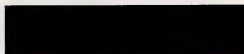


Information  
Services  
Program  
(ISP)

**Information  
Systems  
Planning  
Report**

Education  
Sector



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OCTOBER 1987

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INFORMATION SYSTEMS  
PLANNING REPORT

EDUCATION SECTOR



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**Information Systems Program (ISP)**

***Information Systems Planning Report—  
Education Sector***

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## Table of Contents

<b>I</b>	Major Issues	1
	A. Driving Force	1
	B. Issues and Objectives	2
	C. Management Perception and Organizational Issues	4
	D. Impact of Technology	4
<hr/>		
<b>II</b>	New Applications	7
<hr/>		
<b>III</b>	Budget Analysis	11

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There are a number of reasons for the increase in the number of people in the world. One of the main reasons is the increase in life expectancy. People are living longer and longer, and this is leading to an increase in the number of people in the world. Another reason is the increase in the number of people who are having children. This is leading to an increase in the number of people in the world.

The increase in the number of people in the world is leading to a number of problems. One of the main problems is the increase in the number of people who are poor. This is leading to a number of social and economic problems. Another problem is the increase in the number of people who are unemployed. This is leading to a number of social and economic problems.

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## Exhibits

<b>I</b>	-1 Education Sector—Driving Forces	2
	-2 Education Sector—Issues	3
	-3 Education Sector—Objectives	3
	-4 Education Sector—Impact of Technology	5
<hr/>		
<b>II</b>	-1 Education Sector—New Applications in 1987	7
	-2 Education Sector—Sources of Application Development	9
<hr/>		
<b>III</b>	-1 Education Sector—1987 Budget Distribution and 1987/1988 Changes in the Education Sector	12
	-2 Education Sector—Most Budgets Are Increasing at a Faster Rate	13

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## Major Issues





## I

## Major Issues

## A

### Driving Forces

Administrative applications are being bought to increase the efficiency of the business and administrative functions in the education sector. Schools are purchasing microcomputers to "front end" larger computer systems. New administrative applications should integrate with the basic financial systems.

Strategic planning is higher education's latest buzzword. Like businesses, schools need to do strategic planning. This need is fueled by declining birth rates, an orientation toward "vocational" or skills-based training, and specific employer needs.

Desktop publishing is hot! It is being used to produce a wide range of materials for schools of all sizes. In addition, with the proliferation of personal computers, IS departments are hiring separate staff or allocating part of existing staff for end-user support.

The education sector continues to deal with political pressures such as:

- Cost cutting. While IS can provide a means to improve productivity and information for decision making in key administrative departments, it, too, is under severe cost constraints.
- Changing administrative requirements. State and local governments frequently change administrative reporting requirements and budgeting procedures. Working within a shifting bureaucracy represents a real challenge.

Improved service to high school and post-secondary school students remains a priority. Service improvements include better information for student registration, on-line registration, and better management reporting about the registration process. Since declining birth rates in the 1960s have resulted in a smaller pool of applicants for post-secondary institutions,



colleges, universities, and technical and vocational schools must offer the right classes and services to students in order to grow.

Exhibit I-1 lists the driving forces affecting IS departments in the education sector.

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**EXHIBIT I-1****EDUCATION SECTOR – DRIVING FORCES**

- Improve Education Administration
- Support Strategic Planning
- Begin Desktop Publishing
- Support End-User Computing
- Deal with Politics of Government and School Boards
- Improve Service to Students
- Appeal to a Decreasing Supply of Students for Post-Secondary Institutions

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**B****Issues and Objectives**

IS must develop data-oriented as opposed to process-oriented information, representing a major change in the way educational institutions operate. Department-level fiefdoms are giving way to centrally managed resources with related growth in information necessary to further the strategic planning efforts. A good example is the efforts of many institutional IS organizations to support the school's recruitment efforts; rather than strict cost reduction, IS must support post-secondary institutions' recruitment efforts. Such support consists of data base management programming and mail list management.

Another major issue is the establishment of centralized, integrated student information systems as the key means of providing better services to students. Better service is not simply a concept—it is a key differentiator among competing institutions.

the 1990s, the number of people in the world who are under 15 years of age is expected to increase from 1.1 billion to 1.5 billion.

There are a number of reasons why the world's population is growing so rapidly. One of the main reasons is that the number of children born to each woman has increased. This is due to a number of factors, including the fact that women are now having children at a younger age, and that there is a higher birth rate in developing countries. Another reason is that the number of people who are surviving to old age has increased. This is due to a number of factors, including the fact that people are now living longer, and that there is a higher death rate in developing countries.

The world's population is growing so rapidly that it is becoming a major problem for many countries. One of the main problems is that there is not enough food to feed everyone. This is due to a number of factors, including the fact that the amount of land available for farming is decreasing, and that the amount of water available for irrigation is decreasing. Another problem is that there is not enough housing for everyone. This is due to a number of factors, including the fact that the amount of land available for housing is decreasing, and that the amount of money available for housing is decreasing.

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Key IS objectives include:

- Resolving the paradox of providing more support to a broader range of users with tighter budgets.
- Waiting for technological advances or industry standards which will enable communication between incompatible hardware.
- Providing the necessary data to support an increased level of strategic planning by post-secondary schools.

Exhibits I-2 and I-3 summarize the issues and objectives identified by education sector survey respondents.

EXHIBIT I-2

### EDUCATION SECTOR – ISSUES

- Develop Data-Oriented Information
- Support Recruiting Activities
- Improve Student Information Systems

EXHIBIT I-3

### EDUCATION SECTOR – OBJECTIVES

- Resolve Less Budget/More Support Paradox
- Resolve Incompatibility Among Computers and Networks
- Develop Necessary Data to Support Strategic Planning

the 1990s, the number of publications on the topic has increased. The most recent review of the literature on the topic was conducted by Jansen and colleagues (2005). In this review, the authors found that the majority of studies on the topic were conducted in the 1990s and 2000s, and that the majority of studies were conducted in the United States.

The authors also found that the majority of studies on the topic were conducted in the United States, and that the majority of studies were conducted in the 1990s and 2000s. This suggests that the topic of the present study is a relatively new and emerging area of research, and that there is a need for more research in this area.

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**C****Management Perception and Organizational Issues**

With the growing importance of strategic planning, schools' senior management is relying heavily on IS directors to define and implement the necessary information. IS is now directly supporting senior management at post-secondary institutions in two key areas—financial information and the long-range planning process.

- Financial information must be gathered and consolidated in a meaningful way for use by senior management.
- No longer can university presidents run a fully decentralized operation. Deans and department heads are being made accountable for head counts, capital budgets, and operating budgets to support long-range objectives.

Since they do not directly represent a particular department or academic discipline, IS directors are seen as a "neutral" party to gather and present necessary information; hence, their importance is increasing. Furthermore, technological advances in networking, data base software, and integrated voice/data communications are forcing recognition of the skills and knowledge of the IS director.

Retaining technical staff is becoming a critical success factor. Some schools have experienced incredible turnover during the past year, with staff lured by better salaries and growth opportunities in other industries. As a result of key staff shortages, IS management cannot implement departmental plans.

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**D****Impact of Technology**

New technology has fostered a faster document turnaround to meet the demands for faster-paced administrative processing. Also, networks enable colleges and universities to link geographically separate offices/branches for file transfer and administrative purposes.

INPUT also observed that universities are taking advantage of the fact that replacing old with newer technology will permit growth in processing capability and storage capacity while maintaining a flat budget. And, new technology has enabled IS to promote a "buy-in" by senior management of computerization through daily use of computers as a tool. Major administrative functions include: electronic mail, calendars, data manipulation, and report writing.

the 1990s, the number of people aged 65 and over in the United States is projected to increase from 20 million to 35 million, and the number of people aged 75 and over from 10 million to 15 million (U.S. Census Bureau 1997).

As the number of people aged 65 and over increases, the number of people aged 75 and over will increase at a faster rate. The number of people aged 75 and over is projected to increase from 10 million in 1990 to 15 million in 2010, an increase of 50%. The number of people aged 85 and over is projected to increase from 2 million in 1990 to 5 million in 2010, an increase of 150% (U.S. Census Bureau 1997).

As the number of people aged 75 and over increases, the number of people aged 85 and over will increase at a faster rate. The number of people aged 85 and over is projected to increase from 2 million in 1990 to 5 million in 2010, an increase of 150%. The number of people aged 95 and over is projected to increase from 0.5 million in 1990 to 1.5 million in 2010, an increase of 200% (U.S. Census Bureau 1997).

As the number of people aged 95 and over increases, the number of people aged 100 and over will increase at a faster rate. The number of people aged 100 and over is projected to increase from 0.1 million in 1990 to 0.3 million in 2010, an increase of 200% (U.S. Census Bureau 1997). The number of people aged 105 and over is projected to increase from 0.05 million in 1990 to 0.15 million in 2010, an increase of 200% (U.S. Census Bureau 1997).

As the number of people aged 105 and over increases, the number of people aged 110 and over will increase at a faster rate. The number of people aged 110 and over is projected to increase from 0.01 million in 1990 to 0.03 million in 2010, an increase of 200% (U.S. Census Bureau 1997). The number of people aged 115 and over is projected to increase from 0.005 million in 1990 to 0.015 million in 2010, an increase of 200% (U.S. Census Bureau 1997).

As the number of people aged 115 and over increases, the number of people aged 120 and over will increase at a faster rate. The number of people aged 120 and over is projected to increase from 0.001 million in 1990 to 0.003 million in 2010, an increase of 200% (U.S. Census Bureau 1997). The number of people aged 125 and over is projected to increase from 0.0005 million in 1990 to 0.0015 million in 2010, an increase of 200% (U.S. Census Bureau 1997).

As the number of people aged 125 and over increases, the number of people aged 130 and over will increase at a faster rate. The number of people aged 130 and over is projected to increase from 0.0001 million in 1990 to 0.0003 million in 2010, an increase of 200% (U.S. Census Bureau 1997). The number of people aged 135 and over is projected to increase from 0.00005 million in 1990 to 0.00015 million in 2010, an increase of 200% (U.S. Census Bureau 1997).

As the number of people aged 135 and over increases, the number of people aged 140 and over will increase at a faster rate. The number of people aged 140 and over is projected to increase from 0.00001 million in 1990 to 0.00003 million in 2010, an increase of 200% (U.S. Census Bureau 1997). The number of people aged 145 and over is projected to increase from 0.000005 million in 1990 to 0.000015 million in 2010, an increase of 200% (U.S. Census Bureau 1997).

Finally, new technology has enabled schools to better comply with changes in state and federal laws and related reporting requirements as well as changes in auditing procedures.

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EXHIBIT I-4

### **EDUCATION SECTOR – IMPACT OF TECHNOLOGY**

- Improved Response Times
- Improved Communication
- Improved Efficiency of Computer Equipment
- Heightened Computer Awareness by Senior Management
- Better and Faster Compliance with Changes in Laws





## New Applications



the 1990s, the number of people in the UK who are aged 65 and over has increased from 10.5 million to 13.5 million, and the number of people aged 75 and over has increased from 4.5 million to 6.5 million (Office for National Statistics 2000).

There is a growing awareness of the need to address the needs of older people, and the need to ensure that the health care system is able to meet the needs of older people. The Department of Health (2000) has published a strategy for older people, which sets out the government's commitment to older people and the need to ensure that the health care system is able to meet the needs of older people.

The strategy for older people (Department of Health 2000) sets out the government's commitment to older people and the need to ensure that the health care system is able to meet the needs of older people. The strategy is based on the following principles:

- Older people should be able to live independently and actively in their own homes.
- Older people should be able to access the services they need to live independently and actively in their own homes.
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**II**

## New Applications

Colleges and universities support a wide range of business activities, resulting in a diverse base of applications software. Primary applications include; accounting and finance, admission, financial aid, development/fund raising, registration, bookstore, and administrative offices of the president and various deans. Exhibit II-1 details new applications identified by INPUT survey respondents.

EXHIBIT II-1

### EDUCATION SECTOR – NEW APPLICATIONS IN 1987

- Applications Based on Data Base Management Systems
- Voice/Data Networks
- Desktop Publishing

Post-secondary and secondary institutions are implementing more applications based on data base management systems, including:

- Registrar files.
- On-line library catalog systems.
- On-line registration.

the 1990s, the number of people who have been employed in the public sector has increased in all countries. The increase has been particularly large in the United Kingdom, where the public sector has grown from 10% of the total labour force in 1980 to 20% in 1998.

There are several reasons for this increase. One reason is that the public sector has become a more attractive employer. This is due to a number of factors, including the fact that the public sector is often seen as a more stable and secure employer than the private sector. Another reason is that the public sector has become a more important part of the economy, particularly in countries where the public sector is large.

There are also several challenges facing the public sector. One challenge is that the public sector is often seen as a burden on the economy. This is due to the fact that the public sector is often financed through taxes, which can be a burden on the private sector. Another challenge is that the public sector is often seen as inefficient and wasteful.

There are several ways in which the public sector can be made more efficient and effective. One way is to reduce the size of the public sector. This can be done by cutting back on government spending and by privatizing public enterprises. Another way is to improve the management of the public sector. This can be done by introducing competition and by improving the quality of public services.

There are also several ways in which the public sector can be made more attractive to employers. One way is to improve the working conditions in the public sector. This can be done by increasing wages and benefits and by improving the quality of the work environment. Another way is to provide more training and development opportunities for public sector employees.

There are also several ways in which the public sector can be made more important to the economy. One way is to increase the role of the public sector in providing public services. This can be done by expanding the range of public services and by improving the quality of these services. Another way is to increase the role of the public sector in providing infrastructure and other public goods.

There are also several ways in which the public sector can be made more transparent and accountable. One way is to increase the amount of information that is available about the public sector. This can be done by publishing more information about government spending and by making it easier for citizens to access this information. Another way is to increase the level of public participation in the decision-making process.

There are also several ways in which the public sector can be made more innovative and dynamic. One way is to encourage public sector employees to think creatively and to develop new ideas. This can be done by providing more training and development opportunities and by creating a more supportive work environment. Another way is to encourage public sector employees to work in a more flexible and dynamic way.

- On-line student fee collection systems.
- Budgeting systems.
- Installation tracking of microcomputer hardware and software.
- Purchasing.

Campus-wide voice/data networks, while not strictly application software-based, are becoming more widespread. The past two years' planning efforts are becoming reality.

But, the hottest new application is microcomputer-based desktop publishing. Between 1986 and 1987, desktop publishing appeared across a diverse user base of educational institutions. INPUT believes this represents a significant trend, not a one-time temporary aberration.

The education sector has a few IS needs which respondents believe are not well served by vendors. Specifically, schools want:

- A network version of Lotus 1-2-3.
- Micro-to-mainframe links, especially those compatible with IBM mainframe operating systems.
- Software to integrate existing workstations.
- CPU to CPU communication between different vendors' products.
- More software for primary and secondary school districts' applications, especially payroll, personnel, and finance, running on non-DEC and non-IBM computers.

The education sector is divided in its approach to software development. Larger colleges and universities tend to develop new applications in-house while smaller colleges and universities generally rely on third-party software for new applications. In either case, maintenance and enhancement of existing applications takes far greater share of the resources than developing new applications.

- Larger colleges and universities devote around 40% of software development staff to developing new applications.
- Smaller schools devote less than 25% of their software development staff to developing new applications.

the 1990s, the number of people in the world who are under 15 years of age is expected to increase from 1.1 billion to 1.5 billion (United Nations 1998). This increase is expected to be particularly large in the developing countries, where the population is expected to increase from 1.1 billion to 1.4 billion.

There are a number of reasons why the number of children in the world is expected to increase. One of the main reasons is the high birth rate in the developing countries. In these countries, the average number of children born to a woman is about 5.5, which is much higher than the replacement level of 2.1. This high birth rate is due to a number of factors, including the lack of access to family planning services, the high value placed on children, and the high mortality rate.

Another reason for the increase in the number of children is the high life expectancy in the developing countries. In these countries, the average life expectancy is about 55 years, which is much higher than in the developed countries. This high life expectancy is due to a number of factors, including the improvement in medical care and the reduction in the mortality rate.

The increase in the number of children in the world is expected to have a number of significant impacts. One of the main impacts is the increase in the demand for resources, such as food, water, and energy. This increase in demand is expected to put a significant strain on the environment and the world's resources.

Another impact of the increase in the number of children is the increase in the number of people who are dependent on others. In the developing countries, a large proportion of the population is under 15 years of age, and these children are dependent on their parents and other family members for their basic needs. This dependence is expected to increase as the number of children increases.

The increase in the number of children in the world is also expected to have a significant impact on the global economy. In the developing countries, the large number of children is expected to reduce the productivity of the workforce and the overall economic growth. This is because the children are not able to contribute to the economy and are instead a burden on their families and the state.

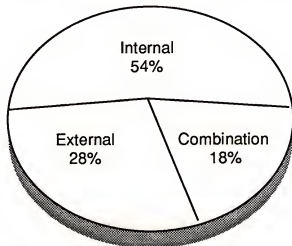
There are a number of ways in which the increase in the number of children in the world can be managed. One of the main ways is to improve access to family planning services in the developing countries. This can be done by providing education and information about family planning, and by making family planning services more affordable and accessible.

Another way to manage the increase in the number of children is to improve the quality of education and health care in the developing countries. This can be done by investing in education and health care, and by improving the quality of the teaching and medical staff. This will help to reduce the mortality rate and improve the life expectancy, which will help to reduce the number of children in the world.

Exhibit II-2 shows educational institutions' sources for new applications software. Internally developed software continues to account for the most frequently used software acquisition method. However, off-the-shelf applications software is used more than a combination of third-party software with either internal development or outside professional services.

EXHIBIT II-2

### EDUCATION SECTOR SOURCES OF APPLICATION DEVELOPMENT (For Major New Applications)



#### Cost Range of New Applications Software:

- Mainframe-Based: \$30,000 - \$1,000,000
- Minicomputer-Based: \$15,000 - \$800,000
- Microcomputer-Based: \$125 - \$16,000

#### Average Cost of New Applications Software:

- Mainframe-Based: \$450,000
- Minicomputer-Based: \$205,000
- Microcomputer-Based: \$975

- Driven by legislative and accounting requirements, more schools are now updating their 1970s vintage in-house developed software.
- The relatively low salaries paid to programmers and systems analysts in the education sector may provide economic justification for continuing in-house applications software development.

the 1990s, the number of people in the UK who are aged 65 and over has increased from 10.5 million to 13.5 million, and the number of people aged 75 and over has increased from 4.5 million to 6.5 million (Office for National Statistics 2000).

There is a growing awareness of the need to address the needs of older people, and the need to ensure that the health care system is able to meet the needs of older people. The Department of Health (2000) has published a strategy for older people, which sets out the government's commitment to improve the health and well-being of older people, and to ensure that the health care system is able to meet the needs of older people.

The strategy for older people is based on the following principles: (1) to improve the health and well-being of older people; (2) to ensure that the health care system is able to meet the needs of older people; (3) to ensure that older people are able to live independently; (4) to ensure that older people are able to participate in society; (5) to ensure that older people are able to live in their own homes; (6) to ensure that older people are able to live in their own communities.

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- While it may be necessary for more schools to eventually shift to third-party integrated applications software, many schools continue to do in-house work, reflecting a "not invented here" attitude.
- However, there are not sufficient in-house programmers to both maintain and enhance existing applications and develop new applications. The increase in external software development indicates IS management is moving in the right direction.







## Budget Analysis



the same way as the other two, but with a different set of parameters. The results are shown in Table 1.

The results show that the model is able to predict the number of cases and deaths with a high degree of accuracy.

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## III

## Budget Analysis

In 1987, respondents experienced limited growth in their IS budgets, due primarily to increases in salaries and fringe benefits and applications software.

- IS spending in 1988 is projected to increase 3-5% for inflation, salaries, and benefits.
- Exhibit III-1 shows the 1987 budget distribution and projects the growth in specific budget categories in 1988.

In general, private secondary and post-secondary schools' budgets are growing at a faster pace than public secondary and post-secondary schools. IS spending in unified primary and secondary school districts is increasing at a slower rate than non-unified school districts.

Nearly 80% of the respondents project that their IS budgets will increase or remain the same in 1988 as in 1987. More than 50% of respondents believe the 1988 growth rates will be greater than in 1987 (see Exhibit III-2).

- Factors contributing to increases in the IS budget include (in order of most frequently mentioned factors):
  - Hardware maintenance.
  - Software maintenance.
  - Personnel expenses.
  - New applications software purchases.
  - New hardware purchases.
  - Telecommunications cost increases.



EXHIBIT III-1

**1987 BUDGET DISTRIBUTION AND  
1987-1988 CHANGES IN THE EDUCATION SECTOR**

BUDGET CATEGORY	1987 I.S. BUDGET (Percent)	1987-1988 Expected Budget Growth (Percent)
PERSONNEL (Salaries & Fringe Benefits)	48.2	2.6
HARDWARE		
Mainframes	6.7	2.1
Minicomputers	6.7	3.5
Microcomputers	5.3	3.9
Mass Storage Devices	4.2	2.0
Other Hardware	0.6	1.1
TOTAL HARDWARE	23.5	2.8
Data & Voice Communications	3.7	5.2
External Software	7.3	12.6
Professional Services	0.3	(0.7)
Turnkey Systems	0.1	0.3
Software Maintenance	2.4	1.9
Hardware Maintenance	8.3	4.5
Outside Processing Services	0.2	(2.0)
Supplies	5.1	2.5
Travel, Subscriptions, Etc.	0.9	1.1
TOTAL	100.0	3.6

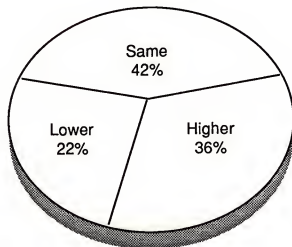


EXHIBIT III-2

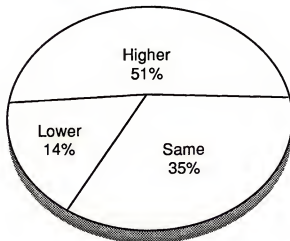
## EDUCATION SECTOR

### MOST BUDGETS ARE INCREASING AT A FASTER RATE

Comparison of  
1988 and 1987  
I.S. Budget



Comparison of  
Changes in Growth Rates of  
1987 and 1988 I.S. Budgets







- One factor was listed as the major contributing factor to decreases in the IS budget, namely declining state/local economy (which leads to decreases in funding from the legislature).

Head count from 1986 to 1987 within education sector IS departments changed in no significant pattern.

- Twenty-three percent indicated head count increased.
- Forty-four percent indicated head count remained the same.
- Thirty-three percent indicated head count decreased.

Head count increased in those institutions implementing new, expensive applications. Generally, head count in junior colleges and secondary school districts was the same as last year.



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### Offices

#### NORTH AMERICA

**Headquarters**  
1280 Villa Street  
Mountain View, CA 94041  
(415) 961-3300  
Telex 171407

**New York**  
Parsippany Place Corp. Center  
Suite 201  
959 Route 46 East  
Parsippany, NJ 07054  
(201) 299-6999  
Telex 134630

**Washington, D.C.**  
8298 C, Old Courthouse Rd.  
Vienna, VA 22180  
(703) 847-6870

#### EUROPE

**United Kingdom**  
INPUT  
41 Dover Street  
London W1X 3RB  
England  
01-493-9335  
Telex 27113

**Sweden**  
Athena Konsult AB  
Box 22232  
S-104 22 Stockholm  
Sweden  
08-542025  
Telex 17041

#### ASIA

**Japan**  
FKI  
Future Knowledge Institute  
Shanpia Bldg., 8-1,  
Kanda Sakuma-cho 2-chome,  
Chiyoda-ku,  
Tokyo 101,  
Japan  
03-864-4026

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