

**M**IS is vital to the new Polish management but Western coaching will be essential to its success.

# Management Information Systems in Poland and in the West

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## What Did We Learn Looking at Polish MIS?

### **What is a Management Information System (MIS)?**

In 1971, the Society for Management Information Systems (now the Society for Information Management) called a meeting of experts to define what is MIS. The proceedings of the meeting were published in an approximately 70-page brochure. All experts agreed on one thing only — that they disagreed on the definition of MIS. To the present day there are as many definitions of MIS as there are textbooks discussing this topic.

For our purpose we will use the following definition:

MIS is a system designed to provide selected decision-oriented information needed by management to plan, control, and evaluate the activities of the corporation. It is designed within a framework which emphasizes profit planning, performance planning and control at all levels. It contemplates the ultimate integration of required business information sub-systems, both financial and non-financial within the company.

A successful management information system must consider the current and future management information needs of the administrative, financial, marketing, production, operating and research functions. It will have the capacity to provide environmental (competitive, regulatory) information required for evaluating corporate objectives, long-range planning (strategy) and short-range planning (tactics) (*Financial Executive*, 1970).

This definition, along with many others, to a large extent, is still an unfulfilled wish of corporate management.

A recent Canadian survey of the ten top MIS issues, with minor variations, confirmed what we have heard many times, that top MIS executives are very concerned with six management issues: budgeting, downsizing, (the first two together is a euphemism for return on investment), obtaining, training and retaining qualified staff, meeting the business goals of the organization, satisfying the needs of end-users, and dealing with senior management (Carey, 1992). The other four concerns were purely technical problems: keeping up with rapidly changing technology, connecting and networking, data security and integration/open systems. They were all well within the domain of the possible for an executive supported by a competent expert. "What have these guys been doing all this time?", quipped one Canadian MIS vice-president.

This comment is justified for the four technical problems. For the six management problems a more fundamental issue is at stake.

For close on two years, one of us tried to "export" to Poland a seminar which would deal with just those six management problems. Nobody seemed to be even interested in those non-technical issues which for years now have been our top concerns. The Polish MIS people did not understand what we were talking about and why we were concerned.

We conclude that, wherever they can afford to have computers, the Poles have the MIS fitting their present state-ownership economy.

### **Stage One of MIS: 1950 to 1975, Relative Successes**

Computers were introduced in the 1950s as calculating devices and for years were treated as such. The first powerful programming languages were both mathematically oriented: ALGOL, an ALGOrithmic Language, and FORTRAN, developed for FORmula TRANslation. FORTRAN was enshrined in the first North American university level curriculum (Association for Computing Machinery (ACM) Curriculum, 1968), which is the foundation of what was soon to be called computer science. It is the domain of mathematicians, operations researchers, physicists and engineers, all from "hard" science areas. For them data were quantitative, discrete, and context-free facts.

Information was usually defined as data which have been manipulated by computers: summarized, sorted, grouped,

sequenced, compared, etc. Decisions were: "yes" or "no". The *ceteris paribus* assumption was always implied. Plans were rigidly structured, like engineering blueprints.

In the early 1960s "general purpose computers" made possible programming payroll, and other accounting systems. It was a logical application of mathematical machines to manipulation of quantitative data using proven mathematical formulas. By 1970, IBM introduced COBOL, i.e. Common Business-Oriented Language, designed programming business problems. For a number of years data processing, as it was called then, remained in the accounting department.

A few years later, vendors of hardware promoted the idea of "steering committees". Such committees were expected to prevent accounting from monopolizing the use of computers. Soon the production area began to raise claims to data-processing services. Accordingly, the next step in expanding the use of computers was controlling and reporting on repetitive production processes, using quantitative data and precise procedures. These were stand-alone systems, addressing the needs of the supply side of the market economy, dealing with resource allocation and production planning.

The demand side of market operations was not considered in our MIS at that time. In the early 1970s, one of us attended the meeting of a professional information-processing society, where an invited speaker, a marketing executive, asked his audience for help in managing his area. All he got back from it was the comment: "Tell us first what you need!" But he could not translate into a simple equation his method of estimating the future behaviour of the market. This was the only thing which his audience was prepared and able to understand.

This is the history of the early development of MIS in the West. We reached this stage in the mid-1970s. In Poland the evolution of MIS stopped right there. As the market and pricing mechanisms did not exist, the demand side of the market, costs, profits, ROI, all were made by administrative decisions and were of no concern to managers. Polish 1992 MIS is identical to 1975 MIS in the West. There are only fewer of them, owing to the scarcity of expensive hardware.

### **Stage Two of MIS: From 1975 on, Our Disappointments**

In the West the evolution of MIS continued after 1975. Purely quantitative, "bread and butter" applications of computers, which we described above, have been all but completed. In our established, consumer-oriented market economy we wanted to design and develop systems addressing the needs of managers dealing with the demand side of marketplace operations. To be able to do it, we needed system designers who could discuss with managers and who would understand their language and their needs. Yet the quantitative approach, which seemed to work in the first stage, continued to be relentlessly forced by computer science academics on students and industry. This was in Stage Two of MIS development, when it became completely inadequate. Our evolution to

more sophisticated applications of computers in business became painful and disaster-prone.

Looking back at the history of numerous disappointments with computers, we recall exhortations from vendors telling us that for a business application to be successful the top executive has to support the move to computers. Naïvely, in the late 1950s, trying to show the executives the power of the machine, we were told to teach them in two hours how to write a five-line program in FORTRAN. It was a disaster. They got the idea that programming is child's play. The next suggestion was that executives had to make public their commitment to computers. In 1963 one of us attended a session with the top manager, announcing that a corporation is not a democracy: "I decided that we will computerize, and you had better conform". This was his way of announcing the arrival of the computerized business! Later, in the mid-1970s, we were told by vendors and researchers that end-users have to be somehow involved in the development of systems. This started an avalanche of feverish academic statistical research. Then, by the late 1970s, strategic planning for corporations became fashionable. The advice then was that the strategic plan for information systems has to be in harmony with that of the corporation. By the early 1980s, alignment of information systems on business became the next panacea. Culture, corporate vision, strategic advantage followed, as remedies in that order.

All these recommendations added together amounted really to a statement that one cannot develop a good MIS without considering its broad human, social and organizational aspects or context. However, computer science graduates were not taught to be interested in these messy aspects. They understand and love their neat, predictable and obedient machines.

So a disappointment with one remedy was soon to be followed by a new corrective prescription. And so it goes till now.

### **The Moment of Truth**

#### *"The Crisis in High-Tech Education"*

Under this title, in a July 1992 article, we read:

The academic focus is all very well... but... we need to be graduating people who can be effective appliers of technology as well as people who can do the research...

Computer science grads often know too little about business and business grads lack the grounding in computer science... (Buckler and Carey, 1992)

Another authoritative comment comes from The International Federation of Information Processing (IFIP) Working Group (1992):

Even though an increasing number of research contributions have recognized the importance of human and social aspects in information systems development, there still exists a lack of knowledge and expertise for dealing with them adequately in practice. Therefore neglect of the human and social aspects continues to be one of the principal causes of information systems failure.

Martin (1992, our translation) rephrases this view emphatically:

We believe that the main reason for the failure of current methods of justifying the future use of information technology is due to the false concept that organizations are governed by the laws of mechanistic systems.

Organizations are complex and dynamic systems. Humans in those systems do not behave as expected by information systems experts. They act rather according to their own logic.

Repeated attempts to discuss these issues were systematically defeated by computer science academics. Clare Cremer, current president of the Canadian Information Processing Society, thinks that:

Computer science academics feel that they are the ultimate body, and that nobody should be dictating to them. (Buckler and Carey, 1992)

On another occasion, but in the same vein, Roger Wolff, of the University of Toronto, an operations research expert, commented that in the late 1970s he:

Was totally convinced that we are going to replace all middle managers with nice little computer models...

After 1980 when he became Assistant Dean, later appointed Dean of the Graduate School of Business, his perception changed:

No longer was I the theorist trying to change management. After 1980, I was trying to run an organization. My dedication to computer models shows you how naïve academics can be (Wolff, 1992).

An MIS system developer should use every possible means to understand the way the manager thinks and makes decisions. He should build the system to provide data in the context needed by the manager. Only then do data become information and complement a manager's thoughts, enhance his knowledge and help him in better decision making (see Figure 1).

The cause of disasters in our Western MIS development is the overconfidence of "techies". They know computers, but they erroneously believe that they can provide a good system without getting interested in the end-user's motives, thinking and ways:

The refusal to discuss and accept change which would make computer courses more attuned to business needs, business people attribute simply to "vested interests" (Buckler and Carey, 1992).

We all know that computer science with other hard sciences gave us powerful hardware and systems software. They deserve generous credit for that but there is also no doubt that teaching programming is easy fun. The domain is narrow, precisely defined and documented, with "other things being equal" (*ceteris paribus*) or considered irrelevant. Teaching business applications analysis and design is an awesome task. The domain is as wide as life itself, with other things not being equal, and most of the time highly relevant. It requires the knowledge of all "soft" sciences which affect the kaleidoscopic patterns of an ever-changing developed market economy. Knowledge of the technology is the easiest part of the job.

*Change in Terms of Reference*

We know that computers are not only calculating devices but also information-processing tools. The term Data Processing from the late 1960s was replaced by the term Information Systems. Now we claim that we are an Information Society, we believe that there is more to it than just the name change. We suggest that there are real changes in concepts with which from now on information systems people have to deal.

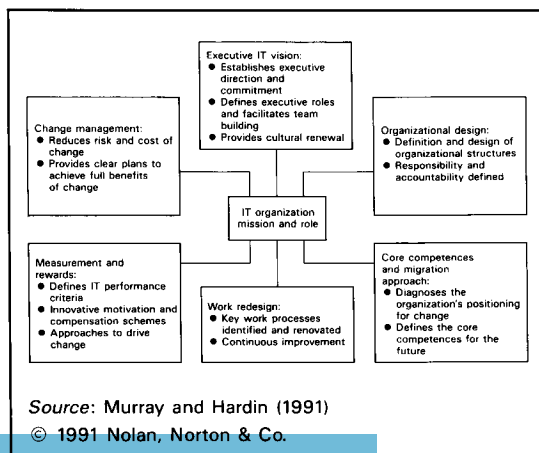
In the past we tried to deal with data as if they were discrete, isolated facts, as suits the machine, but a careful researcher, back in 1972, told us that:

When we try to find the ultimate context-free, purpose-free elements, as we must if we are going to find the ultimate bits to feed a machine (bits which will be relevant to all possible tasks), because chosen for none we are in effect trying to free the facts in our experience of just that pragmatic organization which makes it possible to use them flexibly in coping with everyday problems (Dreyfus, 1979,p. 263).

This context, which we tried to strip from data, is creeping back to where it was. The concept of one, huge corporate database reminding us of a bowl of Alphabits, from which everybody could get what they needed, was stillborn. It was replaced by the concept of a subject database. This gave some minimal context of a specific subject. The identification number of a client, in a database of a consulting company, refers to a person seeking expert advice. The ID of a client in a penal system refers to an inmate in spite of the fact that in both cases the client might have been John Doe, ID Number 12345. But the context is different, and so is the meaning:

Data, then, are far from brute; aspects of objects are not given directly in the world but as characterizing objects in places in a local environment in space and time in the world (Dreyfus, 1979, p. 262).

**Figure 1.** Six Key Areas of Transformation



Information is also much more than just data which have been appropriately manipulated by computers. Information are data in context, supplied by the outside world (or system), or by the subject experiencing data. This personal, subjective context originates from his/her own experience, common sense, intuition, feelings, or knowledge, all beyond the capabilities of programming (Dreyfus, 1979, pp. 263ff).

Decisions are, therefore, never based on pure data or models, but on information or knowledge, as described above. They are subjective, made in the context peculiar to the decision maker (Martin, 1992, p. 11). Dean Wolff is right — we are not going to replace all middle managers with nice little computer models.

On the demand side of the market, the consumer, the economy as a whole, is dynamic, evolving, and subject to various pressures, difficult to predict, changing sometimes diametrically, without warning.

The plan is just the path which we intend to follow towards certain objectives, subject to unpredictable changes in demand and market conditions. Planning is continuous, and it has both short-term (tactical) and long-term (strategic) implications for the enterprise. Strategic decisions, effectively meeting the challenges of the market, are by far more important to us than any strategic plans prepared in advance.

New areas of MIS have to be custom-fitted to the decision maker's needs. An MIS developer should use every possible means to understand the way the manager thinks and make decisions to design a system which complements the manager's thoughts, enhances his knowledge and helps him to better decision making. (Mintzberg, 1980, p. 150) It may be difficult, as information is power. Managers do not like to share it.

We must design flexible and responsive systems on managers' terms. Hence our preoccupation with the accurate definition of requirements through sessions in which users and MIS experts develop a consensus as to the objectives and details of the system. We need rapid applications development techniques allowing us modification of existing computerized systems. It has to be done as required by management, as short notice of days or weeks instead of months and years as before. Cost-effectiveness counts, as we are expected to contribute to the bottom line of the corporation. Vague promises of intangible benefits instead of a business case are not accepted. The functional manager or end user is responsible for working with the system which he helped to design, and producing profit and/or growth of the enterprise. Systems are built for strategic advantage, not for technical adventure.

We understand that. But, despite the long-standing exposure to the consumer orientation of the market economy, we still have academics and human resources personnel who tell the world that computer science is the

proper curriculum of study for developers of those business systems. We naively try to use quantitative (mechanistic) models, where now qualitative and subjective factors are essential. Demand forecasting, ordering of other than staple goods, declaring inventory surplus, managing human resources, segmenting markets, optimizing advertising media productivity or marketing mix, promoting research and development into profitable areas of customer relations all require judgement of an expert, not a formula applied by a mathematician.

### **Problems Facing Polish MIS**

#### *Understanding the Nature of Necessary Change*

The current joke in Poland says it all. The Poles have two ways to solve their economic woes: one is the normal way, the other miraculous. The normal way: we will wait until manna will drop from heaven. The miraculous way to solve the problems: we will all start working hard.

There are also at least four basic problems which have deep historical roots. One is the need to shake off the passive mentality of two generations of Poles accustomed to the Communist state-guaranteed mediocre security from crib to grave. The second is the need to convince them that after many years of resistance to the occupant- and foreign-imposed regime, now is the time for hard and effective work and for paying taxes to the truly independent Polish state. The third problem is to make them accept that there is no alternative to the mixed economy, and the hardships unfortunately are the unavoidable price to be paid for progress on the only path to a better future. The fourth is a proper understanding of the term "privatization":

Managers expect quite a bit from privatization. They consider it an effective way to getting more independence and autonomy, when dealing with the central authorities. This, they believe, is the first step to building a better market image for the company. But in general it is hard to trace in those comments any arguments for increasing the productivity of labour, faster reaction to market conditions, decrease of production costs and reduction of an excessive number of workers (Brzeg-Wielunski, 1992).

Yet there are some remarkable results. The Stettin shipyard reduced the time needed to build a ship from two years to 11 months. Sea tests of the ship required in the past 16 days and a crew of 180 workers. Now they do not take more than six days with 70 workers on board. These are West European norms. The shipyard, however, had less luck with getting 300 qualified workers in addition to its 5,000 present staff. Despite the high unemployment rate there were no applicants. The salary, above the national average, was considered too low, as "it was necessary to earn it through normal work" (*Gazeta Bankowa*, 1992, emphasis ours). As *Gazeta Bankowa* has pointed out, privatization means mainly freedom from excessive interference of Central Government administration, but not productivity. This issue of productivity is important not just to managers of state enterprises but also to the Polish people and all investors in Polish industry. It is here that MIS can make a significant contribution.



The role of MIS could be significant, although so far talk of privatization has tended to exceed its practical application. This means that the private sector remains very small and that the state has yet to shed the majority of its enterprises whether by privatization schemes, liquidation sales (currently the most popular), employee share ownership schemes (which have not been developed) or by President Walesa issuing loans to each of 40 million Polish individuals to buy shares in Polish enterprises. These plans have still to be worked out but what is clear is that privatization is still small-scale.

The new entrepreneurial class is making a bold start. Small- and medium-size businesses learn, sometimes the hard way, to understand how the market works, the vagaries of demand, and the intricacies of introducing new products. They understand the need for cost-effectiveness and that risk taking may end in profits or bankruptcy.

#### *Spreading the Understanding of Market Economy MIS Concepts*

It would be very helpful if for good foreign packages their documentation, messages and screens were translated into Polish. This is an easy, but labour-intensive task. New entrepreneurs for their MIS are buying computer solutions — microcomputers with software packages. Packages require parameters, they issue warnings and diagnostics all based on the Western way of managing enterprises. If there is good understandable documentation for these packages, Polish entrepreneurs will be forced to convert gradually to the Western way of thinking. They must run an efficient operation, and cut surplus personnel to become competitive with the rest of the world. They will watch the market, forecast the demand for products, and check the inventory turnover. This would benefit Polish business and it would be beneficial to Polish programmers and to vendors of packages, expanding into a 40-million people market. There is only one problem.

#### *The Problem of Software Piracy*

On the big sporting Stadion Dziesieciolecia in Warsaw, there is the world's largest open-air market for pirated computer software. Without proper documentation it is probably not used to its full potential. It may, however, facilitate the spreading of "computer literacy". Poles entertain hopes for some kind of amnesty for pirated software. The bill assuring software copyright protection was discussed in the Sejm (Polish Parliament) in May 1992 and it is certain to become law shortly (Zurek, 1992). Thus the protection against piracy of software will be legally established, and ultimately enforced. Then packages offered would become more numerous on the market; their documentation, maintenance and upgrading would be assured by their authors and vendors. At the same time for Poland it would open up the opportunity to enter aggressively the profitable low-capital investment market of software production. There are many top computer scientists, physicists, mathematicians and OR people well prepared to produce systems software. Working under the guidance of experienced foreign MIS designers, they could

also program business applications for the next stage of MIS.

#### **Present Status of MIS Hardware and Software**

##### *Personal Computers or Microcomputers*

"Warsaw businessmen now say a computer is the first purchase of every new Polish entrepreneur" (*Rynki Zagraniczne*, 1992). We hope that they are making good use of them, and do not fall into the trap set by false expectations of the ease of implementation of hardware, its fit to the needs of the company and benefits to be obtained. Naïve buyers are often misguided and buy unneeded and expensive hardware and software. Some dishonest dealers look just for a quick profit on a budding market.

There is every danger of what we have already experienced in the West: the chaotic and excessive buying of PCs for the office. PCs have to be managed, the savings from more effective work should be "cashed" by possible reduction of staff or more effective work. At a recent conference in Toronto two experts voiced the same concern: computers have improved productivity in the factory, but not the office. Over the past eight years white-collar productivity has been inexorably falling by about 1 per cent a year (Glen, 1992).

##### *Big Hardware and Big Software*

In the recent past, in Poland, computers were primarily used for manufacturing process control, science and technology research, transport, Government statistics, and defence. Even within these markets, the sophistication of the computer systems paled in comparison with the West. Because of the way society was organized, many of the largest computer markets in the West, banking, insurance, finance, retail, and personal use, did not exist (Nee, 1991).

The expansion of applications of computers is limited because of the cost of hardware and legal software. What can a university buy, when there is not enough money to pay professors' salaries of US\$350 a month (Stelmachowski, 1992)? These financial difficulties may be eased somewhat by the availability of powerful micros, by downsizing, client-servers and previously mentioned packages. For universities and schools there is also the option to accept used mainframes and minicomputers which are considered obsolete abroad, but can be useful for years in Poland. They are needed to teach about integrated application systems, databases, networking and using Computer Assisted Systems Engineering tools (CASE) (Kuras, 1992).

It is changing now — slowly. The Polish Ministry of Finance will collect its new value-added and income tax with 367 Bull Unix Minis (\$30 million), using Oracle software (Nee, 1991).

UNILOT is a joint venture of UNISYS Corporation with the Polish national air carrier LOT and the PEKAO Bank (*Rynki Zagraniczne*, 1992b). PEWEX, the large retailer,

is using Sun Microsystems servers (computers) for warehouse inventory control. ICL, always very active in Eastern Europe, now has seven sales offices in Poland (Nee, 1991). It is probably safe to assume that only the Ministry of Finance was developing their system from the ground up. The other big systems were most likely good, user-friendly Western packages, bringing all the benefits of systems designed for market economy. Software and management consultants advertise their services. Every Tuesday there is a ten-page supplement to the widely read *Gazeta Wyborcza*, dealing with computers, software, LANs and networking.

### Communications

This is a significant constraint to the development of business and MIS in Poland, as anybody trying to call them or send a fax knows from experience. But even here there are bright spots. According to Tadeusz Wegrzynowski, Director of the Informatics Centre of the University of Warsaw, EARN (European Academic Research Network) in Poland has over 10,000 users and is connected through Copenhagen to the West. One of us is regularly using the electronic mail to communicate with Polish universities. Andrzej Smereczynski, Poland network country coordinator, was the first to open to Central and Eastern Europe the electronic path to the West. The hardware is obsolete and crumbling, but the knowledge seems to be on the leading edge of technology.

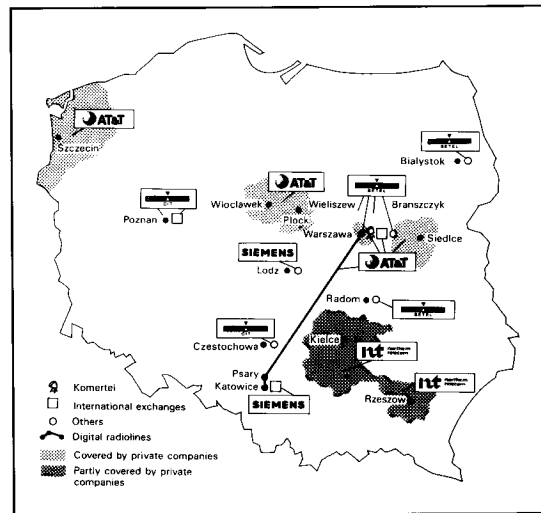
Above all else there is one significant constraint to the development of MIS in Poland and that is the Neanderthal telecommunications system which is an obstacle to networking. In North America, an engineer working in the field can take his snap-open cellular telephone from his shirt-pocket and couple it to his portable lap-top computer back at headquarters. In Warsaw it is not possible to link with other Polish cities, although this is changing. While it is changing, a strange transitional phase is being witnessed at the moment, where in Warsaw it is possible to buy an AT&T telephone which links with a satellite to give instantaneous communication worldwide. Meanwhile, within Warsaw or in contacting other Polish destinations, it is necessary to link into the Polish network, which was severely overloaded before computers and fax machines came to be coupled up to the network.

Through a series of joint ventures a good deal of progress has been made in this area.

For example, there is the introduction planned for Warsaw in summer 1992 of a digital cellular telephone network, the result of a joint venture between Polska Telefonia Komorkowa SA, Ameritech and France Telecom, to be known as Centertel.

Poland will soon have six different telephone systems (see Figure 2) as a result of recent international negotiations. Let us only hope that they will be seamlessly connected and working with identical communication standards and

**Figure 2.** Foreign Investment in Polish Telecommunications



protocols to prevent chaos, ominously mentioned in the title of the article. This optimism is also marred by a polemical article in *Kultura*, questioning the value of recent developments in Polish telecommunications (Kowalczyk, 1992).

### Conclusions

The purpose of this article was to determine the present position of MIS in Poland. Its scope expanded when we realized that MIS, as we continue to develop it here, does not exist in Poland now. The precondition for its existence is a free market, which is still far from being dominant in that country. In the West we still have problems with the successful implementation of MIS. We tried to determine the reasons. We blame the indiscriminate use of a "hard" sciences approach to the mature, Stage Two MIS, which is the domain of the "soft" sciences.

We want Poland to benefit from our experiences in the West. When we attempt to talk to them now about productivity, cost-effectiveness, alignment on business, flexible response to the changing market, they do not understand to what we are referring. Yet sooner or later they will face all these concerns. They must get ready for that day. We must forewarn them that there is more to the development of successful MIS than a "hard" sciences, computer science approach. That market, with real people, needs systems analysts and developers who can understand the way real people work in the marketing, finance, resource management and human resources area. Only then will they develop appropriate computer-based systems. The demands on such people are great. But we all have to get such people ready for their duties, to use limited resources and time wisely. They have their own

MIS but holding to these approaches may give rise to future horror stories. Computer magic still exists and some wasteful spending will continue. Their systems will gradually prove inadequate. They will need our system development methods. The time to get interested in them is now.

We hope that we made this point clear for the sake of the European economies in transition and ... for our own.

### References

- "Another Polish Revolution in Computers" (1992a), *Rynki Zagraniczne*, No. 1, Warsaw.
- Brzeg-Wielunski, S. (1992), "Przewaga Formy nad Trescia", *Gazeta Bankowa*, Vol. 19 No. 4, Warsaw, 25 April.
- Buckler, G. and Carey, D. (1992), "The Crisis in High-Tech Education", *Canadian Datasystems*, July.
- Carey, D. (1992), "Rating the Top MIS Issues in Canada", *Canadian Datasystems*, June.
- Cracow School of Economics (1992), brochure.
- Donosy (1992), electronic newsletter published daily by students of the University of Warsaw, and mailed by electronic mail to about 2,800 subscribers around the world, 29 June.
- Dreyfus, I. (1979), *What Computers Can't Do*, 2nd rev., Harper Colophon Books, New York.
- Financial Executive* (1970), US Financial Executives Institute, Morristown, NJ, July.
- Glen, R. (1992), "Open-systems March", *Canadian Datasystems*, June.
- "Good Year for Hewlett Packard" (1992), *Rynki Zagraniczne*, No. 1, Warsaw.
- "Import of Computer and Office Devices, Customs Information" (1992), *Rynki Zagraniczne*, No. 2, Warsaw.
- "Information Systems Development: Human, Social and Organizational Aspects" (1992), Call for papers, International Federation of Information Processing Working Conference, 17-19 May 1993, cited in *MIS Interrupt*, June.
- Kowalczyk, A. (1992), "Rzeczpospolita telekomunikacyjna, najwiekszy skandal", *Kultura*, No. 6/537, Paris, pp. 139-46.
- Kuras, M. (1992), Professor at Cracow School of Economics, personal electronic letter, 6 February.
- "Management Information Systems", Committee of US Financial Executives Institute.
- Martin, L. (1992), *A la Justification des Technologies de l'Information*, Canadian Information Processing, Canadian Information Processing Society, Toronto, May/June, pp. 10ff.
- Mintzberg, H. (1980), *The Nature of Managerial Work* (2nd ed.), Harper & Row, New York.
- Murray, J.R. and Hardin, C.R. (1991), "The IT Organization of the Future", *Journal of Information Systems Management*, Fall, p. 70.
- Nee, E. (1991), "UNIX for a Once-closed World", *UNIXWORLD*, Special Supplement to Vol. VIII, pp. 10-17.
- Rynki Zagraniczne* (1992b), No. 2, Polish Chamber of Commerce, Warsaw ul Trebacka 4, Warsaw.
- Sosnowska-Smagorzewska (1992), "Dial C for Chaos", *Warsaw Voice*, April.
- Stelmachowski, Z. (1992), *Zwiazkowiec*, Toronto, 30 June.
- "Stocznia na Poczatec" (1992), *Gazeta Bankowa*, 19-25 April.

- Stokes, L.S. Jr (1991), "The New MIS Manager for the 1990s", *Journal of Information Systems Management*, Winter, p. 47.
- Szkola Glowna Handlowa (1992), *Biuletyn Informacyjny Senackiej Komisji do Reformy oraz Senackiej Komisji Programowej*, No. 7, 13 January.
- Tragalski, J., Mroczkowski, T., Bednarczyk, M. and Masny, A. (1992), *Studium Przedsiębiorczosci*, Akademia Ekonomiczna w Krakowie, Krakow, p. 56.
- Warsaw University of Technology (1992), Master of Science in Business programme brochure 1992-1993.
- Wolff, R. (1992), "The First Annual MBA Ranking", *Canadian Business*, April.
- Zareba, J. (1992), "Ryzykowny Skok Optimusa", *Gazeta Bankowa*, Vol. 10 No. 16, 16 May.
- Zurek, J. (1992), "Programisci bojcie sie", *Gazeta Wyborcza*, 12 May.

### Bibliography

- "Apple and SAD" (1992), *Rynki Zagraniczne*, No. 2, Warsaw.
- Balcerowicz, L. (1992), "Kazdy System Mozna Popsuc", *Tygodnik Powszechny*, No. 18, 3 May.
- "Good Year for Hewlett Packard (1992), *Rynki Zagraniczne*, No. 1, Warsaw.
- "Import of Computer and Office Devices, Customs Information" (1992), *Rynki Zagraniczne*, No. 2, Warsaw.
- "Poland Builds Western Style Tax System" (1992), *Rynki Zagraniczne*, No. 1, Warsaw.
- "Polish Banking System" (1992), *Rynki Zagraniczne*, No. 1, Warsaw.
- Woydt, A. (1992), "Niespełnione Nadzieje", *Gazeta Bankowa*, 10-16 May.

### Appendix I: Stage Two of MIS

There are two brighter spots in these developments in the West:

- (1) Some companies, at the time when there was as yet no computer science program, selected the end-users of applications to be converted and sent them to programming courses. These end-users became programmers converting their own manual applications to a computerized version. This frequently gave good results and became part of their standard practice for future staffing. Others just advertised that they will hire university graduates and train them in information systems skills. Those managers claimed that they could teach a good manager how to program, but would not be able to teach a programmer how to manage.
- (2) To enable their students to earn money to finance their studies a few affluent schools initiated the "co-operative" or "sandwich" degree programme. In alternate semesters, students were sent to work in related occupations in business. In the case of computer science students, corporations, at their own expense, through osmosis, were teaching them unfamiliar, "messy" concepts of market economy which universities did not cover in the classroom. Some graduates became interested in business applications, stayed with these companies and often did a good job, while many returned to their first love, pure computer science. However, there are innumerable institutions

where computer science students do not benefit from costly "co-operative" or "sandwich" degree programmes. They learn all about computers, but do not have a single course about how real people work, the people for whom they intend to spend their working life designing systems.

### Appendix II: PCs in Poland

A number of PC vendors are active on the Polish market. The Polish company Optimus, in Nowy Sacz, founded in 1990, working with imported parts and boards is assembling and selling 2,500 micros monthly, exporting 10 per cent of them. In 1991 Optimus has only 0.5 per cent of complaints and received the best rankings in the monthly, *Enter*. On 1 March 1992 by virtue of the agreement of association, Poland removed all import duties on computer equipment and parts from the European Community. This created a big problem for Roman Kluska, the owner of Optimus, who has to import some parts from Hong Kong, paying a duty of 15 per cent. If necessary he will move his production to Holland. He is taking risks, and is winning in the Polish market with a potential demand for ten million PCs. There is another Polish PC vendor: Protech in Warsaw, along with tens of smaller private Polish firms and imports such as Hyundai, Compaq, Commodore, Apple Macintosh and clones from Taiwan. Adam Kita (firm AKITA) in Krakow is making the specialized mother boards (Tragalski *et al.*, 1992). There are also a number of foreign manufacturers who would provide Poles with modern technology and 50 per cent of capital needed to manufacture subassemblies (Zareba, 1992).

In general the IBM-compatible PC clones dominate. Lately Apple has been represented by a Polish firm, SAD, and moved to Poland. *Zycie Warszawy* of 29 June 1992 was typeset (published) using an Apple Macintosh (Donosy, 1992). Other newspapers followed suit more recently.

Lack of equipment in schools is acute. A friend shipped from Toronto 94 C64 Commodores to Warsaw schools. Small Polish transformers made them usable and nine new school computer laboratories are working now, still a rarity in Poland.

### Appendix III: MIS Education in Poland 1992

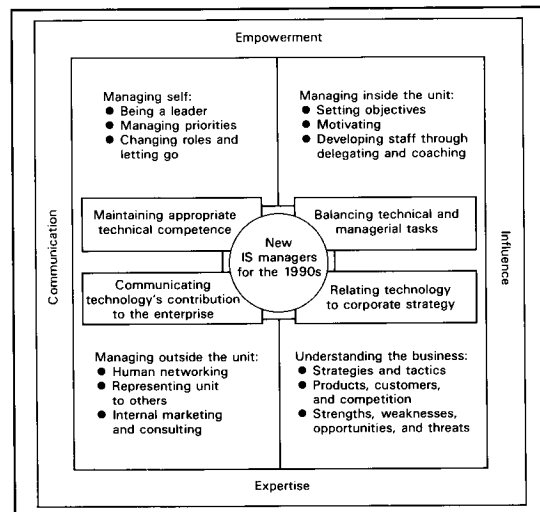
As can be seen from Figure A1 (Stokes (1991)), MIS managers need to maintain appropriate technical competence; they have to balance technical and managerial tasks, communicate technology's contribution to the enterprise and relate technology to corporate strategy.

From our long-term experience, for application systems analysts we suggest a curriculum consisting of 75 per cent of courses from a business administration programme and 25 per cent relating to computers, programming and systems design methodologies and skills. It was not possible to find anybody fitting this bill in Poland in May 1992.

Here are some samples of curriculum which the Poles might consider as MIS:

At SGH (Warsaw School of Economics) (Szkola Glowna Handlowa, 1992) one of seven options of studies is Quantitative Methods and Information Systems. Other options are:

**Figure A1.** The New IS Manager's Competence Model



economics, finance and banking, business administration, management and marketing, state enterprises (*gospodarka publiczna*) and international business and political relations. We know what Quantitative Methods are in the first option. Information Systems are most likely elementary programming. In another part of the SGH brochure we see Informatics and Econometrics. Again, we believe that it has nothing to do with MIS or as part of a programme preparing systems analysts capable of analysing business application problems.

At the School of Economics (Akademia Ekonomiczna) in Krakow, one of the options of studies is Economic Cybernetics and Computer Science with specialization in:

- (1) Statistics
- (2) Economic computer science
- (3) Accounting (Cracow School of Economics, 1992).

The most promising for continued MIS evolution beyond Stage I is the programme in the new School of Business at the Warsaw University of Technology. Block six of this programme is Management Control and Information Systems. We quote:

Management control is examined from the functional and the value chain perspective also in the context of financial control. The key area of information search, and database organization with modelling and decision support systems with the aim of enhancing the user environment for better control... This is detailed in a study of the improvement of management control through information systems examining corporate and divisional reporting systems, the design of management reporting systems, changes in planning and forecasting systems, and the ability to perform *ad hoc* analysis. Finally, the significance of managerial behaviour in the design of management control systems is presented. The teaching staff will come from Paris and Bergen (Warsaw University of Technology, 1992).

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