

nication for direct marketing by telephone, increasing competitive capabilities and efficiency. Tele-communication is used for disseminating information about products and services. IS will enable consumers to become better informed on types of products and services they desire. Thus competition will strengthen.

In the mentioned pattern, the role of cities will change. The City developed as a market centres and the place, where inhabitants buy goods while companies process information needed for marketing. Use of new technologies in companies is diminishing the role of city administration and institutions offering business and other services in cities. Changes in marketing and possibilities for globally relocating activities intensely using information and knowledge are endangering numerous communities in developed countries. Enterprises are striving to position their production of goods and services in places where production and transport costs are lowest.

3.4 Regional spatial effects

IS can provoke the emergence of non-competitive areas, that will not be able to generate sufficient financial resources from income tax for the maintenance of collective services IS will facilitate the introduction of the principle »pay-for-use service«. Possibly there will be no need for public subsidies for services financed by the community in the future.

Technologies supporting IS allow the placement of knowledge- and information-based employment anywhere, with significant effects on the social and spatial structure.

Work-from-home and increasing number of users working from a particular place can diminish the demand for new office space. People living in suburbs and buying goods and services from a distance will have no reason to visit the cities. The cities can be emptied and turn into ghettos for the poor.

These changes have to be analysed and the effects on the operation of the public sector determined. If for instance there will be no physical work places, payment of taxes of employees will not be possible. Then again, influences on the transport infrastructure have to be considered. Since technology is affecting the »shrinking« of the World, less voyages will be needed and resources intended for investment into road and railway infrastructure can become fruitless.

4. Development acts

Government has to plan investment expenditures in advance, thus it cannot cope with rapidly changing circumstances and demands. IS will only radicalise these conditions by stimulating change and disabling conditions for predicting future needs. The transport infrastructure or business centres for example, can become obsolete soon after completion, because of changes in business flows, preferences and demands of potential users. Because of the increased rate of change it would be beneficial for local authorities and central government to design strategies and plans for introducing ICI and connected applications and services, rather than building new roads.

Development of the IS in Slovenia will amongst other depend on the formation of **information areas**, that enable access to information by various communication platforms. In-

formation areas should be established in national, regional and local communities. Pertaining relations and interests define these communities. Various organisations and individuals appear as providers of information needed in information areas. Some operate on the local, others on the regional or national level. Public institutions have to enforce information that is compatible with the needs of individuals and companies. Information areas also define market networks. Individuals, regions or the state that will not be connected to these networks will become non-competitive.

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Note

¹ The article is based on the results of the research project The tele-communication system and its effects on physical development (Gulič, A., Praper, S. et al., 2000), commissioned by the Ministry of environment and physical planning – Office for physical planning and the Ministry of transport and communication – Tele-communication office.

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E – urban systems

1. Virtual networks and urban systems

Because of its character and scope, information technology is causing social changes. A new, so-called information society is emerging¹ whose main feature is different production and access to information. An abstract space is being created, that cannot be comprehended only as the usual social and physical space, but affects cities immensely. The city is consequently changing into a space where several separate, global, supplementary networks are connecting into the wider picture². These are **virtual networks** that intertwine and form the urban social and cultural life. Information flows through these networks and all of the »mobility« happens: tele-communication, infrastructure, transport, institutional networks of trans-national corporations, media ... Virtual networks are the place where all interaction between the urban and electronic space happens and mixes with the physical, social and cultural space.

For some time connecting into different modern efficient tele-communication systems or virtual networks isn't in the domain of innovative technological organisations, but has become a

day-to-day content in the business, research, political, education, cultural World, but also in the private space of leisure, shopping and even love. Different types of connections on the micro, macro and global levels quickly and silently became part of our life and radically diminished or even shattered distances and obstacles of space, time, culture, business etc.

Because of virtual networks, cities have ceased to be only physical places, aggregates of shapes and people, but are increasingly becoming electronic places, where the later dominates, established by information technology. One can expect that in **urban systems** massive changes will be influenced by information technology. Information technology affects economic, social, physical, environmental and institutional development of cities. It is used in production, services, transport, consumer services, leisure, media, entertainment industry, education, social and cultural life. Cities are not changed by information technology as such, but by changes caused on the social, economic, environmental and other fields.

The city of course remains an agglomeration of people, buildings, crossroads of transport networks, the seat of economic, cultural and social life. It is however becoming the electronic seat for virtual networks and telematics' ³.

2. E-individuals day-to-day life

Information technology is creating electronic space, affecting the execution of **day-to-day activities by individuals**. With information technology and the use of »e-activities« the cities inhabitants can transcend physical boundaries. The rationale of these activities is to enable individuals, with access to information technology, to use »telematics« (telephone, TV, e-mail, internet ...) and reach the desired information or service without moving in the physical space. Many of these are already known: »e-employment«, »e-banking«, »e-shopping«, »e-education« ... The number activities occurring in virtual space is increasing, because they mean less savings on costs and time. People don't have to travel to work or services, factories, banks, offices, schools, entertainment centres, churches, hospitals ... We can therefore expect changes within the framework of production, transport, services, leisure, media, education, social and cultural life.⁴

For easier planning and defining the day-to-day life of individuals, activities can be divided into groups. **Day-to-day life** runs along different patterns of activities, for instance:

- home,
- work,
- services (shopping, banking ...),
- recreation/leisure/holidays.

Part of the daily activities happen in the physical space. Statistical data (for Slovenia shown later on) and supply show that more and more of them happen in the electronic space. »Tele-activities« will provoke different organisation of households and daily life patterns.

Communication-information technology enables access to electronic space from **home**. It also enables working from home and the use of »e-activities«. Thus Graham and Marvin⁵ elaborate on the possibilities of the future home becoming the »loci« of urban life. The home will become the point from which individuals will connect into the social environment.

The communication-information unit at home joins the work and living environment. New technologies facilitate working from home »enabling individuals to have all the necessary equipment at home and connect to their basic institution« (Zakrajšek, 1987).

Working from home has positive and negative effects on »e-workers«⁶.

Positive effects of »e-employment«⁷ are that the individual doesn't have to travel to work every day, one has more time for the family and oneself, focusing on important matters is easier and the employer saves on costs of renting and furnishing offices.

Negative effects of »e-employment« are isolation and the feeling of seclusion from the company and co-workers. Fryxell and the Japanese⁸ point out the need for physical contact at work, not provided by »e-employment«. Employers also point out the costs of the equipment for working from home.

Service activities are defined as »non-production economic activities« (e.g. shops, banks, insurance agencies, transport, communication modes, public administration etc)⁹.

Certain »e-service activities« exist in Slovenia. »Tele-shopping« exists interactively through the internet, television (TV-shop), »e-banking« through the internet (SKB-NET, NLB-Klik), bankomats, banking services are available by telephone (Teledom).

The key advantage of »e-activities« is that they transcend physical boundaries. »e-banking«, »e-shopping«, »e-education« ... are all »e-activities« that are part of the service activities tied to popular use. Because of them the individual saves on costs, time, travelling to the bank, shop, education institution ... Thus also traffic routes can be relieved of voyages to undertake the services, there are less traffic congestion and pollution.

Leisure is defined as »the part of the day, week or season, when the employed person is not tied by professional etc. duties and uses one's time for rest and entertainment, thus replenishing one's physical and mental strengths«¹⁰. The way in which leisure time is spent depends on age, sex, education, and average household income¹¹. It has been established, that in Slovenia »almost half the population doesn't exploit this time qualitatively¹² or doesn't even have it.«¹³ »e-employment« and »e-service activities« permit living on any given site. Thus the concept of **holidays** can also change.

Information technology can change and above all alleviate the conduct of various day-to-day activities. If a person doesn't have information technology, »tele-activities« are impossible. Thus one becomes **underprivileged**. In our society various social groups are underprivileged, not only individuals.

In the urban environment **functionally disabled groups**¹⁴ are segregated and underprivileged in other ways as well. In the urban built-up environment, they can encounter different types of obstacles (physical, economic, spatial, psychological and time) besides informational ones. Physical and spatial obstacles are the reason for their poor mobility. They are the reason for inaccessibility of numerous services; they cannot co-create and connect into the active social fabric of the city. The production of obstacles causes social exclusion

of functionally disabled people i.e. certain places are intentionally made inaccessible. The political and social practice in Slovenia often still excludes functionally disabled people. However the use of information technology can enable the functionally disabled to overcome some of the spatial and physical obstacles and prevent exclusion.

With the aid of information technology they can **transcend physical and spatial obstacles** in by using electronic space, integrate in social life. If they have the possibility of living an independent life¹⁵, by using information technology, they can operate from their (work) unit at home, thus despite existing obstacles equally function from home and use »e-activities«. Therefore they can satisfy most of their needs without the help of others, especially for activities where physical contact is not necessary or desired. Virtual networks can facilitate freedom, enable greater autonomy of »plugged-in« functionally disabled people, but also other individuals, groups, organisations ...

In practice there are of course problems. Not all functionally disabled individuals have access to information technology. Reasons vary: price of technology, ignorance, non-adapted technologies ... Other social groups are also excluded from the global tele-communication-information system. The poor because of high priced information technology, the less educated because of insufficient knowledge or capabilities ... Functionally disabled people are one of the poorest social groups in Western societies¹⁶. Because of their handicap they need extra (over)expensive technologies for communicating through networks, institutions catering to their needs often don't have (sufficient) information technology ... These are some of the reasons excluding functionally disabled individuals and other de-privileged groups into »**information ghettos**«.

3. E-real estate

Tele-communication networks enabling working remotely »from a distance«, without moving physically affect the basic principles of real estate. With connections their institutional character changes, e.g. customs that prevail in a certain environment, but there are also virtual modifications also in their physical and actual economic characteristics. Support for either »on-line« education, virtual offices, shopping from a keyboard or »cyber« – meetings, all change the character of real estate, i.e. its immobility. Virtually the introduction or changes to inter-or intra-networks, can change the location (site) of real estate. The same applies to diversity, that is seemingly diminishing, all of which affects actual changes in economic factors, such as: economic location, rarity, interdependency or even time of return of investments.

The **classical real estate market** was until recently divided in a simple fashion, according to its prevailing use, into several sub-markets:

- office space market (offices, shops, hotels ...),
- housing market (urban, suburban, rural ...),
- industrial property market (factories, services, warehouses ...),
- agricultural property markets (forests, fields, pastures ...),
- specific real estate uses (churches, parks, graveyards ...).

Economic and other changes in contemporary West European cities and the World in general are affecting the classical boundaries between particular markets and real esta-

te sub-markets. One of the basic factors of comprehensive spatial, organisational and functional restructuring is in fact, the rapid growth of tele-communication, tele-metric networks and services, reflected most vividly in the **changed relationship between economic activity and its location**.

Economy is transforming into »e-economy«. Simultaneously organisation changes in business activities, that are total (e-marketing), partial (e-banking, reservation of aeroplane tickets) and occasional (electronic businesses and labour organisation, e.g. transit villages, technopolis, employment centres and working from home) are eliminating formerly distinct boundaries between office space, industrial and housing real estate markets. In the future real estate will not be grouped according to prevailing use or physical displacement, but according to its position in the tele-communication network.

Numerous global processes that affect all the sub-markets condition the industrial real estate market. New management models, within particular enterprises or between them and their consumers, are devising different real estate needs, especially concerning new roles of warehousing. Only the most imaginative and adaptable users of such space and transport systems will survive. Demand for industrial real estate property, especially if it is located adjacent to the main air, maritime, road and railroad transport centres, will increase, but adequate tele-communication ties will have to be introduced.

The **retail sector** has been brought into the front line of globalisation and technological processes, thus also its real estate market. Early forecasts indicated the complete dominance of electronic retail, since it enables consumers to shop directly from their homes. In the long run, only shops in the best sites would survive. Many retailers simply shunned the meaning of e-shopping and the internet era and considered electronic shopping a variety of catalogue retail. The business success of e-shopping however rectified their standpoint and forced them into intense restructuring with innovative electronic offer, implying the position of the new, central type of retail, running between real and virtual bricks and mortar.

Similarly, market analysts predicted the **decline of the office real estate market**, basing their findings on the effects of technological advancements on such particular spaces by. New working methods, such as virtual offices, office hotel management and work from home, were supposed to replace classical office management and coupled with changed logistic and technological preferences affecting the suitability of certain existing spaces, redesign the office space market. The need for small offices near residential areas will undoubtedly increase, after all not only top executives, but also lower level management, computer experts, retailers and many others, are recognising and demanding the comfort of working from home or in the immediate neighbourhood. However, such exaggerated forecasts were soon proven wrong, in the USA for example, demand for office space has in fact lately increased.

The **hotel real estate market** has successfully adapted to the changed conditions, by developing various aggressive programmes to deny technophobe pessimistic forecasts. Analysts spoke about drastic diminishment of travelling and the replacement of physical contacts between companies and clients with new communication and business modes, as well as video-conferencing etc. The latter did neverthe-

less affect the sector in a constructive and not destructive manner, because they provoked the establishment of new hotel management methods. Globalisation has caused even more travelling, working from home is in full swing, also causing necessary occasional co-ordination meetings simultaneously offering good business opportunities for well located and easily accessible hotels.

The effects of globalisation and technological changes on the **housing real estate market** were, contrary to the other sectors, underestimated. Households demand not only faster telephone services, but are adapting their housing preferences to changed technical possibilities. Further growth of working from home will cause the increased demand for offices equipped with communication means, within the houses themselves or in their immediate vicinity, also causing necessary increase in average floor space of homes. Households desire optimal ties with the outside World not only for work, but also changed social patterns. Therefore in the new age of globalisation, interaction patterns are becoming more important than settlement patterns; people seem to communicate easier with their peers in other cities and countries, than their neighbours.

To analyse the real estate market we have to position it in the wider, but also immediate environment and research the direct forces affecting the creation and interaction of supply and demand. Virtual networks facilitate globalisation and above all affect the key factor of real estate: location. The virtual positioning of cities into the wider network economy of available information, services, capital and employment flows is virtually diminishing the stability of real estate. Demand has become tightly knit with other real estate factors. Thus a central location can be replaced by one in an unpolluted environment, with better quality construction and of course with quality and extents of virtual connections.

The **internet and other virtual networks** as new tools for obtaining information and supplying services are affecting different levels on the real estate market. So far these effects are recognisable on the lower levels of market operation, e.g. shortening the time and distance of interactions on the real estate market. Information systems provide the buyers and retailers with low cost and high quality information, one of the basic weaknesses of the classical real estate market. Thus for example, the decision of an average buyer of a holiday home in Miami (USA) is easier, because he can obtain accurate information about the house and even see it (on photos, video or even in real time screening). Virtual networks will undoubtedly mark the operation of the real estate capital market, mainly by diminishing transaction costs and increasing market efficiency.

Even the **offer of real estate** is adapting to the new conditions. Besides the direct changes to building methods and spectre of potential sites affecting the immobility of offer, there are also changes in use of existing buildings and rehabilitation of derelict industrial sites. Managing the need of real estate has to be closely tied to management of human resources, capital and technology, after all the infrastructure of modern organisation includes all the resources: IT – programme equipment, computer equipment, buildings...

So called technopolis and transit villages are being built, designed and prepared for the virtual present and future. Real

estate companies are thus protecting their investment before the perils of time and installing high speed network systems into renovated and new real estate and neighbourhoods. They have recognised present and future needs when even more public institutions (health care, education etc.) will provide their services by internet and simultaneously providing ties between neighbours and other members of the community, as well as guaranteeing easy access to various data bases.

Certain renowned experts forecasting the effects of the **kingdom of internet** have dealt with effects on the real estate market. Jakob Nielsen, the recognised web-guru predicts the collapse of the real estate market in over priced areas, such as the Silicon Valley or Manhattan. The web technology does in fact enable people to work, manage their businesses and co-operate anywhere, and not to pay the exorbitant price of living in a densely populated area. Thus Nielsen predicts an 80 % drop in value of real estate in such places.

These forecasts are somewhat exaggerated and rather one-sided, but the relations on the real estate market will undoubtedly change in favour of peripheral, cleaner and quieter areas. However, virtual networks will not be able to completely compensate direct human, either in the business nor private life. Already today many businesses could be carried out without physical contact with business partners, but they are still undertaken personally, in conference halls, restaurants, clubs and on golf courses. Despite the varied choice of retail channels, people still prefer seeing, feeling and smelling the merchandise put on sale, they desire the return information supplied by salespeople and other buyers and mostly choose to shop directly. The same applies to leisure time. A World premiere of a theatre performance can be viewed on television or a computer monitor, but a seldom few would refuse a theatre seat on Broadway. People are social beings and despite the overabundant influx of virtual networks into all pores of life, we believe that real estate in central areas, above all in great World capitals and centres of business, politics and culture, will maintain their price. The present drastic differences in real estate prices will probably diminish, but location, both in the physical and tele-communication sense, will remain the basic factor of real estate markets.

4. Trends

Statistical data imply the increasing use of information technology in households and industry in Slovenia. Many activities in Slovenia operating in the physical environment are running parallel in the electronic space. For example SKB-NET in Klik NLB enable electronic banking, while many shops are offering their goods on-line (e.g. Rec-rec, Bolle, BTC, Comtron, DOM, DZS, Peko ...).

Included is a graph representing the rapid increase of internet users and two graphs showing the growing use of technologies, defined¹⁷ as indicators of social information expansion in Slovenia.

5. Simulation of urban systems

How can we direct the development of urban systems with virtual networks? We believe, that the most effective way would be to use the »what-if« principle. An example of a si-

mulation model of long-term trends shows development trends and examples of a simulation for Ljubljana.

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Notes

- 1 The hypothesis of the new society is confirmed and discussed by numerous authors. Listed are a few books where the primary role in changing cities by tele-communication and information technology is stated: »The invisible city« (Batty, 1990), »The informational city« (Castells, 1989), »The weak metropolis« (Dematteis, 1988), »The wired city« (Dutton in dr., 1987), »The telecty« (Fathy, 1991), »The city in the electronic age« (Harris, 1987), »The information city« (Hepworth, 1987), »The knowledge based city« (Knight, 1989), »The intelligent city« (Lalèrassè, 1992), »The virtual city« (Martin, 1978), »The electronic communities« (Poster, 1990), »The communities without boundaries« (Pool, 1980), »The electronic cottage« (Toffler, 1981), »City as electronic spaces« (Robins, Hepworth, 1988), »The overexposed city« (Virilio, 1987), »Flexicity« (Hillman, 1993), »The virtual community« (Rheingold, 1994), »The non-place urban realm« (Webber, 1964), »The teletopia« (Piorunski, 1991), »The cyberville« (Von Schiber, 1994).
- 2 After Graham, S., Marvin, S. (1997 [1996]) Telecommunications and the city: electronic spaces, urban spaces. London: Routledge.
- 3 The term implies »services and infrastructure, connecting the computer and digital media equipment with tele-communication ties«.
- 4 Graham, S., Marvin, S. (1997 [1996]) Telecommunications and the city: electronic spaces, urban spaces. London: Routledge.
- 5 Ibidem.
- 6 A person working from home using communication-information technology.
- 7 After Fryxell, David A. (2000) Telecommuting. In: Link-up, Medford, Vol.11, No.: 3
- 8 Boyd, John (1999) It beats commuting. In: Asian Business, Hong Kong, Nov 1999, Vol. 35, No. 11, pp.14–15.
- 9 Leksikon Cankarjeve založbe. (1988 [1973]), Ljubljana: Cankarjeva založba.
- 10 Ibidem.
- 11 After Svetilnik, Ivan (1996) Quality of life: final report on the research results in basic research, Ljubljana: Institute of social sciences
- 12 We have to point out, that the quality of spending ones leisure time is not importance, what is »well spent« leisure time cannot be imposed as a criterion, because it depends on subjective judgement.
- 13 Svetilnik, Ivan (1996) Quality of life: final report on the research results in basic research, Ljubljana: Institute of social sciences, pp. 12.
- 14 The discussion is limited to those functionally handicapped individuals, that are impeded in mobility because of congenital defects, disease, accidents or age.
- 15 Independent living can be understood as a paradigm, implying resistance to the medical model of invalidity. Thus a functionally impeded individual should independently decide, how and where to live.

¹⁶ Imrie, Rob (1996) Disability and the city: international perspective, Paul Chapman Publ., London.

¹⁷ Statistical Yearbook (1999) Vol. 38, Statistical office of the Republic of Slovenia 1999, Ljubljana, pp. 172–174.

Graphs

Graph 1: Speed of introducing internet in developed countries

(source: 4th NT conference, Portorož, 10.–12. May 2000, after *The Economist*)

Graph 2: Number of servers/internet users in Slovenia

(source: Statistical Yearbook 1999, Vol. 38, Statistical office of the Republic of Slovenia 1999, Ljubljana)

Graph 3: Households equipped with communication-information technology in Slovenia

(source: Statistical Yearbook 1999, Vol. 38, Statistical office of the Republic of Slovenia 1999, Ljubljana)

Pictures

Slika 1: Example of a simulation model of long-term trends in city development: description of the model

Slika 2: Simulation model of long-term trends in city development: example of a flight above the simulated conditions along the ring road in Ljubljana

(source: Municipality of Ljubljana, department of urbanism)

For literature and sources turn to page 15.

Vesna PETREŠIN

Challenges to cities following the information revolution

»Nobody will ever need more than 640 Kbytes of RAM.«
(Bill Gates 1981)

»Windows 95 need at least 8 Mbytes of RAM.«
(Bill Gates 1996)¹

1. Introduction

The fact that the information age has reached Slovenia is obvious – at least from the moment when we were stunned by a slogan convincing us that there are two Worlds. Day-to-day use of modern technological inventions, coupled with the promotion and growing intensity of e-activities have of course left their mark on our society, which is growing more and more organised along abstracts systems of knowledge and information.

Surprisingly, as early as 1968 Burnham² predicted a transition into a culture less burdened with hard artefacts and static qualities. Contrary to the present, the new culture displays the exchange of matter/energy/information and is reorganising relations between people and their environment: »We