

Visit to Hydroinform

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INTRODUCTION

Hydroinform, which was established in 1990 and became a joint stock company in 1996, provides a particularly clear example of the kind of creative-business organisation that is so necessary for the ongoing development of hydroinformatics as a whole. A visit to Hydroinform thus provided a significant opportunity to track and evaluate this development at first hand.

The origins of Hydroinform can be traced to the attendance of its present managing director, Evzen Zeman, then a lecturer at the Czech Technical University (CTU), at the International Course in Computational Hydraulics at IHE in Delft during 1985–6. One immediate result of this was the conclusion of an agreement between IHE, the CTU and the European Commission to train Czech and Slovak (at that time ‘Czechoslovak’) engineers and scientists at IHE under the Commission’s TEMPUS project. Some 35 persons were educated and trained under this programme, of whom three academically orientated persons in Hydroinformatics, which subject had replaced Computational Hydraulics at IHE in 1991. The academic results were uniformly excellent, but the dismantling of the established political régime and its command economy following the so-called ‘velvet revolution’ clearly posed new difficulties, even as it offered new opportunities to the persons concerned. Because of the consequences for education and for technical development generally, the present writer urged upon the now four persons concerned the necessity of setting up a business operation alongside their academic activities. This appeared clearly as the best way to maintain and further develop technical and scientific standards. The new emphasis upon Hydroinformatics at IHE and the whole tone of the company’s activities led to the bold choice of the name Hydroinform. Introductions were made to leading technological service institutes in Western Europe and Hydroinform took out agency agreements with some of these institutes. In particular, in 1992 it became an agent for the

Danish Hydraulic Institute (DHI) for DHI’s MOUSE and its MIKE systems. As of May 1999, Hydroinform had installed some 25 MOUSE systems, 20 MIKE 11 systems and 2 of each of MIKE 21 and MIKE SHE.

Although this kind of agency function was invaluable in building up a base of consultancy work, it was understood from the beginning that an own capacity in the analysis, design and construction of hydroinformatics systems was essential for a sustainable longer-term development. Consequently, software design has been a constant central issue and the May 1999 Company Information Document continues to emphasise that ‘The division for software design forms the backbone of the company’. The other three divisions of Hydroinform – water resources and river hydraulics, water distribution and water supply, and urban drainage – derive much of their decisive market advantage from the technological lead provided by this in-house software division. As the company has moved into measuring programmes also, so the scope of the software division has come to encompass SCADA (Supervisory Control And Data Acquisition) work.

The physical growth of the company is illustrated in Figure 1, and as of May 1999 it employed 29 professionals with M.Sc. and Ph.D. degrees on a permanent basis, augmented with some 15 professionals engaged on a temporary basis at any one time. The division of work is illustrated in Figure 2, from which it is seen that the ratio of software production and sales to consultancy work is about the same as in some leading West European organisations. In 1997, DHI purchased a major shareholding in the reconstituted company and this increased its capital base considerably. At the beginning of 1998, Hydroinform moved into its newly constructed and wholly owned ‘high-tech’ office in Prague, the entrance of which is shown in Figure 3. The building itself has recently received an architectural prize.

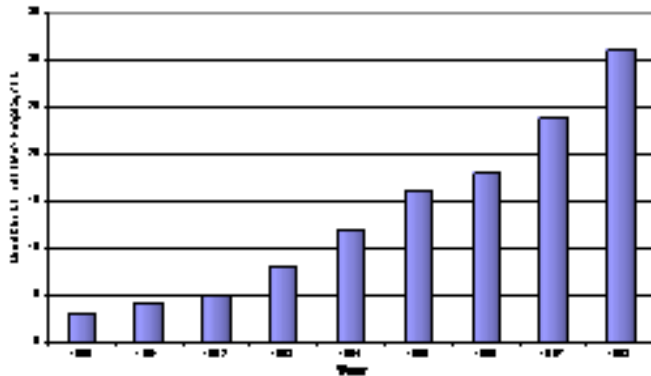


Figure 1 | Hydroinform a.s.: number of full-time employees.



Figure 2 | Hydroinform a.s.: division of work.



Figure 3 | Hydroinform a.s.: entrance to the building in Prague.

ACADEMIC AND BUSINESS DEVELOPMENT

The necessity of maintaining close relations between academia and practice has been clearly understood in our field since the era of computational hydraulics during the 1970s and most of us would probably agree that it is more important today than ever before. However, the way in which such relations should best proceed has been disputed in many places and it was expected from the beginning that Hydroinform would experience problems when its principals held teaching positions. Witnessing the rapid growth of business activities of this kind alongside academic responsibilities, in 1994 the then-Dean of the CTU set out the policy that this situation could not be tolerated. Accordingly, in 1994, the principals of Hydroinform resigned their academic positions. However, they have continued teaching on a voluntary, unpaid basis, albeit since restricted to only three out of their original eight subjects. Even so, it has been possible in this way to keep unsteady flow, computational hydraulics and hydroinformatics generally on the civil engineering curriculum.

One consequence of this policy, which is still in force, is that the CTU (which was originally founded in 1707) has now lost the greater part of its younger staff. At a meeting organised by Hydroinform between the present Dean, together with his Head of the Civil Engineering Department, and the present writer, it was explained, by way of example, that the youngest member of staff in the geographical section was 60 years old! The writer's suggestion to discuss with the two major GIS companies that are strongly represented in Prague with a view to obtaining the services of their staff on a part-time basis did not seem to be acceptable. It was countered that university budgets were being cut in absolute terms alongside an ongoing inflation. At the same time, however, it was accepted that students were working increasingly with Internet facilities, so that a great deal of knowledge acquisition was proceeding independently of the efforts of the university staff. Similarly, although the CTU has a Business and Innovation Centre, supported by the European Union through its PHARE programme, this still works mostly on a project consultancy basis. The changing role of academic staff in new business situations was recognised in principle

but its wider relation to human resources development in business contexts did not seem to be accepted. Similarly, the new paradigm of academic–business cooperation based on venture capital that is now spreading rapidly in North America, and which is just now starting to make its influence felt in Western Europe, was considered to be so far removed from the Czech context as to be practically irrelevant.

These discussions were thrown into focus in an extended seminar with CTU undergraduate and doctoral students. Although held late on a Friday afternoon, this attracted a full, attentive and lively audience, who posed searching questions. As in so many other places nowadays, one has the feeling that younger people are, so to say, ‘teaching themselves’ over the Internet, and (unfortunately in the present writer’s view) for a large part without the relativising influence of the academic staff.

Some of the consequences of this situation for a company like Hydroinform were discussed with the company principals, and specifically the ongoing training role of these principals and other more senior staff within the company.

BUSINESS-THEORETICAL AND RELATED STRATEGIC ASPECTS

This visit provided a quite unique opportunity to work over the theory that had been evolved for the development of hydroinformatics along the creative-business line and to assess the resulting evolution in business strategy. The inherent limitations of the 1980s structure of a single central knowledge-encapsulating organisation and a periphery of otherwise independent agents for marketing and maintaining its encapsulations had become evident already in the early 1990s. One response had been to introduce regional knowledge centres that could provide expert support in the regional languages and Hydroinform had been projected to some extent in this role for the Slavic-language area. The discussions of experience with this model emphasised once again, but now more clearly than ever, that it was too simple and undifferentiated. The real situation was indeed altogether more complicated

culturally than had been envisioned. Moreover, the business structure as a whole was still evolving quite rapidly outside of this model and continuing to turn up unforeseen situations.

As a starting point in the business-theoretic discussions, the developments in the products of the software division proved to be exemplary. Among Hydroinform’s earliest products was Hypress, a system for both water distribution and water hammer simulations, developed with the then Delft Engineering Software and the present writer. This was an ambitious project in numerical terms, and indeed it proved impossible to develop it on the water-distribution (slow-transient) side to a level that would provide any marked advantage over existing packages within acceptable budget and time constraints. Indeed, at the stage where further development had to be curtailed, its performance was no better than that of the Environmental Protection Agency’s (EPA’s) similar product, called EPANET. Alongside this, work in other areas, and specifically in Hydroinform on a new graphical user interface for DHI’s MOUSE system, had emphasised that engineering practice was much more interested in the visual sign vehicles and structures of the GUI than it was in more advanced numerics. Moreover, it had become clear at that time that without a rethinking of the total system operation between its GUI-mediated process control and its database structure, passing through its numerical engines, both development and maintenance costs would spiral out of control. The necessity of a thoroughgoing object-orientated approach became obvious to everyone concerned, so that the phenomenology of the modelling process was itself transformed. The semiotics had therefore taken thereby took over from the numerics as the main emphasis of system development. This same observation development led to the launch of DHI’s MIKE ZERO initiative to provide a common GUI framework and associated database facilities for all DHI’s modelling packages and their further encapsulations. Hydroinform was brought into this development also and resulting experiences and observations led it to build a new GUI around the EPANET. Since this was a non-proprietary package, the resulting system was launched independently by Hydroinform as ODULA. For this development, in 1996 already Hydroinform became

one of the 24 winners of a prestigious European Information Technology Prize awarded by the then-President of the European Commission, Jacques Santer, personally. What is essentially one and the same package is now sold directly by Hydroinform as ODULA, currently with some 120 installations, by Boss International as BOSS EMS, with some 400 installations, and by DHI and its partner network outside the USA and Canada, as MIKE NET, with further 'substantial' sales. The only vestige of the original 'language area' concept that is now left in this development is that ODULA is available in English, Czech, Polish and Russian versions. Similarly, the notion that 'the products prepare the way for the projects', as exemplified so extensively by DHI, has not so far been much realised by Hydroinform, with strong software sales in Poland, for example, but few projects there. Cooperation with DHI's Swedish arm, DHI AB in Stockholm, has for example been much closer.

THE FUTURE

Nothing obscures one's vision of the future so much as the confusion of one's experience of the present. That is why it is so important to study history: only then do the features that presage the future stand out clearly. Thus, for example, this visit provided opportunities to visit the great aviation collection on the outskirts of Prague – one of the most extensive in the world and crowded with Czech products – and to browse in bookshops dedicated to the technologies of the past as well as the present, again in many cases celebrating the achievements of Czech industry. The Hydroinform staff and the representatives of the Czech water industry who attended the writer's lectures at a special Hydroinform-organised seminar and the students who attended at the CTU then appeared as the living representatives of one of the greatest and longest of technological traditions in the world, dating at least from the middle ages. Moreover, this tradition of technological excellence has proceeded almost unbroken through the great upheavals of history.

The rulers and dominant political powers came and went, but the spirit of innovation and conservation, of grand concept and painstaking attention to detail, of thorough design and outstanding craftsmanship, has continued unabated in the Czech lands. This technological tradition, situated within such other-cultural, including architectural, richness is surely the soundest of foundations upon which an organisation such as Hydroinform can be built. A younger, more critical and questioning generation is clearly emerging to make further major developments possible. Hydroinform thus has all the prerequisites to become one of the major players in the hydroinformatics business in Europe. At the same time, however, a major change in emphasis will no doubt make itself felt within Hydroinform itself. We may say, *grosso modo*, that the information revolution that has come to fruition over the past few decades has changed the way in which professionals work within their professions, but it has not much changed the roles of the professions within society as a whole. The communication revolution that is now upon us, on the other hand, is already beginning to change the relations between the professions and society, and will continue to do so increasingly, and in new and in some cases unprecedented ways. Hydroinform has kept abreast of the wave of innovation and application of the information revolution, and has prospered correspondingly. It has accordingly already changed the way in which water professionals work in the Czech Republic. It is now, however, confronted with the next stage in this process, of riding the crest of the wave of the communication revolution, which is not just a question of ensuring further success, but of survival. At first sight, the signs did not look so promising: the thick manuals of the communication-enabling technologies were conspicuous by their absence in the offices of Hydroinform. On the other hand, observing the native tradition of innovation and excellence in applications, and the openness of the younger generation to the new communication paradigm and its technologies, it seems reasonable to suppose that Hydroinform will succeed here also.

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