable.*) I have got tons of documentation and there is plenty of information in SAP's web site. Do you really want to know more at this point? (*Grins.*)

Project manager: Okay, we will talk about it later. (*Seriously.*) We still need to clean up our act and put the project back on track. I would like to hear what is wrong and how you think we can fix it. Let us identify what works for us and what does not. We need to capitalize on our strengths and reinforce our vulnerable areas.

Head of systems development: (*Rather emotionally.*) The most aggravating problems now are in the areas of training and data conversion. Both problems stem mainly from a lack of sufficient in-house skilled personnel.

Chief trainer: (*Assertively.*) Training is a thorny issue which goes beyond the number of trainers available. The training in Hopewell has been sluggish mainly because we embraced the wrong training methodology. We have focused on showing people how the software modules work rather than on demonstrating how these modules are integrated into the business process and how they relate to the core objectives of the business unit.

Project manager: (*Slightly confused.*) I do not understand. I have always thought that training is about showing people how to work with these software modules.

Chief trainer: (*Inspired.*) Traditionally, IT experts treated training as an additional 'task' in the implementation plan. They perceived training as teaching the users how to run the various software modules which relate to their particular role in the company. This approach is problematic because it attempts to replace a set of deeply rooted practices with new seemingly arbitrary procedures. Lacking a meaningful rationale and a clear sense of direction and purpose instils uncertainty in the users, who in turn become uptight, impatient and develop resistance to change. In retrospect, the traditional approach which we took was doomed to begin with.

Head of systems development: (*In a saccharine tone.*) What is the problem here? Why have you not simply supplemented the ongoing training sessions with some big picture mumbo jumbo?

Chief trainer: (*Smiles winningly at project manager seeking his approval.*) That is exactly the pitfall of the conventional IT training – we take a bottom-up approach in which the big picture emerges only at the end of the process when the relationships among all the basic routines are finally clarified. (*Pause.*) The bottom-up approach may be fine for training users of simple software applications in which the training process can be completed within a few hours or a day, but it fails in large-scale projects which span over months and sometimes years.

Project manager: (*Timidly.*) So what is the alternative?

Chief trainer: (*Assertively.*) The better alternative here is the top-down approach, wherein users start the training by embracing the organization's mission and move down through the business processes all the way from a general block diagram to the finest details. The flow of training materials should be from abstract to concrete, from a schematic outline to process flow details, from general objectives to concrete evaluation criteria.

Head of systems development: What is the advantage of top-down-oriented training?

Chief trainer: The users never lose sight of the organization and the system's objectives. They are able to position each new software module in a familiar context rather than treat it as a vague element whose relevance can only be understood later. They can identify the boundaries of each module clearly as well as the relationships between them. (*Pause.*) The top-down approach delivers a well-directed story rather than a disconnected set of instructions and, therefore, guides and enhances the trainees' ability to make sense of the new system. Better sense making reduces the associated uncertainties and improves the trainees' comfort level. All in all, the top-down approach encourages open-mindedness and relieves fears, which in turn reduces resistance to change.

Project manager: (*Authoritatively.*) I am convinced. How long will it take you to reorganize the training programmes and retrain the trainers?

Chief trainer: We will be ready for the upcoming implementation in the San Diego service centre.

Project manager: Any other issues we should discuss today?

Chief trainer: (*Deliberately.*) We also had a problem with project management. (*Looks at head of systems development and says*) No offence.

Head of systems development: (*In a frozen voice.*) None taken.

Chief trainer: I joined Metalica 12 years ago, became a corporate trainer five years ago and have been on this project from the very beginning. This track record provides me with a good perspective on

both the organization and the project. (*Pause*.) I have no doubt that SAP projects should be managed by someone who comes from the business side and is well aware of both the business processes and the corporate culture. This is not a job for an IT expert because SAP implementation is not so much about installation and configuration of software as it is about realignment of both the business process and the organizational ladder. (*Pause*.) The main difficulties and challenges in an SAP implementation do not stem from the new technology but from the adjustments required in the business process and practice.

Head of systems development: (*Accusingly*.) Another related issue has to do with the prolonged decision cycle and my limited authority to make decisions related to the business process. Much of the animosity in Hopewell stems from our inability to solve problems in a reasonable time. Our slow response is being interpreted by the users as incompetence. They simply do not care that sometimes it takes more than two weeks to get the approval of the appropriate committee for a change in a business procedure . . .

Project manager: (*Self-assured*.) That is why I was assigned to lead the SAP project. My involvement will shorten the decision cycle tremendously. You will rarely have to wait for board approvals because I have the capability and the authority to make decisions on the fly. A quick and responsive decision-making process will enable a smoother implementation and ensure substantial savings.

Head of systems development: An efficient SAP implementation requires a savvy team leader who can make quick decisions and muscle them through the organization. I am glad we are going to have a business orientation with someone in charge who can get things done. My main frustration so far has stemmed from the daily battle with the organizational windmills. Now I will be able to focus on the technical issues.

Project manager: Okay. We will meet again tomorrow to discuss our plan of action in detail.

Act 2

Scene 4: Back on Track!

19 December 1997 – at the weekly meeting of Metalica's executive team in the Pittsburgh corporate office. The blue spruce scatters its piny fragrance around the room and inspires a holiday spirit. Outside, an opaque grey sheltering sky seems to bear the first round of snow.

Participating roles: CEO, project manager, CFO and chief trainer.

CEO: We have invited you (*looks at project manager and Chief trainer*) to give us a briefing about the state of the SAP implementation.

Project manager: As you all probably know, we split the implementation into two phases. In the first phase, we deal with the financial facets of the company, sales and distribution, material management and production planning. At this stage we will not handle the manufacturing management side, but rather interface with the legacy systems. Areas such as costing, plant maintenance and the shop floor are left to the legacy systems until the second phase of the implementation.

CFO: (*Abruptly*.) So, how are we doing?

Project manager: (*Upbeat*.) Well, we are still in phase one. At this point, we are finally in control in Hopewell and we are live in San Diego. We overcame the initial hurdles and now we are back on track!

CFO: What is your criterion for being back on track?

Project manager: (*Assertively*.) Having both progress and costs within the parameters of the master plan is a good indicator.

CFO: But how do you know that your wagon will not get stuck in mud again?

Project manager: Oh . . . (*Smiles*.) Since I took over, many lessons have been learned and many fundamentals have changed in the critical areas of training and systems conversion. Rather than tutoring some narrow functionalities, the training programmes are geared now to provide users with a wide organizational outlook, which in turn enhances both user satisfaction and user involvement. (*Pause*.) We run the project very tightly and initiate a swift response to any unanticipated mishap, snag or deviation. We simply nip it in the bud and do not let it become a problem.

CEO: (*Emphatically*.) The San Diego people gave you a lot of compliments, which are in sharp contrast to the opinion of some people in the Hopewell service centre. How do you explain the difference?

Project manager: (*Decisively*.) It is mainly a result of the changes we made in the implementation process, especially in the training programme. We came to San Diego with a much better understanding of the nature of SAP and how it should be applied to our business process.

Chief trainer: (*In a suggestive tone*.) Another related factor which may have a significant influence is our state of mind. (*Pause*.) After the difficulties in Hopewell, we all knew that we had no choice but to make San Diego a success story. (*Forcefully*.) Only a success story could restore our lost credibility and relieve the criticism. (*Pause*.) San Diego was a do or die

situation and we did . . . We had better training, with one-on-one hand holding and a number folks could call anytime.

Project manager: (*Assertively*.) We may have paid dearly in Hopewell, but we learned a great deal from our mistakes. Now the implementation is much smoother. Both the data conversion procedures and the training programme have been improved significantly and tuned to our needs.

CFO: (*Enthusiastically*.) This is great! (*Pause*.) And what about SAP? Does it live up to its promise?

Project manager: SAP functionality is okay. Although some modules are somewhat inferior to their comparable best-of-breed vertical applications, this disadvantage will be compensated for by the integration capability of the software. Remember, phase one is going to cost more than it will return. It is just a foundation on which to build. We hope to realize the power of SAP within a few years when phase two is done and everybody has become accustomed to the powerful features of the tools that it provides.

CFO: (*Anxiously*.) Would you mind elaborating?

Project manager: (*Self-assured*.) Not at all. The main premise of SAP R/3 is its ability to integrate all the business processes organization wide and to coordinate the work flow across functional areas along the business value chain. SAP will enable us to avoid the pitfalls of our traditional functional–hierarchical structures which often hinder cross-functional information flow. For example, SAP will integrate our manufacturing facilities with the sales and distribution branches. (*Pause*.) In addition, SAP implementation methodology forces us once and for all to review critically our business processes at a grass-root level and to restructure them along effective value chains.

Chief trainer: Although organization-wide integration provides many advantages, it may cause some operational difficulties which stem from a tighter alignment between the formal and the actual business practices. For example, SAP does not allow inconsistencies between a sales order entry supply time and inventory status. One simply cannot sell or promise to ship an item which will not be available in the inventory at the appropriate time. This feature may enforce good and honest business practices and it may improve the coordination among the different business units, but it also reduces the flexibility of local management to juggle among conflicting business constraints.

CFO: (*Worried*.) Now you make me wonder whether we will simply replace one problem with another. Are you sure that the aggregated effect of SAP is a productivity gain?

CEO: (*Assertively*.) And I am concerned about the perceived usefulness of the new system. (*Pause*.) We will not be able to reap the benefits of SAP unless everybody uses it. Yet, we already know that compliance with mandatory use of an information system will subside over time. SAP will be used to its full potential only if it is perceived as relevant, appropriate and useful.

Chief trainer: (*Looks at CEO and smiles*.) I would not worry about perceived usefulness or productivity gains. SAP is not perfect, but all in all it has the potential to deliver value. The folks at the sales desks are not raving, but people in purchasing think it is great. Can I read what one person said?

CEO: (*Hastily*.) Please do.

Chief trainer: Here goes. 'I am a senior accounting clerk. As a power user, I have been involved with the purchasing module of SAP from the beginning and I was the first person to enter a vendor invoice into the system. I feel very comfortable navigating and using the system for the day-to-day functionality. Yet, I wish we had been trained to do more than entering transactions and solving minor problems. I would like to be involved in tweaking the guts of the system. System ownership is very important to me. As far as the system is concerned, SAP is really great for us. It is a hundred times better than Walker, our previous purchasing management system. (*Pause*.) SAP is much more user friendly. Help is available online for every field and every transaction can be reversed and corrected. Both the forms and the work process are very intuitive, very sensible and well defined. Except for few awkward German terms that we had to convert, it is a pleasure to follow the default routines. It is not only easy to use, it is also very useful for my job. The information in the system is updated in real time and always current. All the procedures are automated. I have no idea how we could tolerate batch processing and periodical closing procedures for so many years. SAP is a great choice.'

CFO: Is this an exceptional testimony?

Chief trainer: Not really. Though we had to rectify some hiccups in the sales and customer service areas, generally people recognize the value that the new system delivers. Here is another testimony from the manager of the purchasing and office services unit: 'I used Walker since its installation years ago and now have worked with SAP for almost two months. The implementation of SAP was very smooth. We have got good training and a good help desk. The conversion to SAP is being managed much better than the conversion to Walker was at the time we implemented it.

Even though it is very robust, SAP is easy to learn and use. Walker came more pre-customized or pre-configured to Metalica's state of affairs. Now, we need to enter much more information into the system, such as tax codes, terms, etc. Although entering all the extra details correctly is time-consuming, it is not a difficult task and it is definitely worth the extra frills which SAP delivers. We have gained more control over the procurement process because SAP allows us to be more specific with vendors. For example, now we can specify how and when payment is made to a vendor, rather than settling for a pre-set standard. We also gained a much better reporting system, which is more accurate and goes into much finer detail. The additional control came at the cost of some flexibility. For example, while most of the fields in a purchase order form in Walker are discretionary, the same form in SAP must be filled in correctly and completely; otherwise the vendor does not get paid. Moreover, Walker allowed overrides and SAP does not. Everything considered, flexibility may be convenient in the short term, but the SAP way is no doubt much better in the long run because it standardizes the whole process and keeps it in sync.'

CEO: (*Conclusively*.) Good. I am glad that we are back on track. Keep up the good work and keep me posted.

Scene 5: Table Talk

6 July 1998 – in the cafeteria of the Rocky River plant during lunchtime. At a side table overlooking the main courtyard. A conversation among three members of the SAP implementation team – two consultants who serve as team leaders and a unit manager at Metalica who serves as a team member.

Participating roles: team leader A, team leader B and team member.

Team leader A: (*In a provocative tone*.) Would you believe that some of system engineers perceive us as shallow, short sighted and narrow minded? This morning I met a whiz kid who said 'We, the IT people, have the tendency to be very precise and detail oriented; however, you consultants are inclined to be less rigorous. Whereas the IT people tend to optimize, you people opt to satisfy minimum requirements and go on . . .'

Team leader B: (*Somewhat annoyed*.) I am surprised that this person even thinks about us. IT people are notorious for being focused on technological bells and whistles rather than on solutions for real business problems. Computers can be optimized, but people should be satisfied.

Team member: (*Rather coy*.) I find that consultants think in terms of their accumulated experience elsewhere and communicate in lingo taken from instant management cookbooks. This is not surprising because people think with what they know and see the world as it is reflected in the context of their own personal experiences. (*Somewhat emotionally*.) Our team leader always complains that we remould SAP into our existing work practices rather than think about new ways to run the show. At the same time, this person asks us to reinvent the business process, but evaluates our output using a set of generic criteria which are not sensitive to the predicaments of Metalica. (*Pause*.) Would you pass the sugar please.

Team leader B: (*Assertively*.) As an experienced consultant, I can tell you that script writing involves a critical review of the current practices and processes. If you do not attempt to do so, your team and, more importantly, your company is missing a rare opportunity to re-engineer the business process. It is sad if you merely replicate the existing business practices into the scripts and copy the legacy systems into SAP.

Team member: (Defensively.) You are wrong to doubt our competency. We simply do not feel qualified to deal with such a top-level objective. In fact, it is far too much for us to handle the technological changes enforced by SAP along with the effort to write the scripts. Rethinking the value chain from A to Z requires a bird's eye perspective which we do not have. In fact, we would have been totally irresponsible had we assumed such a critical undertaking without the ability to deliver a quality job. The in-depth analysis of the business process which you suggest should be done by senior consultants and not by team members.

Team leader A: (*In a contentious tone*.) I beg to differ. I lead an excellent team of five senior managers; each one is at least at the controller level. Given their seniority and position in the corporate ladder, they all have both the authority and the savvy required for business re-engineering. (*Pause*.) The team dynamics are very positive. Conflict resolution is done through discussion. Professional disagreements are debated until a consensus is reached and the differences are resolved. Personal agendas and issues are not a source of any friction. Hierarchy is flat. No-one is the leader and no-one is trying to conquer anything. All have high self-esteem and mutual respect for one another.

Team member: (*Nonchalantly*.) Would you please pass the mustard.

Team leader B: (*Passes the mustard. Looks at team leader A, sighs deeply and says*) I wish I could say the same. My team members are knowledgeable middle

managers who have a seniority in service but not in position. Although they are fine managers in their particular domains, they do not feel empowered or sufficiently knowledgeable to make plant-wide decisions, let alone organizational-wide decisions. They lack both the expertise and the self-esteem to do so.

Team leader A: (*In a patronizing tone.*) In addition to providing SAP expertise as team leaders, our role as consultants revolves around knowledge transfer. It is our responsibility to teach the power users as much as possible about SAP so that they are able to take ownership. System ownership implies a thorough understanding of a particular application including its intraorganizational effects and an ability to train others. It implies self-sufficiency, problem-solving skills and continuous learning.

Team leader B: (*Forcefully.*) It is easier said than done. The role of consultants should be to provide professional advice, to keep the process in sync with the methodology and to teach basic concepts. Consultants should be perceived as guides, not as leaders. The teams' leadership should be assumed by the organization's people, who should take the initiative and lead the entire implementation process. Yet, too many teams here are led by consultants.

Team member: (*Defensively.*) I do not think that you realize how thin most team members are spread. There is no time to spare on extra voluntary initiatives. Most of us have duties on other teams as well. Moreover, most of us have no sufficient back-up at the home plant and as a result we need to deal with 'other urgent issues' not related to the SAP implementation.

Team leader B: (*Assertively.*) Looking back, making people personally responsible would have boosted my team's performance. At this point, team members feel less accountable because success is a group not an individual responsibility; and I am an outside consultant, not one of their peers.

Team member: (*Somewhat antagonistic.*) Writing scripts and validating them is not an intuitive process. None of us have any previous experience or training in system analysis or in standard operating procedures writing, which require knowledge and experience. No wonder that the scripts produced in the first round were rarely good enough to meet minimum quality requirements. Training in script writing should be mandatory before any participation in implementation. Having the team trained 'on-the-job' is frustrating, yields poor results and is a major cause of our cost overruns, delays and the heavy 'fine-tuning' required after system launch.

Team leader A: (*Nods in agreement and responds in a soothing tone.*) Team building would have been a good pre-project training programme too. It is hard to get a team of people from diverse backgrounds, professions, cities and organizational affiliations to work well together.

Team member: (*Looks withdrawn.*) These pretzels are making me thirsty. (*Sips the last drops of her coffee.*) Can I get you anything from the juice bar?

Scene 6: Soliloquy

30 January 1999 – walking alone towards the eighteenth hole in a golf course. The crisp air is carrying a fresh scent of wet grass and the ruby-flame-coloured sun announces the end of the day in an unworldly vigour.

Project manager: (*In a confident tone.*) We are almost there. The project is running on schedule. It feels good. It feels good especially in contrast to the rough beginning. The implementation team gained a lot of experience and confidence in the past year and have completed most of the major data conversions. The process has been streamlined. It is almost too good to be true.

(*Looking at the naked willows' reflection in the serene lake.*) I should be on the alert. I wonder why so many companies fail let alone suffer from major difficulties in their implementation of ERP systems or any other large informatin systems. How come one out of three attempts is abandoned? How is it that such a mainstream technology which drives a multibillion dollar industry has an overall success rate of a mere 16%? And how come armies of savvy information technology mercenaries nourished by mountains of books about success and failure factors do not bring salvation? This is mind boggling.

(*Perplexed.*) Are we doomed to wrestle with information technology forever, or will we eventually harness it as we did with transportation and building technologies? We have long mastered the construction of airplanes and bridges. Nowadays, airplanes rarely crash and bridges stand still for hundreds of years. Cannot we do the same with software development?

(*Calmly.*) We chose SAP because it felt relatively safe. SAP has an impressive installed base and it has been touted as the leader in its class. It comes with a tested and well-documented implementation methodology, which can be supported by a rapidly growing tier of experienced consultants. We went religiously through the prescribed integration framework from blueprinting and scripting to careful monitoring of work progress. (*Cautiously.*) So what can still go wrong? Why do

some projects adopting this strategy fail? What is the missing link? Is it only a poor execution of a well-designed plan?

(*Assertively*.) We have got clear and attainable milestones, proper planning and a competent development team. We also enjoy top management support. Apparently, all the pieces are now in place and it should be a home run. (In a concerned tone.) But you can never train enough. There is always more to learn about this system. It is incredibly complex. And I am concerned about the never-ending stream of modifications. Because SAP is so tightly integrated, every seemingly minute alteration may become a nightmare. A small amendment in the sales–order module may cause havoc in the inventory module and fixing that side-effect may have repercussions in other areas.

We have lost a few key people too. One person really understood the old system and one had a good grasp of the production planning module in SAP. We are dealing with it, but it is tough. Just shows how vulnerable we are.

(*Relieved*.) Yes, we intentionally build slack time for the unanticipated into the project schedule. (*Insightfully*.) But that is exactly where we fail to appreciate the continuous change as an inherent part of the overall design. We are trained to think analytically in a static context, but we live and operate in a dynamic world which changes continuously. Change is not an exception. It is the norm.

(*With a rather passionate voice*.) SAP is not a one shot deal, but a lifelong journey. We are not done yet with the initial integration and we already need to deal with a version upgrade, which leads us to another round of debugging, adjustments and reconfigurations. These changes require us to write some patches and updates which should be coordinated with other modifications, which stem from the remodelling of the business process. At this point, we will be on the verge of a new upgrade . . . Our job is never done. Ongoing support is the toughest job. It is not easy to get reports out of SAP which fit to our way of thinking about the numbers. People are not easy to change. Too many still read print-outs of their e-mail rather than read it directly from the screen.

(*In a reconciling tone*.) We have bought into SAP under the premise that it would streamline our business process. We knew that the integration of SAP would be a major undertaking and we were ready and willing to pay the hefty price tag, but we did not understand at the time that this would be a lifelong commitment. (*Glances at the twilight and picks up the ball from the tee*.) Oh well, I cannot worry about it now. It is time to hit the nineteenth hole.

Note

Teaching notes are available upon request from the authors.

Biographical Notes

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Appendix A: Milestones in Metalica SAP implementation

February 1996	Approved SAP implementation	(Scene 1)
April 1996	Completed planning of the SAP implementation and recruit an implementation team	
October 1996	Relieved IBM from the project and retain VOBW instead.	
June 1997	Went live – Hopewell Virginia service centre	(Scene 2)
August 1997	Transferred project management from the MIS function to the VP of finance and administration	(Scene 3)
December 1997	Went live – San Diego service centre	(Scene 4)
March 1998	Went live – headquarters	(Scene 5)
June 1998	Went live – Madison service centre	
July 1998	Went live – Lancaster mill	
August 1998	Went live – Dallas and Newport plants	
September 1998	Went live – Lexington and Rehovot plants	
October 1998	Went live – Rocky River plant	
November 1998	Went live – Clifton plant and Fort Wayne service centre	

Appendix B: Company description of Metalica

Metalica Inc. was a leading international supplier of high-performance engineered materials. The company had ten production facilities in the USA and was the only fully-integrated producer of metal-ceramic alloys and materials in the world. Metalica also produced engineered material systems and precious metal products through wholly-owned subsidiaries.

Metalica marketed its products through a worldwide chain of distribution and service centres. The unique and high-quality materials manufactured by the company continued to find new applications in a widening array of markets in which superior performance and reliability were essential. The company's customer list included leading manufacturers in various industries such as electronic equipment and computers, telecommunication systems, motor vehicles, aerospace products and systems, medical equipment, home appliances and high-performance recreational goods.

Since its genesis in 1921, the company had been headquartered in Pittsburgh, PA. Metalica stock was traded in the New York Stock Exchange. In 1998, Metalica experienced sales growth in all major product lines and total sales established a new record, as it had in each of the previous 5 years. The 1998 sales were $537 million, a 15% increase over 1997. (Adapted from Metalica's 1998 Annual Report.)