

Global Information Systems and Organisational Change

Professor George Rzevski, The Open University, Milton Keynes MK7 6AA, UK

Abstract

Global networks connecting computers located around the world enable us to work, keep in touch and form partnerships with people and organisations having similar interests irrespective of their geographical location. Businessmen, academics, journalists and political activists can pursue their interests on a global scale ignoring the well-being of states. We can all watch the same TV programme and receive news about world events with unprecedented speed. Plans are on hand to develop digital distance learning systems enabling students to access educational material and even laboratories located in far away places. Information technology is changing the way we live, work, learn and entertain ourselves.

Introduction

We are witnesses of a rapid expansion of global information systems exemplified by

- Global General Purpose Networks, such as Internet;
- Global Financial Systems, such as those supporting money markets, dealing in shares and banking transactions;
- Global Manufacturing Systems, such as those supporting international consortia for manufacturing aircraft;
- Global News and Entertainment Networks;
- Global Educational Systems.

A large number of people participate in these systems by *surfing* the *information superhighway* or by simply tuning into a global satellite TV channel. By the very act of their participation these people are said to be transported into *cyberspace*. Alternatively, we can say that they are members of the new *information society*, the society whose wealth is primarily based on the exchange of information rather than goods.

The major feature of an information society is that it is *global* rather than national. Worldwide digital networks enable rapid communication across national boundaries and thus provide opportunities for individuals and organisations to form global partnerships and coalitions with a view to achieving their economic or political goals by-passing institutions of nation states. Our existing political and economic power structures are being changed by high speed global information systems.

I have found it useful to consider implications of global networks using metaphors from our everyday life to underline the fact that in transferring our activities from the physical space to cyberspace we often retain our salient behavioural characteristics. Therefore we should not be surprised when we discover that the information society consists of bazaars, exclusive clubs, workshops and villages with village markets and village schools, to mention only some of the great variety of cyberspace institutions.

The Globe as Petticoat Lane

Global systems such as Internet were not planned; they emerged from humble beginnings through a remarkable trial-and-error evolution lasting, so far, less than thirty years. Throughout this period many individuals and teams made brilliant, mediocre or incompetent contributions to various elements of the total. No one was ever in a position to develop a global, or even national strategy, to outline an overall plan and to manage its implementation. Internet is perhaps the first artefact that evolved over the years into a complex system that is now exhibiting signs of self-organising behaviour.

Socially, Internet is a real bazaar. Estimated 30 million participants trade, argue, observe each other, exchange greetings, send and receive messages, gossip, make friends and find partners, learn how to make bombs, read messages of racial abuse or go to an ego trip and everyone is in constant danger of being mugged, or “hacked”.

We are now learning about opportunities and traps that this new gigantic computer-controlled network has created for us. I do not think anyone is sure how to influence the direction of its further growth. Are catastrophic failures imminent? Will fraud be unstoppable? Will Internet divide the World into a new rich and poor?

The Globe as Clubland

Not everyone enjoys or has time to mingle with the crowd. Cyberspace has a number of exclusive clubs for the elite where money dealers, stockbrokers and other serious information traders can make use of well-protected, safe and efficient tools for participating in the *information economy*. Reuters and Dow Jones are examples of distinguished cyberspace clubs that are in many respects not different from those located in the St James' district of London. This is a congenial environment where one would expect to meet famous personalities like Mr Soros and young Turks such as Mr Leeson.

The membership of cyberclubs gives power. For the first time in human history, private international coalitions, partnerships, corporations and pressure groups, supported by global networks, are capable of winning in situations where there is a conflict of their interests with the interest of national governments (witness the power of money dealers in determining the value of national currencies). Currently all signs seem to suggest that the nation state has outlived its usefulness. It appears to be too small as a viable economic unit and too large to satisfy the conflicting demands of regional cultures. A big question is: would a global alliance of nation states aided by effective decision support systems give a new lease of life to national governments? Are governments ready to form their own political clubs in cyberspace?

The Globe as Workshop

A rapid increase in global competition has triggered an avalanche of strategic alliances among manufacturers. Consortia are formed across national boundaries and often across continents. Computer networks connect decision nodes in such consortia making them responsive to any change in external conditions. The design, manufacturing and marketing of products are usually distributed across several countries, taking full advantage of factors such as available skills, cost of investment, components, energy and labour, restrictions imposed by local regulations and culture. Production is usually moved as close as possible to the consumer thus by-passing import restrictions (Japanese car manufacturers). Costs can be cut by allowing employees to work from home and even further reduced by employing freelancers (with their own computing and communication equipment at home) on short-term contracts. All available evidence seem to indicate that this trend will continue - there will be more work opportunities and less full-time employment. We should seriously consider redefining the term "unemployment".

Distributed businesses may take many different forms. Some are based on a single key player who is the owner of the "image" of the enterprise (Benneton, Nikes) supported by many smaller participants. Other businesses are characterised by distributed ownership (Airbus). The latter example clearly illustrates advantages offered by international collaborations: it is an astonishing achievement for the European consortium to compete in the design and manufacture of aircrafts with well established American companies that until very recently dominated the world.

Decisions aimed at improving the effectiveness of a distributed business may be in conflict with national interests. What are the consequences? Are they controllable? How are benefits distributed among consumers, employees and shareholders? Are there safety nets for disadvantaged stake-holders? Are global consortia above national laws? Could governments form their own global partnerships?

The Globe as Village

The news supply industry, including press and broadcasting, thanks to powerful information technology (IT), has rapid access to any world event of interest and a means of transmitting the news to captive audiences with unprecedented speed. The impact of carefully selected images can be devastating, who could stay cool when presented with harrowing pictures of dying children or menacing war scenes with a fearless women reporter pointing to another Roman Catholic Church destroyed by savages. As soon as a new war starts, news editors invite boffins, eggheads, ex-ambassadors, retired generals and experts of all kinds to analyse in front of TV cameras fresh items of news as they arrive. There is no time for a serious analysis, rushed value judgements may be made, cardinal errors may be committed but the viewers are impressed. Very few can follow the details, distracted by powerful images and speed of delivery.

More often than not the whole population receives the same news at the same time, and packaged in the same way, as do political decision makers. This puts politicians at a disadvantage. We expect them to react swiftly and they oblige, often giving an impression of guessing rather than following a long-term strategy. The total effect of this is a

substantial transfer of authority, as perceived by general public, from elected political representatives of a nation to newscasters, reporters, news editors and commentators.

A careful observer will notice a positive feedback at work. The perceived power of the media results in many new opportunities to exercise power (as when aid workers invite cameras to show suffering in order to shock audiences into donating money and when political parties organise television-driven political campaigns abandoning old-fashioned mass meetings). As a result we see a substantial increase in investments into global media networks (Mr Murdoch's vision of a global news and entertainment network) and growth of advertising and PR industry which creates income for TV and newspapers. We also witness a change in attitudes: TV interviewers are increasingly unpleasant and occasionally arrogant, news editors and programme controllers are more selective.

The consequences are still to be digested. Are we better informed? Is there a greater or smaller opportunity for biased interpretation of world events? Are the egos of TV personalities more, or less, dangerous than those of politicians? Who gains and who loses economic muscle? Is democracy weakened or empowered by these processes? If Sky TV can reach two thirds of world households is this a disaster or a blessing? Will global TV obliterate or ensure the survival of the variety of cultures now co-existing around the world? The global village or global collection of villages?

The Globe as Village School

My university is a distance learning institution with almost 100,000 undergraduates and as many associated students distributed over several European countries. At present we package text, educational software, video tapes, audio cassettes and even home experimental kits into large boxes and send them to our students. As you would expect, production, packaging, storage and distribution costs are very high and only due to the economy of scale we can offer educational programmes that are both high quality and inexpensive. Even so production costs are a limiting factor, as the following example illustrates. My team has recently developed a course which aims to help students to acquire skills in designing intelligent machines. During their studies students carry out experiments at home with an intelligent Lego vehicle connected by an infrared link to their personal computers (PCs). The demand for this course is very high but we can only afford to send out each year 350 experimental vehicles.

Early experiments show that it is now feasible to switch to electronic production, packaging, storage and distribution of educational material. We are moving towards a situation where we shall be developing multimedia learning resources in digital form and storing them on educational servers where course material could be accessed by students from their personal computers connected to an educational superhighway, whenever required. Our extensive system of face-to-face tutorials will complement and support virtual study groups. Note the difference - at a stroke, all packaging, storage and distribution costs have disappeared. Any number of students can copy a digital course package without affecting costs. Even home experimental kits are not required. We are now developing a system for remote access to university laboratories. Students will be able to design a software "mind" for our intelligent Lego vehicle, download it to a computer located in our mechatronics laboratory where a number of vehicles will be placed and observed by video cameras. Computer programs developed by students will control the

navigation of vehicles and students will obtain instant feedback on their effort through a video signal displayed in a window on their PCs.

It is not difficult to envisage a world criss-crossed by educational networks helping students from all corners of the Globe to access educational material and even high-tech laboratories at remote locations. Students in a Sudanese homestead using a PC to control robots located in a Stanford University laboratory? Why not.

Instead of Conclusions

I began my research into technological issues and social implications of the emerging information society almost five years ago. I have covered the groundwork and wish now to join forces with others. I would like to hear from technologists, sociologists, infobahn surfers, information providers, publishers, librarians, entrepreneurs, educators, researchers, students, journalists, politicians, media personalities and interested bystanders who have attempted to answer questions posed in this short paper or have ideas how to formulate new ones.