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## FROM THE EDITING COMMITTEE

With the genuine pleasure we are presenting the seventy third volume of the “Studies and Works of the Collegium of Management and Finance” of Warsaw School of Economics, which has been issued in English. The papers included in this volume are the result of the scientific work conducted by the staff of the Collegium as a part of own research and analysis. All the papers have been positively reviewed and they are highly recommended due to the significance of the raised issues from both academic and empirical points of views.

In the first paper Prof. M. Zaleska has analyzed the principles of the models of diversified and integrated supervision of the financial market. Moreover, the paper includes the presentation of prerequisites for introduction, as well as arguments for and against the introduction of the integrated supervision of the financial market in Poland in the context of the countries applying it.

The dynamic development of Exchange Traded Funds (ETFs) in the financial markets around the world is the subject of research of K. Borowski, Ph.D., who has presented the benefits for both individual and institutional investors resulting from using ETF certificates. ETFs constitute a challenge for Polish investment funds, which ought to make an effort to create the first funds of this type in Poland.

The paper of P. Niedziółka, Ph.D. focuses on the activity of hedge funds, which are aiming at a higher than average rate of return and, consequently, accepting a heightened risk, including a prolonged investment perspective. The author has presented, among others, the “short squeeze” effect, connected with anomalies at the markets of reference instruments and the characteristics of contractor’s risk carried by banks, which transfer credit risk towards hedging funds.

E. Ślązak, Ph.D. has presented the trends on the market of credit and debit cards in Poland, which is currently undergoing very dynamic growth, evident from both the increasing volume of cards, and the value of transactions performed with their use. Nevertheless, popularity of cards as instruments of payment in the Polish society is still very low, and the cash turnover retains its dominating position.

Prof. R. Bartkowiak in his paper has emphasized that Ricardo–Solow model of economic growth is a good approximation of real economic processes in different times and places where human beings have lived. On the other hand, every disturbance in the growth process caused by the scarcity of natural resources restores the validity of the Ricardian case.

Prof. V. Melichar and his Co-Authors have analyzed the basic factors of development and modelling of future mobility in passenger transport. By creation of a model and a future mobility development scenario for particular modes of transport, the Authors work on determination of the shares of individual modes of transport, as well as on four constraining factors. These factors include the fixed travel time budget, the path dependence, the urban land-use patterns and the balancing equation of the total volume of traffic.

Prof. M. Mindur has presented the transformation of the Polish industry during the period of 1989–2004. In his paper, the reasons and conditions were enumerated, which determined the direction of changes. Moreover, the paper attempts to establish, whether the changes positively or negatively influenced particular branches of the economy.

The paper of Prof. A. Skowronek-Mielczarek is focused upon the conditions of operation of small and medium businesses as far as innovation and technology are concerned. The Author has analyzed the chief barriers for development of innovativeness in the Polish conditions, which include shortage of research and technological background for business, shortcomings of transfer of innovation from the science sector to business, poor system of financing technological innovation.

In next paper, B. Bojewska, Ph.D. has stated that high quality of work cannot be achieved by influencing chosen areas of the organization. The supreme goal of a company, connected with satisfying expectations of customers, ought to be included in the entire management process, in all areas and on every level of the organization. This is connected with the holistic approach to corporate management orientated towards achieving qualitative goals.

The paper of M. Bombol, Ph.D. is meant to present the chief research approaches towards leisure. It is a multi-dimensional category, referring to aspects of relaxation and rest of an individual, as well as to his or her social and envi-

ronmental contacts, broadly defined economic, cultural and civilisation aspects. The economic aspects seem to require particular attention, since they are seldom a subject of research.

The presented volume reaches not only all the economic libraries and central institutions in Poland, but also the scientific centers all over the Europe cooperating with the Collegium of Management and Finance of Warsaw School of Economics. We hope that the papers in this volume will serve as excellent inspirations for further scientific research for all readers. Moreover, we would like to thank all Authors and Reviewers with our sincere compliments.

Prof. Małgorzata Zaleska  
Emil Ślęzak, Ph.D.





## **Supervision of the Financial Market–evaluation of the Proposed Models of Integration of Supervision, in the Context of Global Experiences**

### **1. Introduction**

The discussion continues in Poland, concerning the need for, and the form of introduction of integrated supervision of the financial market. This article is a voice in the scientific discussion on the proposed models of integration concerning supervision of individual segments of the financial market in Poland. The paper contains:

- a presentation of the concept of diversified and integrated supervision of the financial market, and an indication of 20 years of global experience of supervision integration,
- a presentation of the prerequisites for introduction and arguments for and against the introduction of integrated supervision of the financial market, based on global experiences,
- an evaluation of the proposed model of integration of supervision of the financial market in Poland (on March 28<sup>th</sup> 2006 the government approved the draft act concerning the matter), considering the global experiences.

### **2. Models of Supervision of the Financial Market**

The supervision of the financial market can assume either a diversified, or an integrated form. In the case of the former, the supervision of the financial market is executed by several separate, albeit often co-operating institutions. One example of a country, where supervision of the financial market is diversified, is Poland (in April 2006). The supervision is principally conducted by three institutions: the Commission for Banking Supervision (KNB), the Polish Securities and Exchange Commission (KPWiG) and the Insurance and Pension Funds Supervisory Commission (KNUiFE). The draft of the act on supervision of financial institutions stipulates, that those three institutions are to be substituted by one – the Office for Financial Supervision (UNF), i.e. it proposes the introduction in Poland of

integrated supervision. It is worth mentioning, that according to the draft, the integrated supervision will not concern co-operative savings and credit banks, which do receive and issue financial resources. Consequently, one must assume, that the Office for Financial Supervision will not constitute a fully integrated supervision. The integrated supervision means, that the supervision of the financial market (banking, capital, insurance and pension funds) is executed by a single institution, known as the supervisor. The integrated supervision is therefore described as supervision under one roof. The concept of integrated supervision is not new. It was implemented for the first time about 20 years ago in Norway. In the 1980's, the integrated supervision was introduced in other Scandinavian countries, i.e. in Denmark and Sweden. Therefore, the Scandinavian countries can be considered as pioneers of supervision integration<sup>1</sup>. At the beginning of the 21<sup>st</sup> century, the concept of integration of supervision of the financial market gained new followers in many European countries, including those of highly developed financial markets. A well-known, and broadly analysed example of integration of supervision of the financial markets is the United Kingdom<sup>2</sup>. The integrated supervision was introduced, too, by countries such as Germany, Austria<sup>3</sup>, Belgium<sup>4</sup> and Hungary. Nevertheless, it is worth emphasising, that integrated supervision is not a dominating European model, i.e. in most EU countries, the diversified model prevails<sup>5</sup>. The EU regulations do not relate to the question, whether the supervision of the financial market ought to be diversified or integrated. Furthermore, global institutions determining principles of operation of individual segments of the financial market are diversified, i.e. there is the Basel Committee on Banking Supervision, the International Organisation of Securities Commissions and the International Association of Insurance Supervisors.

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<sup>1</sup> More on the integrated supervision in the Scandinavian countries in: M. Zaleska, P. Winnicki, *Zintegrowany nadzór nad rynkiem finansowym w Skandynawii – analiza porównawcza*, *Studia i Prace Kolegium Zarządzania i Finansów SGH*, No. 54, Warszawa 2005, pp. 45–56.

<sup>2</sup> More on the integrated supervision in the United Kingdom in: M. Zaleska, M. Roszczuk, *Nadzór zintegrowany w Wielkiej Brytanii. Porównanie z rozwiązaniami skandynawskimi*, *Studia i Prace Kolegium Zarządzania i Finansów SGH*, No. 55, Warszawa 2005, pp. 55–68.

<sup>3</sup> More on the integrated supervision on Austria in: M. Domunik, M. Zaleska, *Nadzorowanie rynku finansowego w Austrii*, *Studia i Prace Kolegium Zarządzania i Finansów SGH*, No. 67, Warszawa 2006, pp. 11–25.

<sup>4</sup> More on the integrated supervision in Austria, Belgium, Ireland and Germany in: M. Zaleska, I. Misiak, *Systemy nadzoru nad rynkiem finansowym w Austrii, Belgii, Irlandii oraz w Niemczech – analiza porównawcza*, *Studia i Prace Kolegium Zarządzania i Finansów SGH*, No. 58, Warszawa 2005, pp. 23–34.

<sup>5</sup> More on the type of model of supervision prevailing in individual European countries in: M. Zaleska, *Nadzór nad rynkiem finansowym*, „Gazeta Bankowa” 3–9.4.2006, p. 11.

### **3. Arguments for and against the Introduction of Integrated Supervision of the Financial market, on the Basis of Experiences of the Countries, Which Have Introduced It**

Considering the planned introduction of the integrated model of supervision, it is worth analysing the rationale behind introduction of this type of supervision, and the experiences of the countries, which have introduced the integrated supervision. Those experiences ought to be compared with the propositions included in the draft act on supervision of financial institutions, in order to evaluate the proposed solutions. At the same time, we must remember, that foreign experiences only highlight the probable and possible consequences of the introduction of integrated supervision, and cannot serve as the final indicator. The situation of each individual country, and the specifics of local financial markets differ, and it is those conditions, which must be analysed, while considering the possible changes<sup>6</sup>.

The opinions on purposefulness of introducing the integrated supervision of the financial market are mixed. The countries introducing the integrated supervision usually argue as follows:

- the integrated supervision is an answer to the creation of increasingly complicated financial products and services, and financial conglomerates; to blurring of the limits between individual segments of the financial market,
- the integrated supervision of the financial market possesses a higher status within a country's institutional structure, than separate supervisors of individual segments of the market,
- integration of supervisors allows to avoid repetition and overlapping of competences of individual supervisory institutions, and increases clarity of responsibilities, objectives and prevailing legal regulations,
- the introduction of integrated supervision allows for economy of scale, and for effective use of the available resources,

When considering the integration of supervision, one ought to take into account the arguments against the creation of a single supervisor, e.g. the following:

- individual segments of the financial market possess their own specific characteristics, including different levels of risk, which makes it difficult to apply uniform principles of supervision,
- economy of scale may prove negligible, and the integrated supervisor might be less effective than several specialised and independent institutions,
- integration of supervisors is connected with legislative problems, and with difficulties in introduction of new, integrated computing systems.

<sup>6</sup> <http://wbln0018.worldbank.org>, November 2005.

Considering the present conditions of banking operation, resulting, among others, from the banks' obligation to implement the provisions of the Capital Requirements Directive, it is important to remember, that the possible changes within the organisation of supervision will not support the process of implementation of the Directive.

In order to decide about the need to introduce integrated supervision in a particular country, one must analyse the following factors:

- the country's level of development – the opinions on the subject vary; for example, some experts reckon, that the model of integrated supervision ought to be implemented in highly developed economies<sup>7</sup>, and others, that it is best introduced in small countries undergoing transformation or development<sup>8</sup>,
- the level of development of individual segments of the financial market (imbalanced growth of sectors of the financial market does not facilitate integration, however, the financial sector dominated by banks, with an insignificant role of the capital market, is an argument for integration<sup>9</sup>),
- the share of financial conglomerates in the financial market (the financial market in Poland is characterised by a low degree of mergers between the banking, the insurance and the capital sectors of the market<sup>10</sup>; furthermore, at the moment in Poland there are no groups, which might qualify as financial conglomerates<sup>11</sup>),
- the costs of integration and the benefits resulting from it (the process of integration of supervisors generates costs, which are difficult to estimate, such as integration of computer systems, and systems of reporting; introduction of computer and reporting solutions for a medium-sized bank in Poland costs about PLN 0,5 billion<sup>12</sup>, i.e. the initial period of operation of the integrated supervisor is going to increase the costs in comparison with the costs incurred by the former supervisors. Hence the

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<sup>7</sup> T. A. Rose, J. De Luna Martinez, *International Survey of Integrated Financial Sector Supervision*, World Bank Policy Research Working Paper 3096, July 2003, p. 9.

<sup>8</sup> M. Taylor, A. Fleming, *Integrated Financial Supervision. Lessons of Northern European Experience*, World Bank Research Working Paper, Number 2223, November 1999, p. 2.

<sup>9</sup> M. Taylor, A. Fleming, *Integrated Financial Supervision. Lessons of Northern European Experience*, World Bank Research Working Paper, Number 2223, November 1999, p. 2.

<sup>10</sup> J. Koleśnik, *Regulacje nadzorcze*, in: J. Koleśnik, M. Zygierewicz, *Wpływ zmian rozwiązań regulacyjnych na działalność banków w 2005 roku*, Związek Banków Polskich, Centrum Prawa Bankowego i Informacji, Warszawa 2006, p. 52.

<sup>11</sup> J. Koleśnik, *Polskie konglomeraty finansowe – identyfikacja i wymogi nadzorcze*, *Studia i Prace Kolegium Zarządzania i Finansów SGH*, No. 65, Warszawa 2006, p. 24.

<sup>12</sup> P. Zapadka, *Lepsze wrogiem dobrego*, „Bank”, 2006, No. 3, p. 26.

possible reduction of costs of operation of supervision is not likely to take place soon – for example, in the case of the integration of the Austrian supervision, it took place after two years of operation).

The analysis of the above factors indicates, that both the arguments for, and against integrating the supervision of the financial market are valid in Poland. The crucial question remains: how should the possible integration of supervisions be conducted, if the integration is to prove feasible.

#### **4. Evaluation of the Proposition of Integration of Supervision of the Financial Market in Poland, in the Context of Experiences of Other Countries, Which Have Integrated Their Supervision**

The experiences of other countries indicate, that it is easier to integrate the supervisions of the banking market and the capital market, than of the banking market and the insurance market. The integration of supervisors can be conducted simultaneously (as in the case of the UK and Austria), or successively (as in the case of the Scandinavian countries), but it ought to concentrate around the supervision of the most developed market – in European countries it is usually the banking market. In Poland, the plan of integration of supervisors is different. Firstly, the decision was taken to integrate the supervision of the capital market, the insurance market, and pension funds, before including the supervision of the banking market into the new structure (from 1/1/2007). The President of the National Bank of Poland is to stop acting as the Chair of the Commission for Banking Supervision on the day of consolidation of the supervisions of the capital and insurance markets as well as the pension funds. This indicates, that the plan is to annex the leading supervision to the supervisions of minor significance to the Polish financial market. It seems, that if the integration is to take place, it should be conducted differently. The integration ought to focus around the leading market in Poland, i.e. the banking market.

The integration of supervision of individual segments of the financial market ought to be based on organisational integration, although the organisational integration should not be the sole objective of the process. Other areas of integration ought to include legal regulations concerning individual segments of the financial market. For example, in the United Kingdom, apart from the organisational integration, the legal regulations were consolidated as well. In Poland, however, the only planned type of integration is the organisational one, while other aspects of integration of supervision are ignored. Obviously, the organisational integration is easier to conduct than changing and integrating the

prevailing legislation. As far as the form of organisational integration suggested in the draft act on supervision of financial institutions is concerned, it has to be suggested, that the shape of the potential integrated supervision in Poland should be influenced by the banking community, the capital markets and the insurance markets. The draft provides, that personal decisions concerning the post of the President of the Office for Financial Supervision are to be taken single-handedly by the prime minister, without consultation with bankers. The draft provides, that the prime minister will be able to act as a prosecutor in cases concerning banks. The Commission for Financial Supervision is to be a collegial organ (comprising of seven members), dependent upon government structures.

Operation of any institution implies a necessity to provide it with sources of financing. The operation of supervisors in the Scandinavian countries is financed from fees paid by the supervised institutions, rather than from the state treasury<sup>13</sup>. Similarly in the United Kingdom, the operation of FSA (Financial Services Authority) is not financed by the state budget, but from fees collected from the financial institutions operating in the financial markets supervised by the FSA. The draft of the act on supervision of financial institutions provides, that the operation of the supervisor in Poland is to be financed from fees paid by the supervised institutions, but the costs of the Advisory Committee by the President of the Office for Financial Supervision are to be covered by the state treasury.

It is worth emphasising, that substituting diversified supervision with integrated one implies changing the objectives. In the case of diversified supervision, the objectives focus on security of capitals deposited in financial institutions, stability of operation in the financial market, and compliance with the legal regulations. In the case of an integrated supervision, those objectives are expanded, and include consumer protection of clients of financial institutions, and ensuring fairness of market competition. The objectives of the Office for Financial Supervision presented in the draft are not consistent. For example, one of the objectives is ensuring fair competition only with regard to the market of open pension funds. The draft does not address the need for fair competition in the other segments of the financial market. Furthermore, the objectives include securing financial stability of insurance companies and banks, but they do not mention other institutions operating in the financial market.

The analysis of the solutions proposed by the draft of the act on supervision of financial institutions indicates, that the prevailing solutions regarding supervision of the financial market in Poland are better than those proposed by the draft.

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<sup>13</sup> M. Taylor, A. Fleming, *Integrated Financial Supervision. Lessons of Northern European Experience*, World Bank Research Working Paper, Number 2223, November 1999, in: „Finance & Development”, December 1999, p. 43.

The supervisory institutions in Poland are interconnected, personally and by way of co-operation. The Commission for Banking Supervision is a collegial body comprising of: the President of the National Bank of Poland (as a chairperson), the Minister of Finance or a secretary of state delegated by the Ministry (as a vice-chairperson), a representative of the President of the Republic of Poland, the President of Board of the Bank Guarantee Fund, the President of the Polish Securities and Exchange Commission or their deputy, a representative of the Ministry of Finance and the General Inspector of Banking Supervision. It is worth emphasising, that although a representative of supervision of the capital market participates in the Commission for Banking Supervision, a representative of supervision of the insurance and pension funds markets is not present. On the other hand, participation of a representative of the Polish president in the work of the Commission is controversial, since it is in breach of the constitutional scope of responsibilities of the head of state<sup>14</sup>. Therefore, it would be advisable to substitute the representative of the president with a representative of supervision of the insurance and pension funds market. The Insurance and Pension Funds Supervisory Commission comprises of, among others, the President of the Polish Securities and Exchange Commission or their deputy and the General Inspector of Banking Supervision (as an advisory vote). The members of the Polish Securities and Exchange Commission include the General Inspector of Banking Supervision and the President of the Insurance and Pension Funds Supervisory Commission. Except for the Commission for Banking Supervision, the remaining supervising institutions include a representation of supervision of all the other segments of the financial markets, ensuring flow of information and attempting a broader outlook on the supervised institutions. At the same time, it is worth noticing, that a partially integrated supervision already operates in Poland (the Insurance and Pension Funds Supervisory Commission). The Commission became the body responsible for supervision of the operation of insurance companies, pension funds and occupational pension schemes on the basis of the Act of 1/3/2002 on the changes in organisation and operation of the central organs of state administration and subordinate units, and on the amendments to certain acts. The Act stipulated, that a new body was to assume the competence of the two earlier supervisory bodies. The organisational integration was not accompanied by the integration of corresponding legal regulations.

At the moment, in order to ensure protection for the participants of the financial market in Poland, the individual supervisory organs co-operate. It is

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<sup>14</sup> M. Dąbrowski, Ograniczono konstytucyjne uprawnienia banku centralnego, „Rzeczpospolita”, 5.12.1997, p. 17.

expressed by the declaration of exchange of information, and by a possibility of conducting joint inspections in supervised institutions. According to the Banking Law Act, the Commission for Banking Supervision can reciprocally release information to, and receive it from the Securities and Exchange Commission and the Insurance and Pension Funds Supervisory Commission, as necessary to properly fulfil the supervisory tasks.

As a member of the European Union, Poland is obliged to comply with EU directives, including the directive 2002/87/EC on the supplementary supervision of credit institutions, insurance undertakings and investment firms in a financial conglomerate. The appropriate Act on the subject was passed in Poland on 15/4/2005. It guarantees effective execution of supervision of capital groups, which is supplementary towards the particular segments of the financial market. The act authorises to analyse risk generated by financial conglomerates, and at the same time, it does not exclude specialised (“branch”) supervision of individual units within those groups. The co-operation of supervisors begun to take place within the Co-ordination Committee for Financial Conglomerates, which comprises of the representatives of the Commission for Banking Supervision, the Insurance and Pension Funds Supervisory Commission and the Polish Securities and Exchange Commission. The Committee is chaired by the President of the National Bank of Poland<sup>15</sup>.

## **5. Summary**

There is no globally universal solution for the organisation of supervision of the financial market. During the era of globalisation, the limits between individual segments of the financial market, as well as differences between banking products and services become blurred, and the creation of financial conglomerates becomes commonplace. In this context, the concept of integration of supervision of individual segments of the financial market is justified. Considering the issues such as, for example, the level of development of the financial market in Poland, there are arguments both for and against the integration.

Assuming the model of full integration of supervision of the financial market in Poland would require very profound changes in the organisation of the supervising institutions. Full integration would signify a necessity to conduct not only an external merger of those institutions (as it is planned), but a profound integration of their internal structures, and introduction of basic amendments to several legal acts guaranteeing a transition from institutional supervision to

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<sup>15</sup> P. Zapadka, *Lepsze wrogiem dobrego*, „Bank”, 2006, No. 3, p. 27.



functional one as well. External integration is not going to yield any considerable effects. At the same time, the costs of integration of supervisors, particularly in the initial phase of the process, are going to be high.

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### Website:

1. <http://wbln0018.worldbank.org>, November 2005.

## Exchange Traded Funds (ETFs)

### 1. Introduction

The dynamic development of ETFs throughout the world, and in particular in Western Europe after the year 2000, as well as their popularity with institutional and individual investors, increases the chance of introduction of a fund of this kind to the Polish market. The Board of the Warsaw Stock Exchange (GPW) has not, as yet, managed to persuade an investment fund, be it Polish or foreign, to create an exchange traded fund in Poland<sup>1</sup>. One can hope, that the dynamic inflow of resources to investment funds in Poland observed over the last three years will facilitate the arrival of this type of funds to GPW.

### 2. The Characteristics of ETFs

Exchange traded funds originated in the United States, where the first product of this type, the so-called *Spider* (SPDR – Standard & Poor's Depository Receipt), was created in 1993<sup>2</sup>. The product proved to be a great success, and spurred the introduction of new ETF-type funds, initially in the American market, and later – elsewhere in the world. In Europe, ETFs have been operating since the year 2000, with increasing success.

ETFs are close-end funds<sup>3</sup>, which, after sales of investment certificates in the primary market, introduce them to public turnover, and then to the stock-exchange turnover<sup>4</sup>. The general objective of an ETF is ensuring the possibility of

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<sup>1</sup> Based on: [http://www.gpw.com.pl/gpw.asp?cel=ogieldzie&i=katarchiwum&nr\\_str=&ktore=003979\\_2&nagnaz=Wydarzenia](http://www.gpw.com.pl/gpw.asp?cel=ogieldzie&i=katarchiwum&nr_str=&ktore=003979_2&nagnaz=Wydarzenia) of 10.5.2006.

<sup>2</sup> The first stock exchange, where ETF certificates were introduced, was the American Stock Exchange (AMEX), and later the New York Stock Exchange (NYSE) and the Chicago Board of Trade (CBoT).

<sup>3</sup> More information about close-end investment funds can be found in: K. Gabryelczyk, *Fundusze inwestycyjne*, Oficyna Wydawnicza, Kraków 2006.

<sup>4</sup> In the American (and Japanese) market, the object of turnover are not ETF investment certificates (as it is stipulated by the Polish law), but shares. In the literature of the subject, ETFs are sometimes described as open-end funds: K. Samberger, *Instrumenty pochodne na akcje*, Rynek Terminowy, 1.2003, pp. 58–61. In the further part of this paper it is assumed, that ETFs are close-end funds, and the object of stock-exchange turnover are investment certificates.

simple and cheap investment into stock-exchange indexes. At the same time, an investor benefits from ETFs' being quoted at the stock exchange: easy evaluation, simplicity of entering and exiting the investment.

Composition of an ETF portfolio usually reflects the chosen stock-exchange index, and the fund is managed in a passive manner, i.e. the fund's management is obliged to maintain fixed composition of the ETF<sup>5</sup>. Composition of an ETF may also reflect<sup>6</sup>:

- a particular basket of shares (e.g. American shares) – the so-called regional ETF,
- a basket (index) of high-capitalisation shares – the so-called Large Cap ETF,
- a basket (index) of medium-capitalisation shares – the so-called Mid Cap ETF,
- a basket (index) of low-capitalisation shares – the so-called Little Cap ETF,
- a basket (index) of growing shares,
- a basket of shares from several countries – the so-called global ETF,
- a basket (index) of bonds<sup>7</sup>,
- a sector index,
- a currency basket,
- a commodity basket,
- investment certificates of real estate funds.

Chief advantages of ETFs, contributing to their great popularity, include:

- the instrument's simplicity – composition of an ETF's investment portfolio is publicly known, which enables investors to react to growth or reduction of prices of the instruments within the portfolio. Due to the process of active portfolio management (timing), composition of such portfolio of

<sup>5</sup> Passive management is characteristic of trust funds existing in the Anglo-Saxon markets: Brett M. Świat finansów, Biblioteka Menedżera i Bankowca, Warszawa 1999.

<sup>6</sup> Composition of a portfolio is closely connected with the way an ETF portfolio is managed. The following types of ETF portfolio management can be identified:

- passive management,
- management reflecting different kinds of sectors (often very specific, e.g. production of semi-conductors, or the entertainment industry),
- management specialising in individual countries,
- management reflecting broad stock exchange indexes in portfolio composition.

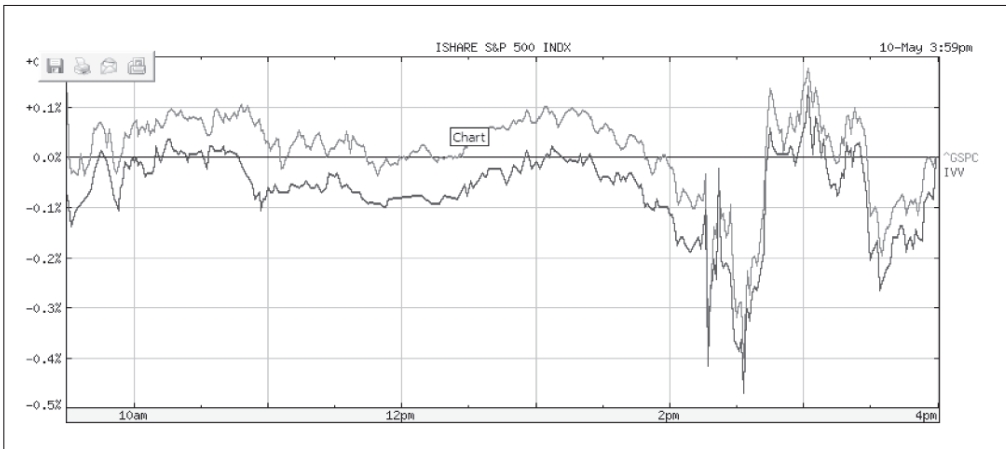
<sup>7</sup> Reflecting:

- a state treasury bond index,
- a commercial papers index,
- debt securities issued by individual companies (single issuer).

investment funds usually remains little known, and investors can learn about it after publication of the fund's periodic report.

- a possibility to freely trade an investment certificate of a particular fund at the stock-exchange market (similarly to certificates in the continuous market).
- up-to-date evaluation of a certificate at the stock exchange. Value of an ETF certificate, unlike a daily (one-off) evaluation of an open-end fund participation unit, changes continuously, depending on the market situation<sup>8</sup>. If the stock exchange index constituting a basis for a particular ETF goes up during the session, the quotation for prices of certificates of the fund goes up as well. Investors can react immediately to changes of prices of assets within the particular ETF. See: Figure 1 and Figure 2.

**Figure 1. Comparison between prices of certificates of the IVV fund<sup>9</sup> and the S&P 500 index on 10.5.2006**

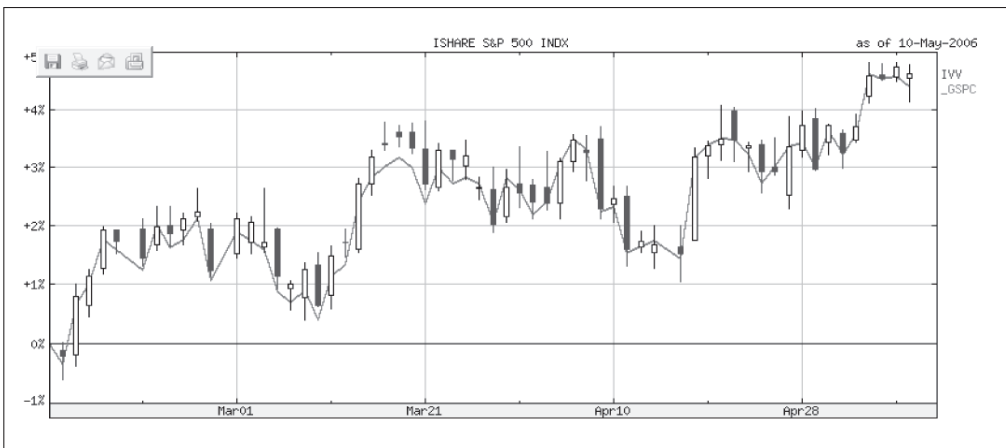


Source: original research on the basis of [www.yahoo.com](http://www.yahoo.com) of 11.5.2006.

<sup>8</sup> In the American market, the law provides for turnover of investment certificates of close-end investment funds only in specified hours. In reality, the orders arriving during the session are filled at its closing. The price of a certificate is the sum of the closing prices of all the shares included in the fund's portfolio.

<sup>9</sup> The IVV ETF was created by Barclays Bank, and its benchmark is the Standard & Poors 500 index (S&P 500).

**Figure 2. Comparison of changes of prices of certificates of the IVV fund and the S&P 500 index over a three month period**



Source: original research on the basis of [www.yahoo.com](http://www.yahoo.com) of 11.5.2006.

- low management costs, due to passive fund management – managers are obliged to maintain a fixed composition of an investment portfolio. Management fees are lower in the case of ETFs, than in the case of other types of funds (open- and close-end).
- guaranteed clarity of investment, due to daily release of information concerning components of the fund's portfolio, and the net value of its assets.
- a possibility to apply tax clearing. In overseas markets, income taxes paid by investors of this type of funds are often lower, than in other cases<sup>10</sup>. In the USA, the law forbids to combine losses and profits from investment in shares in the case of re-purchasing the same securities within 30 days of selling the position at a loss. However, the regulations provide for this type of clearing in the case of purchasing ETF investment certificates, even based on the shares of the same sector, as the papers sold earlier at a loss.
- diversification of an investment portfolio – in order to achieve diversification of an investment portfolio analogical to the one, on which the investment portfolio of a certain ETF is based, investors would have to purchase a basket of assets, which would greatly increase their transaction costs. Considering, that most individual investors possess limited resources, they are incapable to precisely re-create the composition of a chosen stock-exchange index within their portfolio<sup>11</sup>.

<sup>10</sup> Such is the situation in the American market.

<sup>11</sup> In the case of small investment portfolios, a full reconstruction of a stock exchange index would require purchasing fractions of shares (particularly the ones denominated in high values, i.e. over

- low spreads between current offers to buy and to sell investment certificates of a particular ETF at the stock exchange, in comparison with several less liquid shares<sup>12</sup>.
- a possibility to perform a short sale of an ETF certificate, even when its quotations are falling<sup>13</sup>.
- high liquidity. In the case of ordinary and preference stocks, their number in the turnover is strictly determined (free float). Increasing capitalisation of a company quoted at the stock exchange is connected with an increase of share prices, due to increased demand. In the case of an ETF certificate, its price is derived from prices of elements of the index constituting the basis for the ETF. An increase of an ETF certificate price depends indirectly upon liquidity of assets within the ETF, and it is practically not connected with liquidity of ETF certificates. In the American market, the number of ETF-type investment fund certificates in the stock exchange turnover can change, contrary to certificates of classic close-end funds. A market maker, in an understanding with an ETF (often a person acting as an adviser to a particular ETF) may, in case of increased demand for the ETF's certificates, place a selling order for an extra number of investment certificates, at a price close to the price resulting from an up-to date evaluation of the fund's net assets per one certificate (NAV). In the case of intensified sales of investment certificates, the market maker can place a buying order for the certificates at the NAV price<sup>14</sup>. Such high liquidity of investment certificates determines their popularity with individual, and institutional investors. The manner of increasing and decreasing the number of certificates on the market used by market makers, and their maintaining of quota (buying/selling price) of certificates, leads in practice to elimination of the slippage effect, i.e. the disparity between the forecasted transaction price, and its actual price. There is minimal risk of being left with certificates in a short or long position, without a possibility

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USD 100). This would lead to deviations of the portfolio composition from the composition of the chosen index.

<sup>12</sup> Price disparities (buying/selling) of the most popular ETF certificates in the USA are lower, than those of popular shares, e.g. Microsoft or Dell.

<sup>13</sup> At the New York stock exchange, the so-called uptick rule is in place. It means, that selling short is only possible on an up-tick (when the price is rising in relation to the quotation in the previous moment in time), and such sale is forbidden, when the price is falling. This is a natural consequence of automatic filling of stop-loss orders, and opening short positions in shares during the crash of 1987, which, according to the American Securities and Exchange Commission (SEC), contributed to enhancement of price falls.

<sup>14</sup> In practice, market makers create or cancel investment certificates by buying or selling (often in a short position) shares included in the ETF portfolio.

to sell them due to lack of offers (or offers very high or very low in relation to the prevailing price level) in the event of changing market situation.

- use of financial leverage. Purchasing, as well as short sale of certificates of a particular ETF can be conducted by a margin payment<sup>15</sup>, which brings the ETF certificates turnover closer to the turnover in the market of derivative instruments. However, it is worth remembering, that, unlike the open- and close-end investment funds<sup>16</sup>, ETFs cannot use credits and loans while compiling an investment portfolio.
- arbitrage between a present stock exchange price of a certificate, and its internal value (NAV). The process takes place extremely rarely, since prices of ETF certificates oscillate around their internal value (NAV), contrary to prices of close-end investment funds, where such deviations of stock exchange prices from the internal value are quite common.
- lack of style-drift. In open and close-end funds, market popularity of certain branches leads to overweighing the popular sectors in the investment fund portfolio<sup>17</sup>. In the case of an ETF, the consistence of composition of a portfolio rules such phenomenon out.
- a possibility to use several investment strategies in the ETF market – analogically to stock exchange indexes or individual shares<sup>18</sup>. Apart from classic hedging and option strategies<sup>19</sup>, it is relatively common to use a Core/Satellite strategy. The main part of an investment portfolio is constituted by investment certificates of a chosen ETF (passive management). The remaining part of the portfolio is composed of assets included in the ETF, which should bring higher return on investment over a particular period, than the benchmark of the ETF (timing).
- a possibility to create individual personal retirement policies based on ETFs. In the American market, the law<sup>20</sup> provides for purchase of ETF investment certificates as a part of pension policies.

<sup>15</sup> Concerns mainly institutional investors.

<sup>16</sup> A possibility to employ financial leverage by open- and close-end investment funds creates a possibility of their achieving a far higher return on investment, than the benchmark of such fund – providing the manager takes the correct position. The manager's error may lead to a significant decrease of the fund's net assets.

<sup>17</sup> A change of management style may be caused by several factors. During the datacom boom of 1999/2000, many managers, independently of the strategy assumed earlier, purchased shares of Internet and media companies, due to the fact, that they were very popular with investors.

<sup>18</sup> In the case of very popular ETFs, there are options for their certificates in the stock exchange turnover.

<sup>19</sup> D. Hull, *Kontrakty terminowe i opcyjne. Wprowadzenie*, WIG-PRESS, Warszawa 1997.

<sup>20</sup> The most popular pension plans in the American market are: IRA (Individual Retirement Account) and 401(k) (including 401(k) SBO and Roth). On the basis of: <http://www.investopedia.com/terms/r/roth401k.asp> of 12.5.2006.

### 3. Types of ETFs

The most popular ETFs are the index funds. They are passively managed, and their composition reflects the chosen index. The most popular indexes of the American market replicated by composition of ETF portfolios are: Standard&Poors 500, Russell, and Dow Jones. In the group of index funds, three sub-groups can be identified:

- **exchange traded open-end index mutual funds.** They operate in the American market on the basis of the Investment Company Act of 1940. Income received by the fund on a day-to day basis (e.g. dividends or interest), is continuously re-invested on the day of its inflow. It is paid out to investors in cash, once every three months. Funds of this type can invest in derivative instruments and use short sale.
- **exchange traded unit investment trusts.** They operate on the basis of the Investment Company Act of 1940, and are obliged to replicate a strictly determined benchmark by composition of their portfolio<sup>21</sup>. Current incomes of the funds are not re-invested, and are paid out to investors in cash, once every three months.
- **exchange traded grantor units.** There is a separate law regulating their operation in the American market. Nevertheless, their composition is similar to the remaining two types of ETFs. Purchasers of investment certificates have a right to vote during general assembly meetings of companies included in the fund's portfolio. Current income is not re-invested, but immediately paid out to investors.

Another group of funds are close-end ETFs. Their investment portfolio consists of shares or bonds. The capital collected via sales of investment certificates in the primary market is invested according to the fund's investment policy. The fund increases (issues) or reduces the number of investment certificates quoted at the stock exchange. Such increase of the number of certificates is possible by way of: issuing extra certificates, re-investment of the fund's current income, or by issuing subscription rights for the existing certificate owners.

In the Japanese market, quotations of ETFs are modelled upon the quotations at the AMEX stock exchange, on the basis of the agreement signed on 19/6/2001. The most popular ETFs are based on the broadest index of the Tokyo Stock Exchange – the Nikkei 225. Some of the most popular funds of this type are presented in Table 2.

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<sup>21</sup> The subsequent changes in the American legislation lead to the situation, where investment portfolios of this type of funds may slightly differ from the chosen index.



**Table 1. The basic parameters of the three most popular EFTs in the USA**

	NASDAQ 100 Index Tracking Stock	S&P Depository Receipts, Trust Series 1	DIAMONDS Trust Series 1
Popular name	Cubes	SPDRs	Diamonds
The stock exchange of quotation	NASDAQ	Amex	Amex
Symbol	QQQQ	SPY	DIA
Reference index	NASDAQ 100	S&P 500	Dow Jones Industrial Average
Relation of ETF price to the index	1/40	1/10	1/100
Date of introduction	10.03.1999	29.01.1993	20.01.1998
Options for an ETF certificate	Yes	Yes	Yes

Source: original research.

**Table 2. An example of ETFs at the Tokyo Stock Exchange, based on the Nikkei 225**

Reference index	Code	Name	Issuer of certificates	Date of the first quotation	Minimal number of certificates in a single transaction
TOPIX	1305	Daiwa ETF-TOPIX	Daiwa Asset Management	13.06.2001	100
	1306	TOPIX ETF	Nomura Asset Management	13.06.2001	
	1308	Nikko Exchange Traded Index Fund TOPIX	Nikko Asset Management	9.01.2002	1,000
Nikkei 225	1329	i Shares Nikkei 225	Barclays Global Investors	5.09.2001	10
	1330	Nikko Exchange Traded Index Fund 225	Nikko Asset Management	13.07.2001	

Source: original research on the basis of <http://www.tse.or.jp/english/> of 12.5.2006.

Usually the benchmark for an ETF is the appropriate stock exchange index – see: Table 1. However, the model portfolio of an ETF may be based on other benchmarks as well – see Table 3.

**Table 3. The basic parameters of ETFs in the share market (except for Cubes, SPY and DIA)**

ETF data	Reference index and a short characteristics
iShares S&P 500. Symbol: IVV. Quoted at AMEX	Similarly to the SPY fund, modelled on the Standard & Poors 500 index
Standard & Poors MidCap 400 SPDRS. Symbol: MDY. Quoted at AMEX	Standard & Poors MidCap 400, constituting the benchmark for medium-capitalisation companies in the USA
iShares Russell 2000. Symbol: IWM. Quoted at AMEX	Russell 2000, constituting a benchmark for low and medium-capitalisation companies (market capitalisation of the companies included in the index exceeds USD 20 million, and is lower than USD 300 million, which constitutes 9% of capitalisation of all American companies)
iShares MSCI Japan. Symbol: EWJ. Quoted at AMEX	MSCI Japan Index, constituting the benchmark of Japanese companies, created by Barclay Bank
Total Stock Market VIPERS. Symbol: VTI. Quoted at AMEX	Wilshire 5000 Index. Benchmark of a large number, i.e. the majority of American public companies
iShares Small Cap 600. Symbol: IJR. Quoted at AMEX	Standard & Poors SmallCap 600 – benchmark for low-capitalisation companies
Energy Select Sektor SPDR. Symbol: XLE. Quoted at AMEX	Standard & Poors Energy Sector, comprising of energy and mining companies <sup>22</sup>

Source: original research on the basis of: <http://www.amex.com/> of 12.5.2006.

The following can be considered as examples of benchmarks for ETFs in the market of debt instruments:

<sup>22</sup> At the AMEX stock exchange, the quoted investment certificates of 9 different sector ETFs are composed of companies included in the S&P 500 index. Other investment banks create their own sector benchmarks, e.g. MSCI Information Technol – the index of Morgan Stanley Capital International Bank for the sector of information technology companies. Investment certificates in the sector of fuel, energy and production companies included in the DJIA (DJOEPE was issued by Morgan Stalnley Bank as well). The value of the fund's net assets on 11.5.2006 amounted to USD 25,678,000, and was divided into 500,000 investment certificates. On the basis of: [http://www.ishares.com/fund\\_info/detail.jhtml?symbol=IEO](http://www.ishares.com/fund_info/detail.jhtml?symbol=IEO) of 12.5.2006.

- **Lehman Brothers U.S. Aggregate Bond**, consisting of bonds (treasury, corporate, mortgage) with investment rating.
  - **Goldman Sachs \$ Incestom Corporate Bond**, consisting of 100 different American corporate bonds. Weights of all bonds in the index are equal.
- Other popular benchmarks used by ETFs are:
- **MSCI EAFE** – (Morgan Stanley Capital International for Europe, Australia and Far East). The index includes the shares most popular in the European, Australian, and Far Eastern markets. The top 10 most important companies include firms from Japan, Germany and Great Britain.
  - **MSCI Emerging Markets Index** – the Morgan Stanley Capital International Bank created an index comprising of shares quoted in 21 countries of the emerging markets zone.
  - **FTSE/Xinhua China 25** – including the largest companies in the Chinese market. Individual companies are included in the index with weights proportional to their capitalisation. All the companies included in the index constitute components of the broad FTSE ALL – World Index, which includes companies from all over the world.

Figure 3 presents an example of quotations of funds in the economic press.

**Figure 3. An example of information concerning ETF certificate prices, presented in the press**

52-Week High	Low	Close	Net Chg	Name	Tick Sym	Vol. 100s	Yld	YTD	Div. Amt	Exp. Ratio
60.00	40.52	58.14	+1.23	iShrRu1000V	IVD	36879	2.4	+5.09	3573	0.25%
65.00	35.97	62.31	+0.56	iShrRu2000G	IVO	32856	0.3	+6.12	0048	0.25%
41.10	24.04	38.47	-0.78	iShrGSShur	IGV	3071	-	+2.84	-	0.50%

**52-Week High & Low** Fund share price

**Close** Daily or weekly share price close

**Yield** Annual dividend yield of fund

**Dividend Amount** Quarterly per share dividend

**Expense Ratio** Annual management and operating fees

**Net Change** Daily or Weekly gain or loss in share price value

**Name** Fund family name and fund name

**Tickor Symbol** Identifies the fund's trading symbol

**Volume** Numbers of share traded for the day or week

**Year-to-Date** Refers to year-to-date return starting January 1st of the same year

Management fees and operating expenses are presented as a percentage of the fund assets' net value. Source: <http://www.etfguide.com/> of 12.5.2006.

#### 4. ETFs in the Commodity Market

ETFs investing in the commodity sector are a very interesting form of participation in the commodity boom, because, unlike in the case of a direct purchase of a commodity, the investor does not bear any storage costs. There is a broad range of futures contracts and options for commodities available in the market, but those types of transactions incur significantly greater investment risk via the financial leverage<sup>23</sup>.

At the moment, there are many ETFs operating in the American and European commodity market. Two Barclays Bank funds can serve as examples:

1. Comex Gold Trust (IAU) – the value of assets of about USD 950 million

**Table 4. The basic data concerning the Comex Gold Trust fund**

Net assets (USD)	952,420,033	Number of ounces of gold	1,323,321.341
Number of certificates	13,300,000	Gold in tons	41.16
Management fees and operating expenses	0.40%	Beta (in relation to S&P 500)	0.29

Data for 12.5.2006.

Source: original data.

2. Silver Trust (SLV) – the value of assets of USD 900 million

**Table 5. The basic data concerning the Silver Trust fund**

Net assets (USD)	\$894,489,787	Number of ounces of silver	61,994,778
Number of certificates	6,200,000	Silver in tons	1,928.2
Management fees and operating expenses	0.50%	Beta (in relation to S&P 500)	0.42

Data for 12.5.2006.

Source: original data.

Certain investors see the growing oil prices as an opportunity for good investment. American investors can finally purchase certificates of the first ETF based directly on WTI-type crude oil prices in immediate delivery. The certificates are issued by Victoria Bay Asset Management LLC, and they can be purchased within the stock exchange turnover at AMEX, under the name of The United States Oil Fund (USO).

<sup>23</sup> D. Hull, *Kontrakty terminowe i opcyjne*. Wprowadzenie, WIG-PRESS, Warszawa 1997.

**Table 6. The basic data concerning the USO ETF created by Victoria Bay Asset Management**

Management fees and operating expenses	0.85%
Price changes (USD)	0.01
Minimum transaction volume	1 share
Possibility of delayed payment	Yes
Short sale	Yes

Data for 12.5.2006.

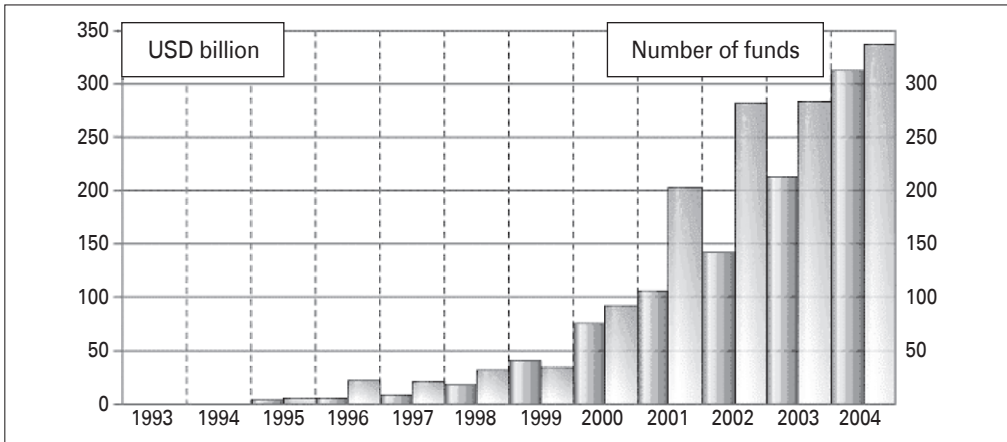
Source: original data.

In the European liquid commodity market, one of the most popular benchmarks is the Deutsche Bank Liquid Commodity. The index was created by Deutsche Bank. It comprises of: 35% crude oil, 20% heating oil, 12.5% aluminium, 12.25% corn, 11.25% wheat and 10% gold.

## 5. The Volume of ETFs' Assets

In 1993, the volume of ETFs' assets amounted to USD 811 million. At the end of 2004, it reached USD 309 billion, accumulated in 336 funds, managed by 40 managers and quoted at 29 stock exchanges worldwide. The largest number of ETFs is quoted in the USA (152 funds with assets worth USD 300 billion – the data for the end of 2005), Europe (114 funds with assets amounting to USD 34 billion), and Japan (15 funds with assets worth USD 30 billion)<sup>24</sup>. Between 2003 and 2004, the assets accumulated in the ETFs worldwide rose by 46.1%: in the USA by 51.1%, in Europe by 66.5%, and in Japan by 9.7%. The average annual increase of the value of assets accumulated in the ETFs between 1993 (USD 460 million) and 2004 (USD 227 billion) amounted to 50%.

<sup>24</sup> At the end of 2004 on the basis of the report by Morgan Stanley Bank.

**Figure 4. The number of ETFs and the volume of their assets**

Source: original research on the basis of the report by Morgan Stanley, and the report by the Bloomberg agency. The right scale: the volume of ETFs in USD billion. The left scale: the number of funds.

## 6. Summary

The dynamic development of ETFs in the financial markets around the world, and the benefits for both individual and institutional investors resulting from using ETF certificates, constitute a challenge for Polish investment funds, which ought to make an effort to create the first funds of this type in Poland. Introduction of ETFs into the stock exchange turnover would expand the range of investment opportunities in the Polish capital market, and would certainly make the range of products offered to customers more attractive.

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## Activity of Hedge Funds in the Market of Credit Derivative Instruments

### 1. Introduction

A hedge fund is one of the newest types of institutional investors in the financial market, aiming at a higher than average rate of return and, consequently, accepting a heightened risk, including a prolonged investment perspective. A credit derivative instrument is one of the most important product innovations of the recent decade, providing a possibility to transfer credit risk fast and in a flexible manner, without the necessity to dispose of reference assets. The objective of this paper is to examine potential effects of an intensified activity of hedge funds in the market of credit derivative instruments.

### 2. The Definition of Hedge Funds, and Their Financial Market Strategies

The beginnings of operation of hedge funds can be traced back to 1949. It was then, that A. W. Jones initiated the first fund (in the form of a partnership), orientated towards hedging strategies<sup>1</sup>. The investment profile of hedge funds evolved in time, and in the 1990's they were associated with high-leverage speculation, rather than with actual risk hedging. Hedge funds are institutions, the operation of which is characterized by<sup>2</sup>:

- orientation towards a higher than average return on investment,
- capital raised among sponsors (non-transferable shares, income from changing value of assets<sup>3</sup> and management fees, as well as from commission on profit) and investors (transferable shares); management

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<sup>1</sup> M. Banasiak, W. Gudaszewski, E. Kotwa, Charakterystyka funduszy hedgingowych, Rynek Terminowy, No. 1/05 (27), I quarter 2005, p. 35.

<sup>2</sup> *Ibidem*, p. 35–41 and Large EU banks' exposures to hedge funds, European Central Bank, November 2005, p. 10.

<sup>3</sup> Contrary to investment funds, the managers invest their own capital– see: Budowa portfela inwestycyjnego z wykorzystaniem aktywów alternatywnych, presentation prepared by Copernicus Partners LLP, 9.5.2004, p. 4.



- based on maximization of outsourcing (an auditor, an investment adviser, an administrator, a clearing bank),
- high level of leverage (low level of private funds provided by a sponsor within the balance sheet)<sup>4</sup>,
  - investing in all types of instruments (including derivatives), without clearly established proportions<sup>5</sup>,
  - orientation towards total return, as opposed to beating benchmarks, which is characteristic of investment funds<sup>6</sup>,
  - low clarity of investment policy and lack of standards of balance presentation,
  - raising capital mainly from rich clients within the private banking sector (in some countries (e.g. the United States), there is a requirement of additional accreditation in order to confirm an investor's wealth. Germany is an exception, since in 2004 the turnover in the public retail market was introduced, but it did not bring expected results, namely an increased level of funding<sup>7</sup>,
  - limited possibility of advertising the funds, and offering them in the retail market<sup>8</sup>,
  - liberal legal and supervising regulations,
  - a relatively low (possibly even negative) correlation with the capital market indexes<sup>9</sup>,
  - low liquidity of investment in hedge funds (selling units is usually possible once every three months, with a grace period of 1 to 3 years), which determines the possibilities of implementation of medium- and long-term strategies, also those concerning assets of limited negotiability.

<sup>4</sup> E.g. in the case of LTCM private funds constituted about 4% of the balance total. After LTCM's bankruptcy, hedge funds significantly limited leverage to the level of about 7:1 – see: Hedge funds, “The Economist”, 2.6.2001 and J. Sulmicki: Stabilność rynków finansowych a wejście Polski do strefy euro, Oficyna Wydawnicza SGH, Warszawa 2005, p. 61.

<sup>5</sup> The only category of assets hedge funds do not invest in, is property – see: Budowa portfela..., *op. cit.*, p. 6.

<sup>6</sup> *Ibidem*, p. 4.

<sup>7</sup> In the first year of operation, instead of EURO 50 billion, only EURO 500 thousand were raised – see: A. Gieros, Ryzyko? Niekoniecznie, Manager – Magazin, No. 1(2), January 2005, [www.manager-magazin.pl/index.php?ct=archiwum&mag=2&art.=73](http://www.manager-magazin.pl/index.php?ct=archiwum&mag=2&art.=73), data for 12.4.2006 and E. Kupiecka, Inwestycje alternatywne dla inwestorów indywidualnych, [www.copernicus-tfi.pl/files/inwestycje\\_alternatywne\\_dla\\_indywidualnych.pdf](http://www.copernicus-tfi.pl/files/inwestycje_alternatywne_dla_indywidualnych.pdf), 21.3.2005, p. 5, data for 14.4.2006.

<sup>8</sup> Individual investors are the leading group of providers of capital for hedge funds (about. 40%) – 25% is provided by banks and another 25% by funds of funds, and 5% each is invested by companies (e.g. AP7, British Telecom, Electrolux, GM) and other parties – see: M. Banasiak, W. Gudaszewski, E. Kotwa, *op. cit.*, p. 37.

<sup>9</sup> E.g. during the fall of the years 2000–2002, the MSCI World index fell by about 40%, and the ROI of hedge funds amounted to about 12%. More on the subject in: E. Kupiecka, Inwestycje..., *op. cit.*, p. 5, data for 14.4.2006.

An estimated number of hedge funds at the end of 2004, amounted to over 8000, and the total value of investment in this period amounted to about USD 800–1000 billion<sup>10</sup>.

Hedge funds are usually located in countries, where tax and legal environment is favourable (the United States and offshore countries, such as the Bermudas, the Bahamas, the Cayman Islands<sup>11</sup>, the Virgin Islands)<sup>12</sup>. The place of registration of a fund can differ from the place of registration of its managing company – in this case, about 80% of firms are registered in the United States.

Investments in participation units of hedge funds belong to the category of alternative investments (investments in alternative assets)<sup>13</sup>. The main types of investment strategies of hedge funds include (the so-called criterion of openness/reactivity to market risk)<sup>14</sup>:

- arbitrage strategies, including:
  - Merger arbitrage (described as event-driven strategies) – using evaluation discrepancies between merging companies (the strategy used before a formal merger, often in cases of mere suspicion of a merger/takeover). One example can be the operations of hedge funds connected with the fusion between Vodafone and Manesman in 1999,
  - Convertible bond arbitrage (an example can be a long position in the market of Siemens Exchangeable 2005 bonds, providing the right of exchange to Infineon shares, with a simultaneous short position in the Infineon shares market) – the strategy orientated towards profit from discrepancies between evaluation of shares and convertible bonds,
  - Fixed income arbitrage (e.g. a simultaneous purchase of a treasury bond with a sale of a future contract for that bond),
- event-type strategies (e.g. the GBP's forced exit from the EMS, from which G. Soros's Quantum funds benefited)<sup>15</sup>,
- strategies based on results of a fundamental analysis,

<sup>10</sup> E. Kupiecka, Aktywa alternatywne w portfelu inwestora instytucjonalnego, [www.centrumwiedzy.edu.pl/index.php?option=com\\_content&task=view&id=5](http://www.centrumwiedzy.edu.pl/index.php?option=com_content&task=view&id=5), p. 3, data for 14.4.2006.

<sup>11</sup> The reasons for registering funds in the Cayman Islands are: income tax exemption and lack of investment limitations – see: E. Kupiecka, Dobry klimat na Karaibach, „Parkiet”, 5.8.2005.

<sup>12</sup> [www.skarbiec.biz/inwestycyjne-fundusze/hedgingowe.htm](http://www.skarbiec.biz/inwestycyjne-fundusze/hedgingowe.htm) – data for 12.04.2006 in the quoted locations about 87% of all hedge funds are registered – see: M. Banasiak, W. Gudaszewski, E. Kotwa, *op. cit.*, p. 36.

<sup>13</sup> Traditional investments (shares, bonds, fund units) are described as mainstream, and alternative assets as absolute return strategies – see: E. Kupiecka, *Inwestycje...*, *op. cit.*, p. 1.

<sup>14</sup> J. Kowalski, Strategie funduszy hedgingowych, „CFO – Magazyn Finansistów”, No. 4/2004 of 1.12.2004 – the article is available at [www.cfo.cxo.pl/cgi-bin/print.asp](http://www.cfo.cxo.pl/cgi-bin/print.asp) on 10.04.2006 and M. Banasiak, W. Gudaszewski, E. Kotwa, *op. cit.*, pp. 37–38 and 40–41.

<sup>15</sup> M. Luszczyn, P. Opolski, Historia funduszu Long-Term Capital Management, „Rynek Terminowy” No. 2/03 (20), p. 43.

- branch, or regional strategies (investment in shares or bonds of parties from a particular branch or region),
- “last but not least” – purchasing undervalued companies plus a short sale of shares of overvalued companies from the chosen sector,
- strategies relating profit to realisation of forecasts derived from technical analysis,
- strategies based on results of quantitative analyses,
- strategies orientated towards producing profit from changes of basic macro-economic parameters (including relative changes).

Hedge funds can be classified according to specialisation:

- emerging markets (investments in emerging markets),
- distressed securities (investments in securities issued by parties on the verge of bankruptcy),
- funds of hedge funds, the operation of which significantly limits the risk resulting from the strategy of a particular hedge fund. Funds of funds generate the necessity to pay double commission.

Hedge funds rarely invest without a securing procedure. Often long and short positions are assumed simultaneously in similar, although not identical instruments. Effectively, most hedge funds investments can be classified as spread strategies.

Structured instruments become increasingly popular among clients of the private banking sector, since they provide a chance to indirectly invest in hedge funds units. Those instruments include hedge funds linked notes (usually with capital protection and a minimal ROI, including debt securities, the return on which depends on profitability of hedge funds, or variability of hedge fund indexes<sup>16</sup>), buy options for units of hedge funds, rebalancing strategies (investment in hedge fund units and in risk-free securities, orientated towards correction of portfolios according to the market situation)<sup>17</sup>.

Hedge funds are already available to Polish investors. From the beginning of 2006, participation units in 3 sub-funds (Superfund A, B and C)<sup>18</sup> of the Superfund (Specialised Open Investment Fund), which in turn is managed by Superfund TFI S.A.<sup>19</sup>, have been offered by DI BRE Bank S.A. The A, B and C Sub-funds invest in Luxembourg managed futures funds, which in turn are involved in the markets

<sup>16</sup> The most popular indexes are: FTSE Hedge Index, MSCI Hedge Invest Index, S&P Hedge Fund Index and the family of HFRI indexes – see: Kupiecka E., *Inwestycje...*, *op. cit.*, p. 5, data for 14.4.2006.

<sup>17</sup> More on the subject in: M. Banasiak, W. Gudaszewski, M. Hnatiuk, *Instrumenty strukturyzowane z ekspozycją na rynki hedge funds*, „Rynek Terminowy” No. 2/05 (28), I quarter of 2005, pp. 22–28.

<sup>18</sup> Subfunds differ in investment strategy, risk profile and the expected return.

<sup>19</sup> Superfund TFI S.A. was registered in December 2005.

of the most liquid financial and commodity derivatives<sup>20</sup>. The plans to establish TFI were announced by Advanced Financial Services as well. TFI Alternatywne Inwestycje is to establish a closed investment fund investing in hedge funds<sup>21</sup>.

### 3. Hedge Funds at the Markets of Credit Derivative Instruments

In practice, until the mid-1990's the trade in the financial market involved the instruments generating mainly the market risk (shares, bonds and derivatives, the value of which was directly or indirectly dependent upon the quoted cash instruments). Consistent regulation of interdependency between private funds and exposures subjected to risk, as well as domination of credit risk in the structure of banking risk, led to development of transfer of credit risk, which included syndication, securitisation and credit derivatives. Of the quoted methods of risk reduction, the most popular are the credit derivative instruments, which results from their flexible construction facilitating de-fragmentation of the instrument's risk, and transferring only its chosen components, as well as from the instruments's not influencing the relations with issuers of the reference debt.

**Table 1. Transfer of credit risk within institutions of the financial market – the share of individual types of financial institutions in the supply of, and the demand for credit risk hedging**

	2003	2006E
<b>Purchase of hedging</b>		
Banks	51%	43%
Brokerage houses	16%	15%
<b>Hedge funds</b>	<b>16%</b>	<b>17%</b>
Other institutions	17%	25%
<b>Sales of hedging</b>		
Insurance companies	20%	21%
Banks <sup>22</sup>	38%	34%
Brokerage houses	16%	14%
<b>Hedge funds</b>	<b>15%</b>	<b>15%</b>
Other institutions	11%	16%

Source: British Bankers' Association: Credit derivatives Report 2003/2004. Executive summary, [www.bba.org.uk](http://www.bba.org.uk), p. 7.

<sup>20</sup> Hedge Fund Superfund available from Brokerage House of BRE Bank S.A., [www.media.brebrokers.pl](http://www.media.brebrokers.pl) – data for 8.4.2006.

<sup>21</sup> [www.afs-invest.pl](http://www.afs-invest.pl), data for 10.4.2006.

<sup>22</sup> The parties most interested in selling hedging are banks using low margins at their local markets, see: B. G. Dages, D. Palmer, S. Tunery, An Overview of the emerging market credit derivatives market, Federal Reserve Bank of New York, May 2005, [www.bis.org/publ/cgfs22fedny4.pdf](http://www.bis.org/publ/cgfs22fedny4.pdf), data for 8.2.2006.

Until the end of the 1990's, the market of credit derivatives was an intra-bank market, contributing, on one hand, to diversification of credit portfolios, and on the other, to the transfer of credit risk from global investment banks towards smaller, mainly commercial regional banks. As long, as the credit risk turnover took place within the global banking system, only the advantages of credit derivatives were emphasised. The beginning of the new century brought about an increased diversity of both the buyers, and the sellers of credit risk, which is apparent from the data in Table 1.

The increased diversification of types of financial institutions involved in turnover of credit derivatives is certainly connected with benefits, such as improved market liquidity (hence a more adequate valuation), and de-concentration of credit risk, previously focused within the banking sector. Additional motivating factors for banks, as far as transactions with hedge funds are concerned, are<sup>23</sup>:

- satisfactory return on investment rate, and diversification of sources of income,
- low correlation, or its lack, with profitability of traditional investments,
- possibility to conduct a back-to-back hedging transaction involving derivatives and products offered within the private banking segment.

It was probably due to those reasons, that A. Greenspan decided, that credit derivatives, in spite of their numerous disadvantages and risks, are the instruments, which prevented a crisis in the American banking sector after spectacular bankruptcies of large corporations, which in turn resulted from transfer of credit risk towards insurance companies and hedge funds<sup>24</sup>.

Hedge funds are becoming increasingly active participants of the market of credit derivative instruments<sup>25</sup>, which results from the following factors:

- credit risk constitutes a welcome component diversifying hedge fund portfolios,
- credit margins are characterized by high variability, which creates a chance for higher than average profits,

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<sup>23</sup> Large EU banks'..., *op. cit.*, p. 11.

<sup>24</sup> R. Dodd, Rumors and news: Credit derivatives trigger near system meltdown, Financial Policy Forum, derivatives study center, Special Policy Brief 26, 5 August 2005, [www.financialpolicy.org/fpfsfb26.htm](http://www.financialpolicy.org/fpfsfb26.htm) data for 20.12.2005.

<sup>25</sup> At the same time, credit derivatives are not the basic area of co-operation between banks and hedge funds (the co-operation focuses on money loans and security loans). The share of credit derivatives, according to notional value in the total value of credit derivatives in the countries of the EU reached in 2004 the maximum of 8% (the research conducted on the basis of data from 3 large banks from Germany, France and Sweden) – see: Large EU banks'..., *op. cit.*, p. 12.

- selling hedging is an equivalent of investing in corporate debt, which constitutes an element of the strategy exploiting the disparity between valuation of debt and valuation of capital,
- hedge funds investments in the form of sales of hedging regarding companies facing bankruptcy (companies of a seriously deteriorating economic and financial situation), are a practical implementation of the distressed securities strategies, aimed at market undervaluation of the firms on a verge of bankruptcy, which is based mainly on psychological or regulatory factors (the necessity to sell assets below their investment rating is embedded in statutes of many banks, investment and pension funds).

Keeping in mind the benefits, it is important to remember, that the systematically growing share of hedge funds in the credit derivatives turnover is connected with numerous dangers.

The problem of dependence of stability of the financial system upon the financial balance of hedge funds is no longer a theoretical, hypothetical or a projective matter. To prove it, there is the case of the LTMC fund, which faced bankruptcy in the second half of 1998, and would not have avoided it (dragging with it a lot of renowned financial institutions), if it was not for the decision of 14 investment banks to capitalize it with USD 3,5 billion, inspired by FED. The effects of the possible bankruptcy of LTCM were compared with the influence of the Second World War upon the financial system, which is justifiable in the context of the fund's involvement in the derivatives market at the level of USD 1,25 thousand billion (notional value)<sup>26</sup>.

The transfer of credit risk from institutions equipped with the experience, databases and skills to identify and quantify this risk, to parties, which sometimes have only a vague idea about exposures they accept, has to be considered the most important danger. It leads to a paradoxical phenomenon of concentration of credit risk in parties ill prepared to manage it, with a simultaneous "mass" reduction of the risk within the credit sector.

The security gained by banks seems superficial, due to the following reasons:

- credit derivatives do facilitate transfer of credit risk of reference assets, but its place is taken by contractor's risk (a worsening economic and financial condition of a fund may result in late clearance of due claims of banks),
- higher liquidity of credit risk may destabilize the banking system, since banks may assume higher credit risk, rising the probability of default of

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<sup>26</sup> M. Lusztyń, P. Opolski, *op. cit.*, pp. 43–44.

their portfolios. An enhanced possibility of transfer adversely affects the process of risk monitoring<sup>27</sup>,

- funds, by using financial leverage, use credit lines.

Sometimes hedge funds consciously aim at achieving a “short squeeze” effect, which is connected with the prices of debt securities no longer playing an informative role on the economic and financial condition of their issuer. No necessity to possess the reference assets as one of the key elements of definition of a credit derivative instrument, leads to a possibility of high leverage of position (nominal value of credit derivatives for a particular type of reference assets is several times higher than the reference value for issue of bonds). In case of default, the high level of leverage, and physical settlement type of clearance, led to high demand for bonds issued by the party conducting a default, and consequently to a rising price of the debt security (against the logic, which would indicate, that a worsening economic and financial condition of the reference debtor should unambiguously result in falling prices and increasing profitability). One of the examples of high risk of “short squeeze” is the case of the Delphi company, which announced bankruptcy on 8.10.2005. In spite of the bankruptcy, the high leverage (12.5 times) at the market of credit derivative instruments, led to a rising price of its bonds (issued for about USD 2 billion) by about 24%, due to their popularity with purchasers of hedging. It is due to such reasons, that the mechanisms of cash clearance are introduced, especially since they work well in the case of contracts for the CDS index. Due to limited potential profits from short squeeze, hedge funds support delivery settlements<sup>28</sup>.

An important problem faced by hedge funds at the market of credit derivative instruments, is the basis risk, closely connected with unmatched (as far as maturity, currency, position in the hierarchy of subordination are concerned) short and long positions. This can be confirmed by the events of early May 2005: on 5/5/2005, the market was shaken by the news of a possible bankruptcy of several hedge funds, and serious problems of one of large banks (Deutsche Bank was indicated), which was said to have resulted from lowered ratings of GM and Ford (from investment to speculative). An additional effect was the exclusion of bonds of the concerns of the motor industry from the Lehman Brothers and

<sup>27</sup> W. Wagner, Credit derivatives, the liquidity of bank assets and ranking stability, University of Cambridge, Cambridge Endowment for Research in Finance, Judge Institute of Management Working Paper 18, January 2005 [www.cerf.cam.ac.uk/publications/files/wp18%20Banking%20competition.pdf](http://www.cerf.cam.ac.uk/publications/files/wp18%20Banking%20competition.pdf), data for 15.2.2006.

<sup>28</sup> Plot twists ahead for credit derivatives, FT, 5.1.2006, [www.news.ft.com/cms/s/1d72ce5c-7e22-11da-8ef9-0000779e2340.html](http://www.news.ft.com/cms/s/1d72ce5c-7e22-11da-8ef9-0000779e2340.html), data for 11.1.2006 and The Ballooning Credit derivatives market: easing risk or making it worse?, Finance and Investment Wharton, [www.knowledge.wharton.upenn.edu/index.cfm?fa=printArticle&ID=1303](http://www.knowledge.wharton.upenn.edu/index.cfm?fa=printArticle&ID=1303), 25 November 2005, data for 10.2.2006.

Merill Lynch indexes. Furthermore, it led to numerous disinvestments (securities were sold by investors trying to replicate the index, and by parties, which due to statutory requirements had to get rid of the bonds). The bonds belonging to the quoted parties constituted a large proportion of the market of corporate bonds (USD 290 billion in the case of GM, and USD 160 billion in the case of Ford). Hedge funds were purchasing the risk of the *equity* tranche, securing that purchase by buying the risk of the *mezzanine* tranche, the value of which was not affected by the *default* of GM and Ford, which led to massive losses, and a fall of between ten and twenty funds. Assuming the opposite position (purchasing hedging for the *equity* tranche) at the moment of *default* already cost 50% (about 16% before the change of rating), which further enhanced the losses. Losses were also incurred by another strategy used by hedge funds, which could be included into the convertible bonds arbitrage category (a long position in convertible bonds, secured by a short position in shares)<sup>29</sup>.

#### 4. Summary

Hedge funds are among the most mysterious institutions operating in the financial markets. Their influence upon the market is ambiguous – on one hand, they improve liquidity, but on the other the excess absorption of risk, including credit risk, may lead to materialization of the W. Buffet's thesis, that credit derivatives in hedge fund portfolios may become a weapon of mass destruction<sup>30</sup>. A complexity and uniqueness of the strategies they apply requires discretion and lack of conservative framework of regulations, which can be accepted, if we assume, that their offer is addressed to the "top" segment of the private banking sector, with additional security measures in the form of the necessity to verify the material status of investors, and a ban on advertising of participation units. The problem begins, when banks or pension funds became investors, since they cannot legitimately invest in risky speculative ventures, or limit credit risk by transactions with hedge funds (which often makes such hedging illusory).

A significant influence of hedge funds upon the financial market was noticed by the international regulatory bodies co-operating within the Basel Committee on Banking Supervision. The Financial Stability Forum was established in 1999. Its works resulted in the following conclusions regarding the key factors increasing the risk of destabilization of the financial markets<sup>31</sup>:

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<sup>29</sup> R. Dodd, *op. cit.*

<sup>30</sup> K. R. Roane, *Dueling Over Derivatives*, [www.usnews.com/usnews/biztech/articles/050725credit.htm](http://www.usnews.com/usnews/biztech/articles/050725credit.htm), article of 25.7.2005, data for 11.1.2006.

<sup>31</sup> J. Sulmicki, *op. cit.*, pp. 54–55.



- insufficient banking supervision in tax havens,
- inappropriate monitoring of risk connected with operation of hedge funds.

For the time being, the correct conclusions formulated by the Forum of Financial Stability were not reflected in the appropriate supervisory regulations. In the context of growing influence of hedge funds upon the financial market and its stability, the following risk-limiting solutions are worth considering:

- 1) a necessity to treat hedge funds similarly, as other participants of the market of non-stock-exchange derivative instruments (the ISDA standard and security deposits beyond the threshold value)<sup>32</sup>,
- 2) introducing the category of “acceptable contractor” in futures transactions, which would limit the growing share of hedge funds in the structure of sellers of hedging, and allow for separate treatment (in the regulatory sense) of exposures with “acceptable contractors”, and of those with other parties (a similar solution is recommended in the New Capital Accord),
- 3) obliging every hedge fund to obtain external rating, which would not signify a disclosure of the funds’ investment policies, but would provide investors with an objective evaluation of funds. The proposed attitude would limit investments in low rated hedge funds by banks and investment and pension funds. The diversity of hedge funds may prove a problem in this respect, also in terms of appetite for risk, so perhaps the primary action should be classification of funds before granting them ratings within their particular category<sup>33</sup>.

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<sup>32</sup> Due to the scope of operation, and experience of the managers in charge of LTCM, the banks did not demand cash collaterals from the fund for the signed futures transactions, which at the moment of LTCM’s bankruptcy incurred a massive risk of losses in the banking sector.

<sup>33</sup> Introduction of rating for hedge funds is considered by the Morningstar rating agency – see: A. Gieros, *op. cit.*

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## The Directions of Development of the Market of Credit and Debit Cards in Poland

### 1. Introduction

The dynamic development of data communication technologies, the rising pressure of competition within the banking sector, as well as the growing expectations of customers, who expect convenient and fast access to money, are the main factors of development of the modern noncash turnover. An average Polish household statistically pays noncash for just 2% of all purchase transactions, while in the developed systems of retail payments in the European Union (e.g. in France and the United Kingdom), the indicator amounts to about 20–30%<sup>1</sup>. Eliminating notes and coins from payments by individuals and businesses in Poland will be impossible without consistent facilitation of access to noncash instruments of payment, such as:

- electronic instruments of payment,
- transfer orders,
- orders to pay,
- giro cheques.

All the quoted forms of noncash money transfers (except cheques), increase convenience of payments, and enable banks to significantly cut operating expenses connected with servicing of cash payments. Furthermore, those instruments reduce common crime connected with the traditional form of money (robbery, forgery, unregistered transactions of the grey market).

The scale of use of individual types of instruments of noncash transactions in Poland varies significantly<sup>2</sup>. Transfer orders definitely dominate the market (over 80% of the total number of transactions), and their significance increases along with dynamic saturation of the society with banking services, and with growing popularity of on-line banking. Electronic instruments of payment (i.e. credit and debit cards in the prevailing market practice) are far less popular (under 20%). The significance of cheques and orders to pay is marginal (under 1%), and cheques,

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<sup>1</sup> Data from the European Central Bank.

<sup>2</sup> Data from the National Bank of Poland.

contrary to orders to pay, must be considered a typically decadent product, from which Polish banks are swiftly withdrawing, due to operating expenses.

While analysing the development of instruments of noncash payments in Poland, a particular attention ought to be devoted to the increasing popularity of electronic instruments of payment. Their matter is regulated by the Act of 12/9/2002 on electronic instruments of payment<sup>3</sup>, which provides, that an electronic instrument of payment is an instrument of payment, which:

- provides remote access to money,
- enables an owner to carry out operations with the use of electronic data carriers or
- provides electronic identification of an owner necessary to carry out an operation.

The Act defines two types of electronic instruments of payment, i.e. credit or debit cards, and electronic money instruments. Unfortunately, until the first quarter of 2006, no electronic money systems in Poland have been created, in spite of advanced solutions existing worldwide. In the above context, the objective of this paper is to conduct an analysis of the dynamics, and to appoint the directions of development of the market of the only electronic instruments of payment used in the Polish practice, i.e. credit and debit cards.

## 2. The Basic Market Trends

The number of cards issued by banks in Poland increased nearly sixfold during the years 1998–2005. At the end of 2005, their number amounted to 20 370,3 thousand. The number of cards in Poland grows dynamically, and the reduced volume of cards issued in 2003 did not result from market factors, but from changes in reporting by the National Bank of Poland. From January 2003, the statistics do not include the following cards:

- outdated and not returned to banks,
- listed as invalid,
- issued and not collected by customers.

The main factor of increase of the number of cards issued in Poland is the significant improvement of saturation of the Polish society with banking services<sup>4</sup>. The number of newly opened personal accounts more than doubled during the last eight years. At the end of December 2005, twenty largest commercial banks in Poland run nearly 16,5 million personal accounts, while at the end of 1998,

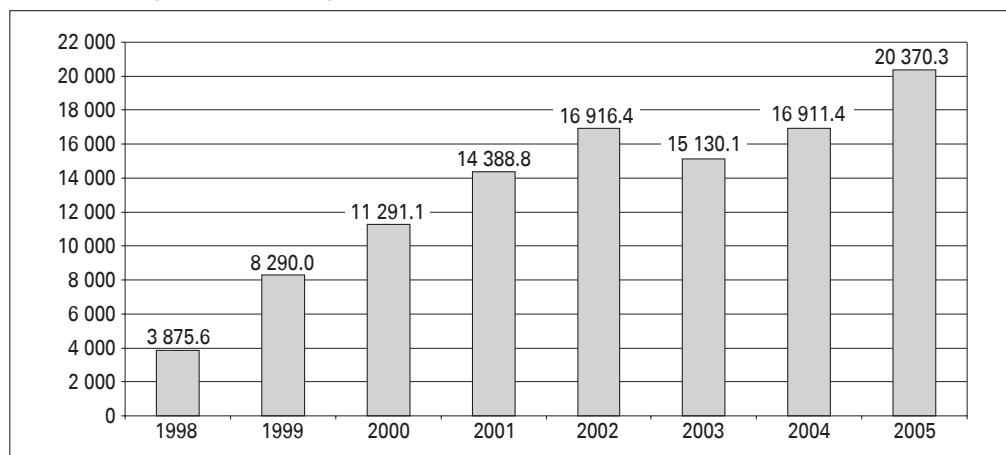
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<sup>3</sup> The Journal of Laws No. 169, pos. 1385 with subsequent amendments.

<sup>4</sup> At the end of 2005, under 60% of adult Poles had a current bank account.

their number amounted to merely 6,6 million<sup>5</sup>. The increase of the number of personal accounts influences directly the number of cards, since, as a standard, a debit card is issued for each of those accounts.

**Figure 1. The number of credit and debit cards in Poland during the years 1998–2005 (in thousands)**



Source: original research on the basis of data from the National Bank of Poland (NBP).

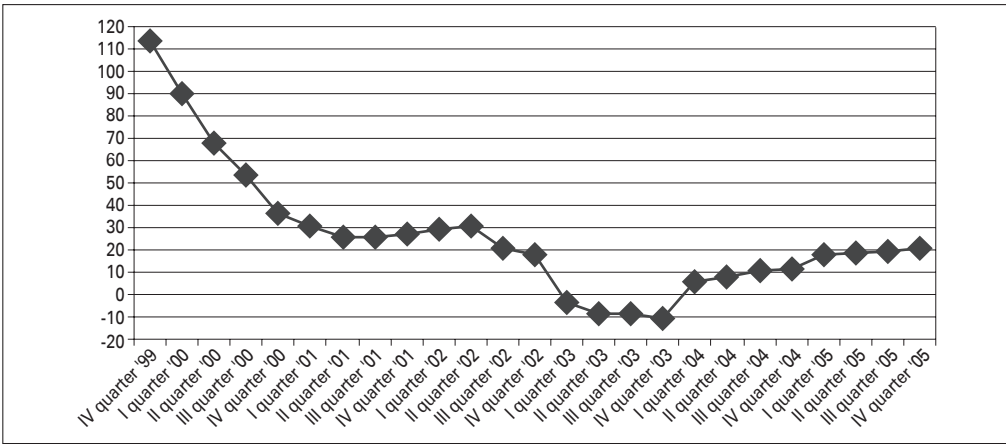
The particularly high annual growth (by 20.4%) of the number of cards in 2005 draws attention. The banks issued almost 3,5 million new cards in the quoted year. The growth was all the more symptomatic, because for the first time in the process of evolution of the market of electronic instruments of payment in Poland it resulted from issue of a higher number of credit, than debit cards<sup>6</sup>.

In the quarterly dynamics of growth of credit and debit cards, after levelling the changes in methodology of statistical data in 2003, market growth of 20–30% per annum can be observed. Such dynamics of growth of the card market volume has to be regarded as highly satisfactory, considering, that the growth of over 50% p.a. at the turn of the past and the present decade resulted from the so-called “low base” effect. If the present dynamics of development of the card market is maintained, by the end of 2007 their number should exceed 25 million.

<sup>5</sup> „Rzeczpospolita”, 15.10.2005.

<sup>6</sup> The analysis of market trends in the segment of debit and microchip cards is presented in part 3 of this paper.

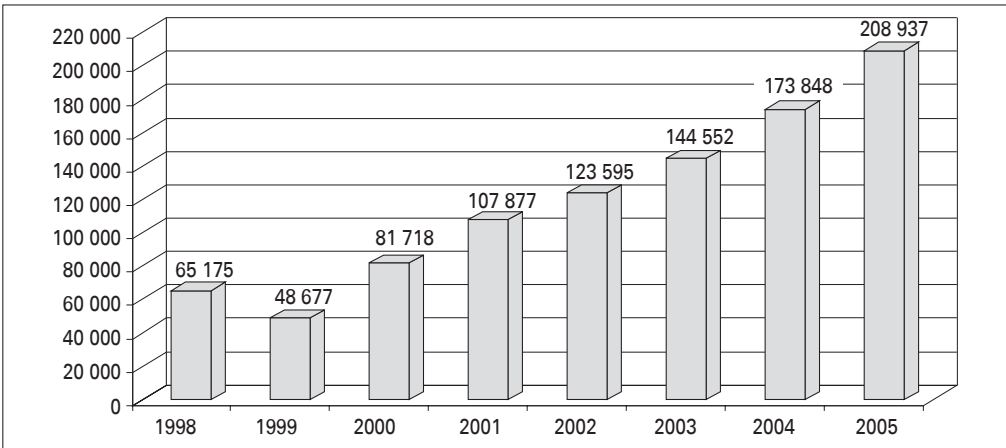
**Figure 2. The dynamics of growth of the volume of credit and debit cards in Poland during the years 1999–2005 (the analogical quarter of the previous year=100)**



Source: original research on the basis of data from the National Bank of Poland (NBP).

Along with the growing number of cards in the Polish market, the volume and the value of transactions paid for by card grows as well. During the years 1998–2005, the number of transactions increased from 65 175 thousand to 208 937 thousand, i.e. over 3.2 times. Still, only one in ten transactions was paid for with a card other than a debit one, and the number of credit card transactions in 2005 did not exceed 20 million.

**Figure 3. Volume of transactions in the card market during the years 1998–2005 (in thousands)**

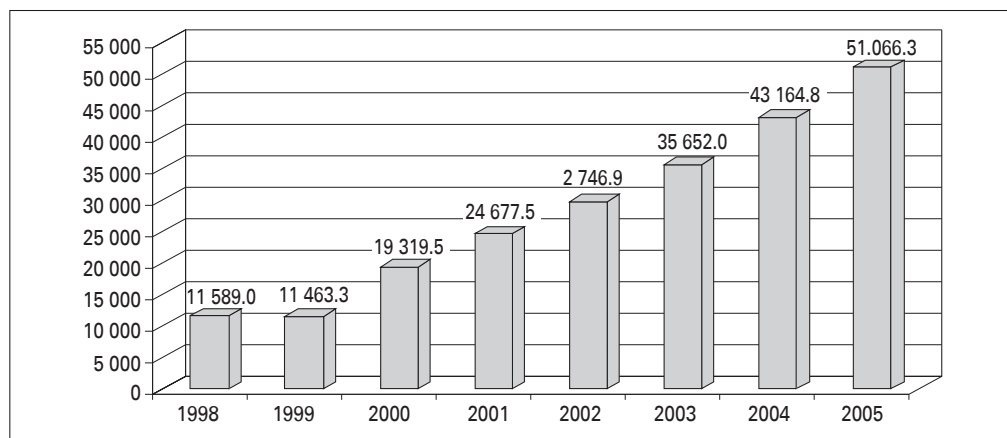


Source: original research on the basis of data from the National Bank of Poland (NBP).

In the final quarter of 2005, statistically each card was used in 10.3 transactions, while six years earlier – in less than 6 transactions. Nevertheless, popularity of use of credit and debit cards in Poland is far below the West-European standards. According to Visa Europe, customers of Polish banks shop using cards almost four times less frequently, than consumers in the “old” European Union<sup>7</sup>. In most cases, debit cards in Poland are used for cash machine transactions, and many owners and users of those cards are not aware of the possibility to pay with those cards in EFT/POS terminals in shops. The above is confirmed by the research on the manner of using cards, conducted in Poland by Visa Europe between 1.10 and 30.11.2005. The results of market research indicate, that only 34% of transactions cleared by Visa cards in Poland were of a noncash character – the rest were cash machine operations<sup>8</sup>.

A very popular behaviour pattern, particularly among people with low income, is withdrawing all the funds from a personal account in a single transaction. Everyday shopping is paid for by card by people with academic education and monthly income exceeding the national average. However, banks estimate, that such card users constitute under twenty percent of customers of the largest retail banks<sup>9</sup>.

**Figure 4. Value of transactions in the credit and debit card market in Poland during the years 1998–2005 (in PLN million)**



Source: original research on the basis of data from the National Bank of Poland (NBP).

Considering the value of transactions cleared using credit and debit cards, it is worth emphasising, that at the end of 2005, customers of Polish banks

<sup>7</sup> Analysis by Visa Europe.

<sup>8</sup> *Ibidem*.

<sup>9</sup> „Rzeczpospolita”, 31.1.2006.

carried out transactions worth, in total, over PLN 51 billion (i.e. 18% more than at the end of 2004). During the years 2000–2005, the average dynamics of growth of the value of card transactions amounted to about 20% p.a. Such data are characteristic of the markets of noncash payments at a very early stage of their development.

It is worth noticing, that a statistical value of transactions per card rises as well. At the beginning of the present decade (i.e. in the last quarter of 2000), one card served transactions worth PLN 1 711; five years later, the value of transactions exceeded PLN 2 500. At the same time, the value of a statistical single operation decreases. In the first quarter of 2005, the average value of a card transaction amounted to PLN 302<sup>10</sup>. This means, that customers use their cards more often for transactions of lower values, which indicates, that in spite of an apparent domination of cash turnover, popularity of noncash transactions in Poland consistently increases, and customers are far more prone to using cards for payments, than at the end of the 1990's.

### **3. Main Types of Operations in the Market of Credit and Debit Cards**

Large significance of cash transactions in Poland is not only the effect of very conservative patterns of behaviour of card owners, but also a consequence of the prevailing low availability of cash machines (ATM) and terminals for noncash transactions (EFT/POS) in shops and service outlets. After a period of very fast development of the network of cash machines during the years 1998–2001, the recent dynamics of growth of the number of new machines does not exceed 10% p.a. At the end of 2005, customers of banks in Poland had access to almost 9 thousand cash machines, i.e. almost 3,5 thousand more, than at the beginning of the present decade. During the 12 months of 2005, only 722 new machines were installed in Poland. Generally, cash machines are located in cities, which is another reason for low popularity of credit and debit cards in Poland.

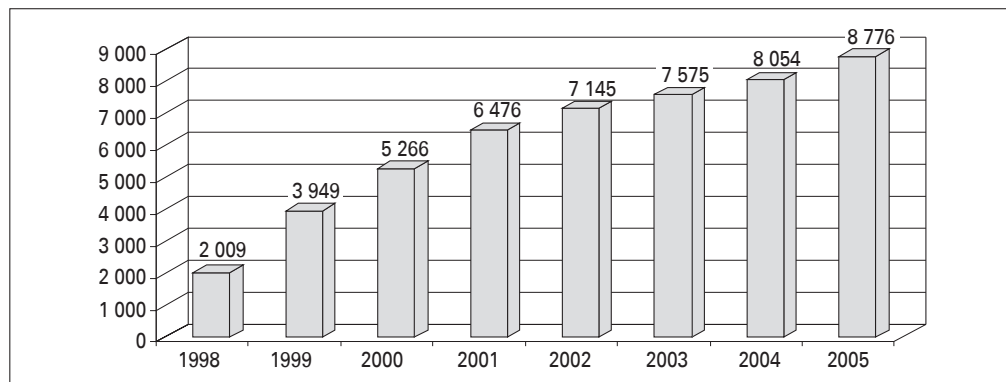
In practice, accessibility of cash machines is limited by high commissions for using ATM networks other, than recommended by the bank running the customer's personal account. Only a few banks in Poland provide a possibility of commission-free use of all cash machines, and often such facility requires fulfilling detailed conditions, usually unfavourable to customers<sup>11</sup>.

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<sup>10</sup> „Rzeczpospolita”, 15.5.2006.

<sup>11</sup> For example, in the case of Volkswagen Bank Direct, cash machine transactions are free of charge, if their value exceeds PLN 400.



**Figure 5. The number of cash machines in Poland, during the years 1998–2005**

Source: original research on the basis of data from the National Bank of Poland (NBP).

Generally, banks tend to encourage customers to carry out noncash transactions, rather than to use cash machines. In the case of the former, banks draw significant income from participating in commissions (the so-called interchange fees) collected by authorisation centres from acceptors for every card payment made by clients. Providing access to ATMs means mainly high expenses on maintenance and day-to-day servicing of the cash machine network. On the other hand, cash machines are less costly, than conducting pay-outs in outlets where bank employees must be involved, which explains the increasingly common practice of introducing fees for cash out-payments from bank accounts<sup>12</sup>.

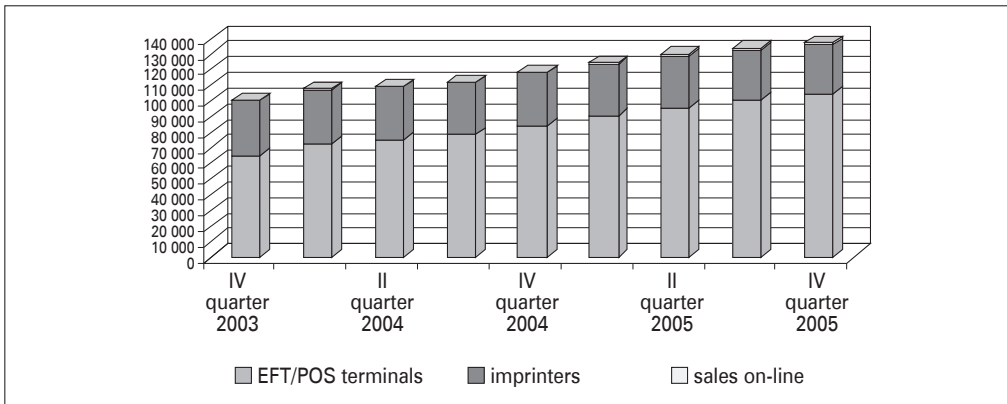
The number of cash machine transactions increases consistently. During the entire year 2005, 504,1 million operations were registered, for an average value of PLN 302. By comparison, in 1998 there were almost ten times less such transactions (i.e. 53 million), and the average value of a transaction amounted to PLN 141. However, in 1998 customers had only 2 thousand ATMs at their disposal.

The popularity of credit and debit cards in Poland is facilitated (however still insufficiently), by the increase of the number of outlets, where card payments are accepted. At the end of 2005, there were 137 thousand such outlets in Poland, of which 76% were electronic EFT/POS terminals providing instant on-line authorisation. Far less outlets (31,5 thousand and 23% of the total number) were equipped with imprinters, i.e. terminals for manual acceptance of cards with convex letters. Imprinters are used for off-line authorisation, and the final clearance of purchase requires telephone authorisation at an authorisation centre. The least popular solution are on-line payments, accepted by 1 142 outlets (i.e.

<sup>12</sup> Such practice is questioned by the Office of Competition and Consumer Protection, which is of the opinion, that this cost ought to be included into monthly charges for running an account.

less than 1% of the total number). It can be expected, that along with the development of e-commerce in Poland, Internet payments are going to rapidly gain significance.

**Figure 6. The number of outlets according to the manner of card acceptance, during the years 2003–2005**

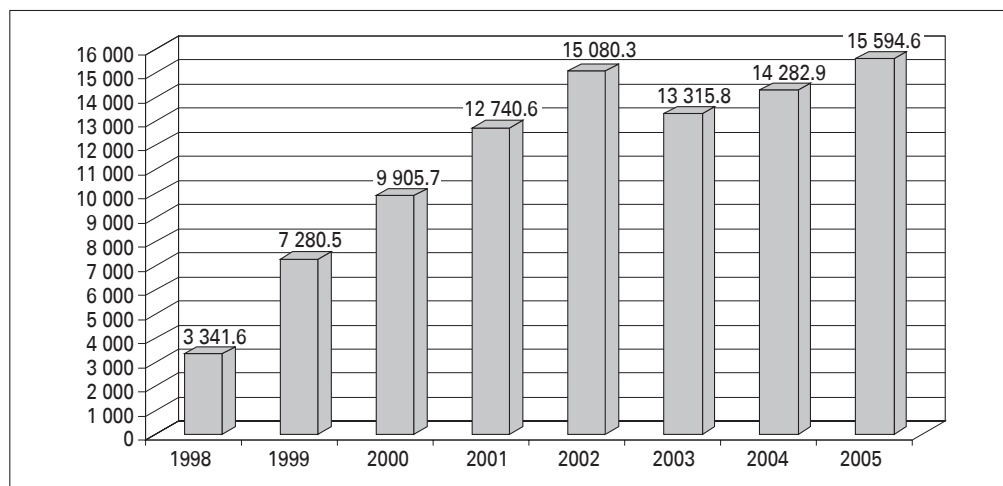


Source: original research on the basis of data from the National Bank of Poland (NBP).

The general rate of increase of the number of outlets accepting card payments in Poland is far from satisfactory. During the years 2003–2005, only 37 thousand of such outlets were created. The main barriers are high commissions paid by acceptors of card payments, low awareness of the possibility of electronic payments among clients, and the traditional preference for cash turnover, as a more credible one.

#### 4. Type Structure of the Market of Credit and Debit Cards

The analysis of the structure of the market of credit and debit cards in Poland indicates, that at the end of 2005, almost 16 million cards (i.e. 76.6%) were debit cards. Contrary to their name, their function is not to draw debit in banks, but to pay to the level of the balance of the account for which they were issued. In Poland, those cards are still used far too rarely for payments, and usually customers use them for paying out cash from cash machines. At the beginning of the present decade, there were almost 10 million debit cards in Poland (including the invalid, outdated and uncollected ones). During the years 2000–2005, their number increased by almost 60%, which, as has been mentioned, can be explained by the increasing numbers of personal accounts opened in the Polish banking sector.

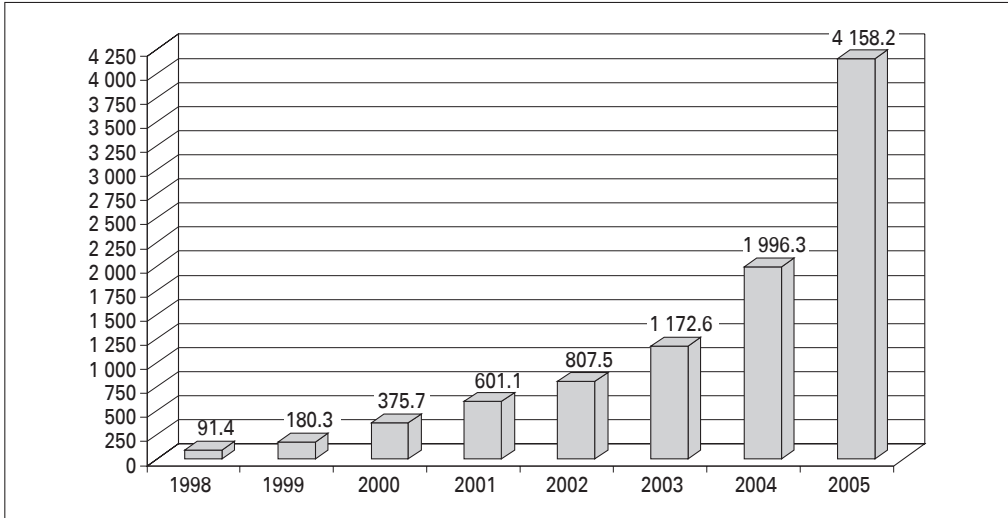
**Figure 7. The number of debit cards during the years 1998–2005 (in thousands)**

Source: original research on the basis of data from the National Bank of Poland (NBP).

During the years 2003–2005, the highest growth of new cards issued could be observed in the credit card segment. By the end of 2005, banks in Poland issued almost 4 160 thousand cards of this type. Thus credit cards achieved an over 20% share of the card market. It is worth remembering, that at the beginning of the current decade, the number of credit cards issued did not exceed 200 thousand (i.e. 2.2% of the total number). Considering marketing plans of banks, increasing interest in credit cards among clients, and low level of development of this card segment of the Polish market, credit cards are among the most prospective instruments of noncash payments in Poland.

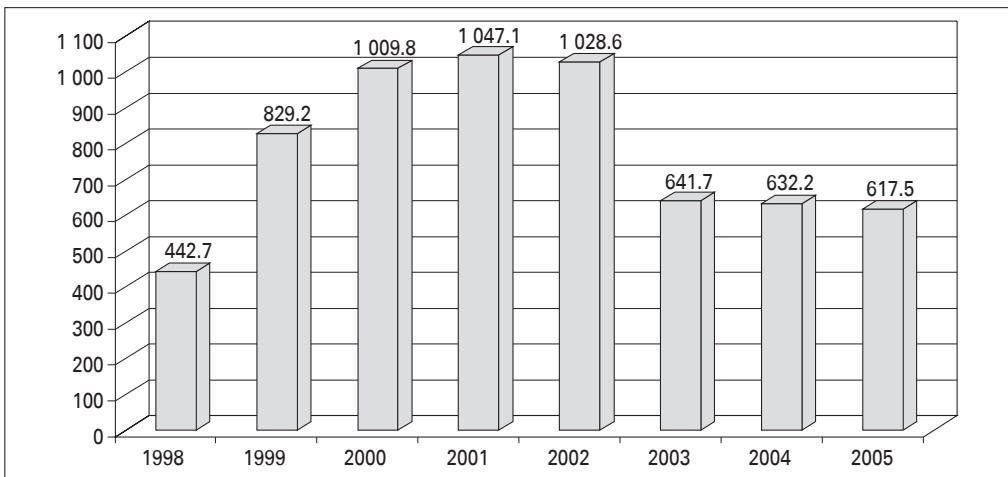
It is symptomatic, that due to the consistently high interest on credit drawn by cards (about 17–20% p.a.), almost 80% of their owners pay their debt off during the interest-free period. The increasing popularity of credit cards is also confirmed by the reduction of average credit card indebtedness. In the end of 2005, the average indebtedness amounted to a little over PLN 1000, while a year earlier it was higher by about PLN 400. Still, credit cards are used for payments of relatively high amounts. At the end of 2005, the total value of payments carried out by credit cards amounted to PLN 3 518 million<sup>13</sup>. Thus the value of payments by card constituted just 7% of the total value of all transactions by credit and debit cards in Poland. This signifies, that the Polish society is still reluctant to use credit cards.

<sup>13</sup> Data from NBP.

**Figure 8. The number of microchip cards during the years 1998–2005 (in thousands)**

Source: original research on the basis of data from the National Bank of Poland (NBP).

The significance of charge cards, the owners of which are obliged to pay off all transactions at a set settlement day, consistently falls. By the end of 2005, the number of charge cards issued amounted to 617,5 thousand (i.e. about 3% of all cards). In 2001, there were over 600 thousand charge cards in operation, at which point their constituted 4.2% of all cards. This means, that in the Polish card market charge cards are gradually substituted by credit cards, as the latter gain popularity.

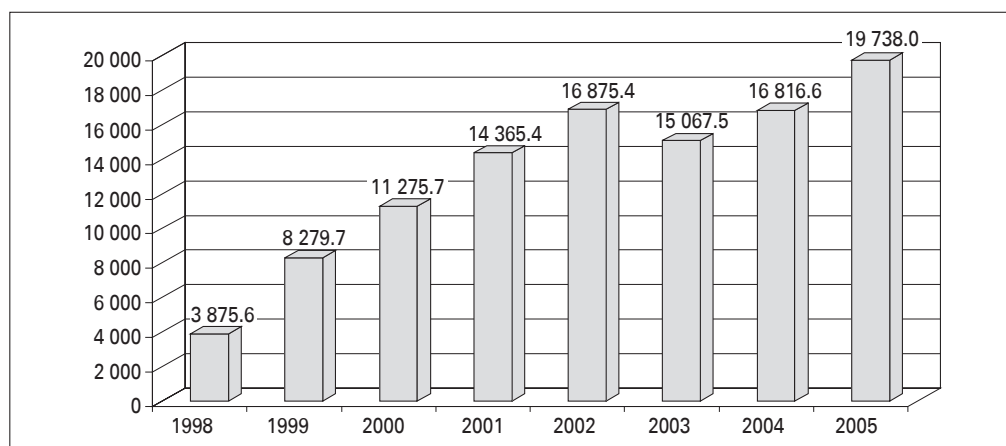
**Figure 9. The number of charge cards during the years 1998–2005 (in thousands)**

Source: original research on the basis of data from the National Bank of Poland (NBP).

As far as the technology of data storage is concerned, almost 97% of all cards are magnetic strip cards. At the end of 2005, their volume reached the level of 19 738 thousand pieces. The main, and practically the only reason for the popularity of magnetic strip cards is their very low cost of production, and still relatively low level of fraud, in comparison with the West European countries. The following can be listed as the disadvantages of magnetic strip cards:

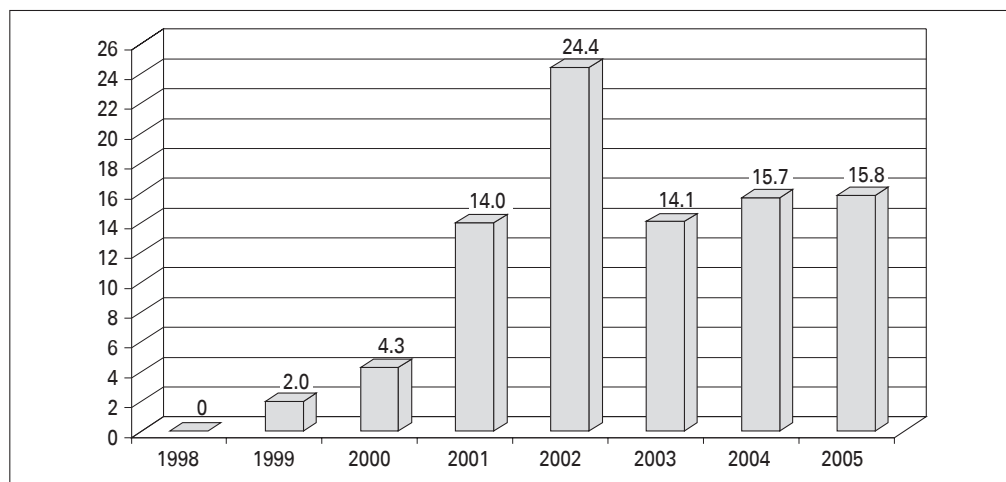
- very low level of security against card skimming,
- low durability of cards, i.e. their susceptibility to demagnetisation of the magnetic strip within 3 years,
- very low data storage capacity,
- lack of multi-functionality.

**Figure 10. The number of magnetic strip cards during the years 1998–2005 (in thousands)**



Source: original research on the basis of data from the National Bank of Poland (NBP).

Microchip cards are free of the disadvantages of magnetic strip cards, nevertheless their popularity in Poland is very low. Merely 16 thousand microchip cards were in use at the end of 2005 (0.1% of the total number). Issuing those cards is more costly, but they are far better secured, and a microchip can serve several different applications (not just payments, but loyalty programmes as well, and it can store personal data). Only one bank in Poland has so far decided to substitute all newly issued magnetic strip cards with microchip cards.

**Figure 11. The number of microchip cards during the years 1998–2005 (in thousands)**

Source: original research on the basis of data from the National Bank of Poland (NBP).

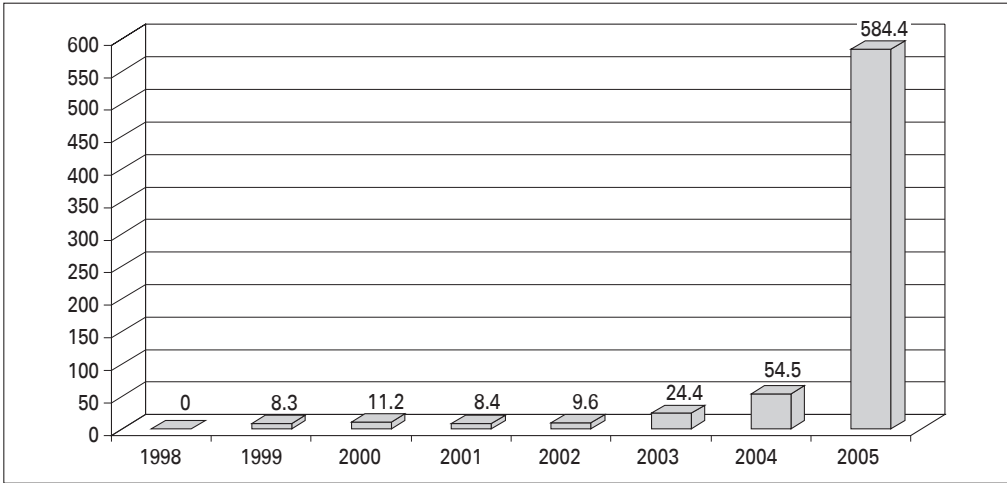
The fact, that a part of EFT/POS terminals in shops and service outlets are not suitable for servicing microchip cards influences the cards' low popularity. Therefore, so-called hybrid cards (i.e. equipped with both a microchip and a magnetic strip) are far more popular in Poland. This type of cards combines the advantages of microchip functionality, and the broad acceptance of the magnetic strip.

By the end of 2005, banks in Poland issued almost 600 thousand hybrid cards, i.e. almost forty times more, than microchip cards. In 2005 only, almost 530 thousand cards of this type were introduced in Poland. Such high increase in their volume indicates the banks' determination to gradually substitute magnetic strip cards with their microchip equivalent<sup>14</sup>.

The last of the analysed categories are virtual cards, the use of which is connected with Mail Order & Telephone Order transactions (MOTO), i.e. purchases on-line, by telephone or fax. Virtual cards are particularly popular in on-line banking, since they facilitate secure on-line payments. Virtual cards in Poland are still considered an innovation, and their significance in the card market is marginal. At the end of 2005, only 32,2 thousand of such cards existed in the turnover, i.e. merely 8 thousand more, than in 2004.

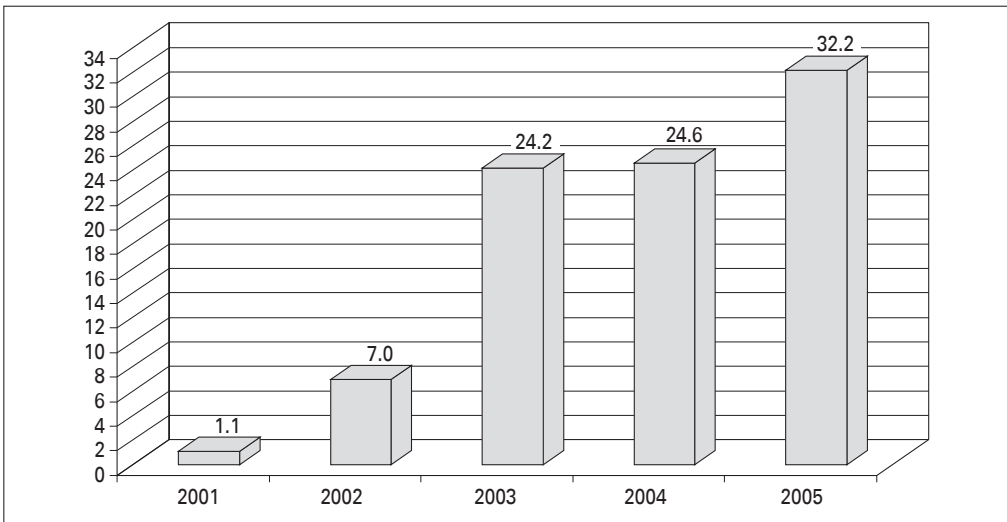
<sup>14</sup> Those actions are often forced by card systems, i.e. Visa and Master Card Europe, which on 1.1.1995 introduced the principle of liability shift, meaning, that responsibility for fraudulent transactions will be placed on the party participating in clearance of the transaction, which did not introduce microchip technologies of the EMV standard.

**Figure 12. The number of hybrid cards during the years 1998–2005 (in thousands)**



Source: original research on the basis of data from the National Bank of Poland (NBP).

**Figure 13. The number of virtual cards during the years 1998–2005 (in thousands)**



Source: original research on the basis of data from the National Bank of Poland (NBP).

## 5. Summary

The market of credit and debit cards in Poland is currently undergoing very dynamic growth, evident from both the increasing volume of cards, and the value of transactions performed with their use. Nevertheless, popularity of cards

as instruments of payment in the Polish society is still very low, and the cash turnover retains its dominating position.

The consistently high share of debit cards, which in Poland are used mostly to draw cash from cash machines, is symptomatic. Nevertheless, since 2004 the share of credit cards has been increasing rapidly. Those cards dominate the card market in Western Europe. In spite of low security and several shortcomings of magnetic strip cards, they constitute over 97% of all cards in Poland, while microchip and hybrid cards remain insignificant. No large changes are to be expected in this market over the upcoming few years, as far as data carriers are concerned. The domination of the magnetic strip during the next 2-4 years seems to remain unchallenged.

## **6. Bibliography**

1. The Act of 12.9.2002, on electronic instruments of payment; the Journal of Laws No. 169, pos. 1385 with subsequent amendments.
2. „Rzeczpospolita”, 15.10.2005.
3. „Rzeczpospolita”, 31.1.2006.
4. „Rzeczpospolita”, 15.5.2006.
5. Analysis by Visa Europe <http://www.visaeurope.com/>.
6. Statistical data from the European Central Bank, <http://www.ecb.int/home/html/index.en.html>
7. Statistical data from the National Bank of Poland, <http://www.nbp.pl/>.



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## **The Ricardo-Solow Production Function. A Combined Approach to the Limits of Economic Growth<sup>1</sup>**

### **1. Introduction**

Economists describe how human beings satisfy their needs with goods they produce, and finally the source of these goods is nature. Therefore limits that occur when humans exploit natural resources are, or should be, the main problem discussed by economists. There are two basic concepts concerning the limits to goods' production: conceived by David Ricardo and Robert Solow. Although they are different, they can be, on the other hand, combined into a uniform model of economic growth, which is the task of the submitted article.

### **2. Complementarity of the Ricardo and Solow Approaches to the Issue of Economic Growth**

An increase in the total output, or output per capita, is seen as the main objective of economic activity of a given society<sup>2</sup>. This way of reasoning was adopted by the adherents of the classical system of economic thought. They were also the first to apply the concept of macroeconomic production function as a tool in analysing economic phenomena<sup>3</sup>. And eventually they recognised the so-called limits to economic growth. Their followers – belonging to the neoclassical branch of economics – devote much less attention to the problem of economic growth and do not take its limits into account.

The main classical growth model was formulated by David Ricardo in 1817, whereas its neoclassical counterpart by Robert Solow some 140 years later<sup>4</sup>. If

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<sup>1</sup> This is a revised English version of the article submitted to „Kwartalnik Historii Myśli Ekonomicznej”, published by Warsaw School of Economics.

<sup>2</sup> E. Gonner, in an introductory essay to the one of main books on classical economics, wrote: “In Ricardo’s view, the whole economic effect of the country presented itself as embodied in the commodities produced” (D. Ricardo, *Principles of Political Economy and Taxation*, G. Bell & Sons, London 1924, p. xxix).

<sup>3</sup> W. Rostow, *Theorists of Economic Growth from David Hume to the Present. With a Perspective on the Next Century*, Oxford University Press, New York–Oxford 1990, part I.

<sup>4</sup> D. Ricardo, *op. cit.*, and R. Solow, A Contribution to the Theory of Economic Growth, “Quarterly Journal of Economics”, 1956, Vol. 70 (February).

one considers the technological progress and, consequently, the limits to economic growth, the Ricardo and Solow models seem to be different. But, on the other hand, one can use the difference between the two approaches to construct a combined Ricardo–Solow model of economic growth with a double limit to the output growth.

In order to link together the approaches by Ricardo and Solow, one needs a production function, according to which the volume of output  $Q$  depends entirely on the input of a single factor of production, i.e. the physical capital  $K$ :

$$Q = F(K).$$

Obviously, this is a very simplified version of production function, but it will prove to be a reasonably useful tool in describing the process of economic growth driven by technological progress embodied in the capital, which is so strikingly emphasised by Solow.

At the beginning, the Ricardian limit to economic growth will be presented, then the limit as conceived by Solow. Then they will be matched with each other, and the common area of economic growth will be drawn. Finally, three different cases of economic growth, as they have appeared in human economic history, will serve as a demonstration of how useful the combined Ricardo–Solow approach to the discussed issue could be to some extent.

### 3. The Ricardian Limit to Economic Growth without Technological Progress

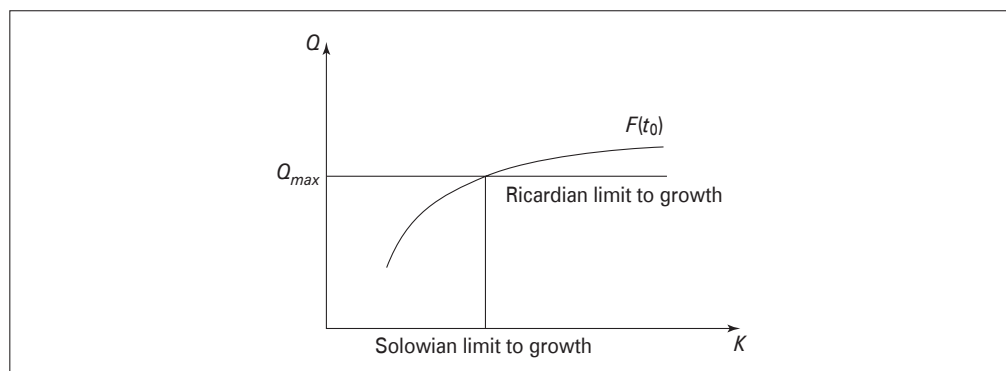
The Ricardian limit to economic growth is of a natural-territorial character<sup>5</sup>. It means that there exists such a concentration of human population and economic activity, and the extent to which natural resources are exploited is so elevated, that the subsequent increase in population and economic activity is no more possible. This approach can be called Ricardian, and part of it makes the famous Malthusian principle of population, for the first time formulated in 1798<sup>6</sup>.

Thus one can trace the Ricardian limit to economic growth  $Q_{max}$ , that cannot be exceeded at any time by the output produced – irrespective of the volume of engaged capital (Figure 1):

$$Q \leq Q_{max}.$$

<sup>5</sup> R. Bartkowiak, Limits to Economic Growth. Selected Problems of Neoclassical Economics and Development Economics, Oficyna Wydawnicza SGH, Warszawa 2005, pp. 71–77.

<sup>6</sup> T. Malthus, An Essay on the Principle of Population; or a View of Its Past and Present Effects on Human Happiness; with an Inquiry into Our Prospects Respecting the Future Removal or Mitigation of the Evils which It Occasions, Cambridge University Press, Cambridge 1992, ch. i–ii.

**Figure 1. The Ricardian limit to economic growth without technological progress**

Source: own presentation.

It is not possible for the technological progress to permanently overcome the natural-territorial limit to output increase. Ricardo was convinced that the technological progress could be instrumental in removing this limit only provisionally<sup>7</sup>: “This tendency, this gravitation as it were of profits, is happily checked at repeated intervals by the improvements in machinery, connected with the production of necessaries”.

The occurrence of the limit to economic growth is accompanied by the fall in profit rate, or rate of return on investment, and this fact explains why the propensity to invest falls and, eventually, so does the scope of production. In Ricardo’s opinion, this sequence of events cannot be reversed<sup>8</sup>: “The natural tendency of profits then is to fall; for, in the progress of society and wealth, the additional quantity of food required is obtained by the sacrifice of more and more labour. [...] I have already said that long before this state of [food] prices was become permanent, there would be no motive for accumulation; for no one accumulates but with a view to make his accumulation productive, and it is only when so employed that it operates on profits”.

Thus the economy reaches its stationary state. Jerzy Osiatyński remarks on this<sup>9</sup>: “Since the profit rate is equal to zero, the accumulation level is so low that an economy approaches the state of static equilibrium. Rents are spent on luxury goods and conspicuous consumption, and the only class that could guarantee an economic growth, i.e. the class of capitalists, will be deprived of any incentives to invest”.

<sup>7</sup> D. Ricardo, *op. cit.*, p. 98.

<sup>8</sup> D. Ricardo, *op. cit.*, pp. 99–100.

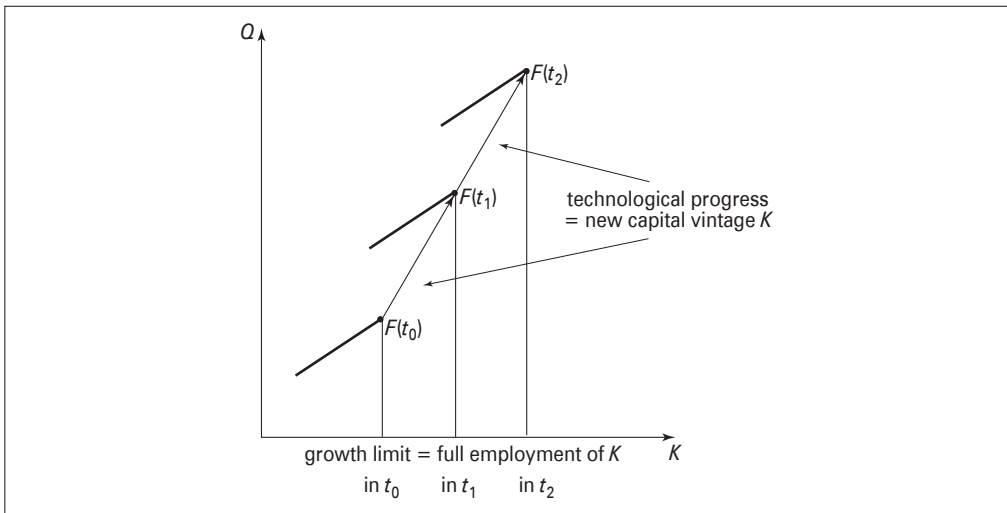
<sup>9</sup> J. Osiatyński, *Capital, Distribution, and Value. Crisis of the Neomarginalist Economics*, PWN, Warszawa 1978, p. 231.

#### 4. The Solow Production Function with Technological Progress

Contrary to Ricardo's view, Solow maintains that there does not exist the Ricardian limit to economic growth caused by scarcity of natural factors of production, and the only limitation can be lack of capital with a given level of productivity<sup>10</sup>: "This amounts to assuming that there is no scarce nonaugmentable resource like land. Constant returns to scale seems the natural assumption to make in the theory of growth. The scarce-land case would lead to decreasing returns to scale in capital and labor, and the model would become more Ricardian".

Nevertheless, the upper limit to capital as well as to output increase does persist in the specific sense that the capital is fully employed in production processes and thus the output produced is always at its maximal, or potential, level. This situation can be described as the Solowian limit to economic growth (Figure 2).

**Figure 2. The moving Solow function with technological progress**



Source: own presentation.

Due to the advancement in technology, the stock of capital whose productivity is steadily improving rises, hence the output grows at higher and higher rate<sup>11</sup>:

$$K(t_0) < K(t_1) < K(t_2) \Rightarrow Q(t_0) < Q(t_1) < Q(t_2).$$

<sup>10</sup> R. Solow, A Contribution..., *op. cit.*, p. 67.

<sup>11</sup> R. Solow, Capital Theory and the Rate of Return, North-Holland Publ. Comp., Amsterdam 1963.

If one assumes that the increase in the stock of knowledge, and therefore in the technological progress as well, is not continuous, the Solow production function curve for a definite period of time is contained to a single point, and with the time lapse (in Figure 2, there are three intervals marked) it takes the form of separated points (one should recall the assumption about the full employment of capital at any time).

Finally, it is worth concluding that some decades later Solow has slightly changed his point of view concerning the growth process<sup>12</sup>: “Growth theory was invented to provide a systematic way to talk about and to compare equilibrium paths for the economy. In that task, it succeeded reasonably well. In doing so, however, it failed to come to grip adequately with an equally important and interesting problem: the right way to deal with deviations from equilibrium growth”. Limits to economic growth seem to be the most important of all the deviations ever seen in human economic history.

## 5. Removal of the Ricardian Limit to Economic Growth as a Result of Technological Progress. The Solowian Area of Economic Growth

If an output grows along the production function curve, then the technological progress will not occur, and the Solowian growth theory will be similar to that proposed by Ricardo. But this is what Solow decidedly rejects. The assumption on the existence of technological progress helps distinguish the Solow model from its Ricardian counterpart.

As a result of technological progress, the limit to output growth is steadily removed, therefore the Ricardian limit to growth does not occur (Figure 3).

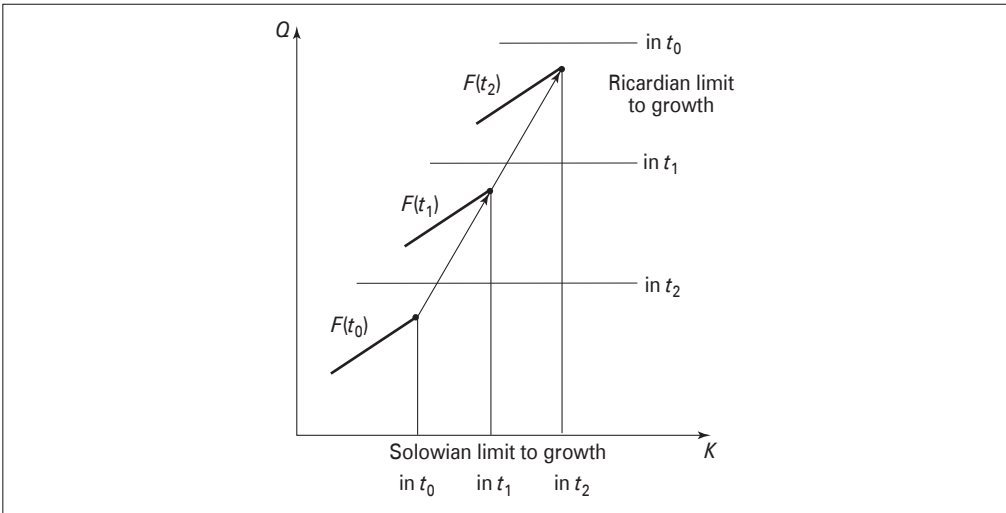
$$K(t_0) < K(t_1) < K(t_2) \Rightarrow Q_{max}(t_0) < Q_{max}(t_1) < Q_{max}(t_2).$$

An economic system does not attain any stationary state or the possibility of its occurrence is being removed too<sup>13</sup>. Thus in the process of economic growth, there are two different limits to growth that produce a rectangular area of growth (Figure 4).

<sup>12</sup> R. Solow, *Growth Theory. An Exposition*, Oxford University Press, New York–Oxford 2000, p. xvii.

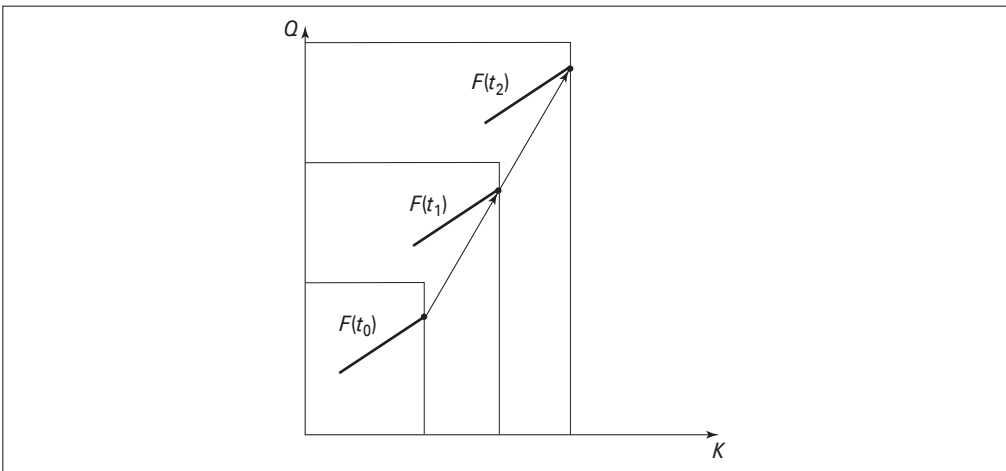
<sup>13</sup> R. Bartkowiak, *History of Economic Thought*, PWE, Warszawa 2003 (in Polish), pp. 58–62, and W. Rostow, *op. cit.*, pp. 86–87.

**Figure 3. Removal of the Ricardian limit to growth as result of technological progress**



Source: own presentation.

**Figure 4. The Solowian area of economic growth**



Source: own presentation.

The Ricardian limit to growth is rigid because the output produced cannot exceed a given maximal level. On the contrary, the Solowian limit is of a conditional character. An increase in the capital stock induces an increase in output, which depends entirely on the volume of capital. A point at which the economy actually

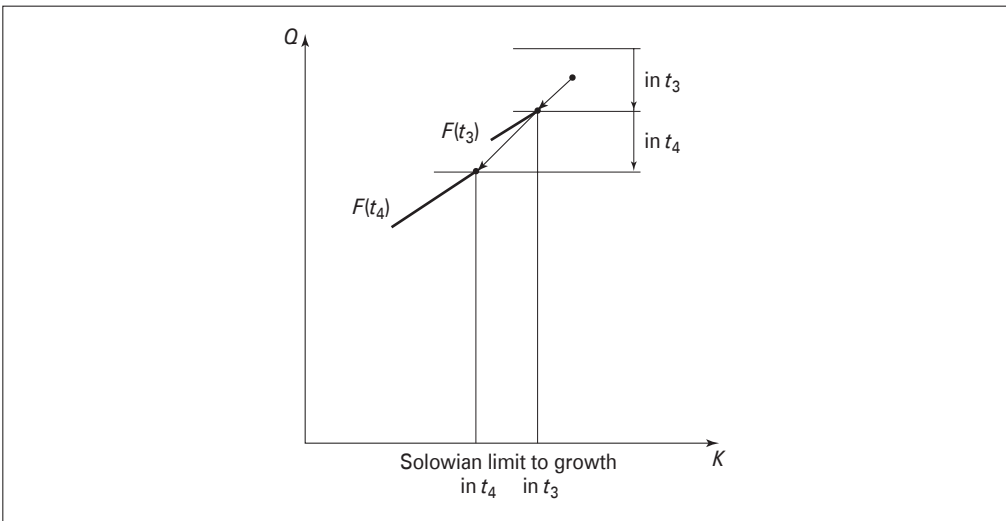
is corresponds to the existing capital stock, so it lies on the “Solow (vertical) arm” of the growth area.

### 6. Return of the Ricardian Limit to Economic Growth. The Ricardian Area of Economic Growth

One cannot exclude a possibility that at an unspecified time in the future the Ricardian limit to growth will return. In such a case, the capital stock would start to decrease due to the scarcity of natural resources of which the capital is derived. It would be so because capital goods make part of output, and the limit would apply primarily to the output. Eventually the output would diminish, but at every stage of this process it would be at its maximal and as well steadily declining level (Figure 5).

$$K(t_2) > K(t_3) > K(t_4) \Rightarrow [Q(t_2) = Q_{max}(t_2)] > [Q(t_3) = Q_{max}(t_3)] > [Q(t_4) = Q_{max}(t_4)].$$

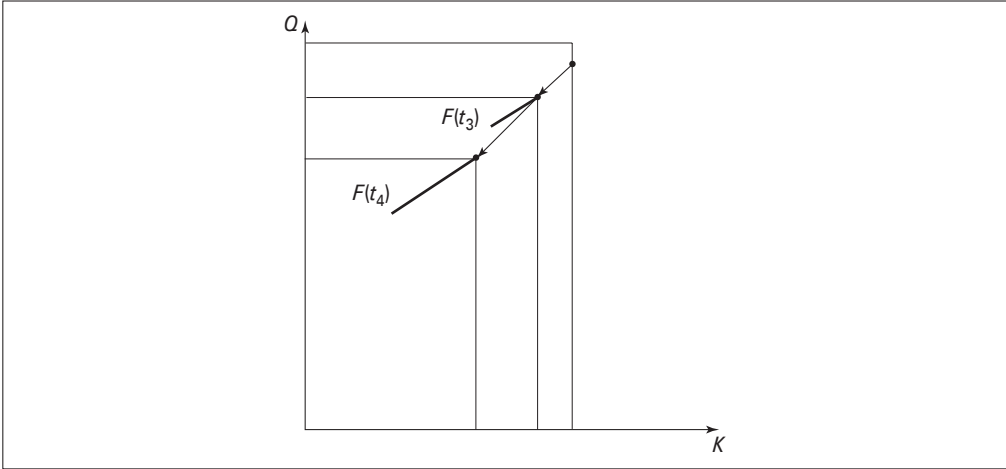
**Figure 5. Return of the Ricardian limit to economic growth**



Source: own presentation.

The economy would attain a point at the confluence of the “Ricardian (horizontal) arm” of the growth area, delimiting the maximum volume of output at whatever time, with the “Solowian arm”, but – taking into account the views expressed by both the authors – in fact it would be on the “Ricardian arm” (Figure 6).

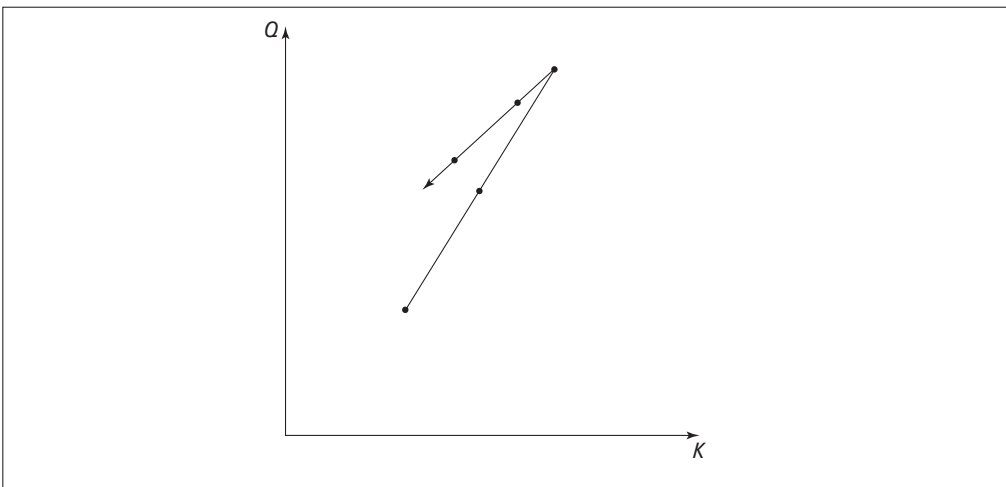
**Figure 6. The Ricardian area of economic growth**



Source: own presentation.

In a multi-temporal approach, the mentioned point would begin a movement in a backward direction alongside with the decrease in output produced (Figure 7). The scope of output decrease, marked by this movement, would depend on the way and time humans start to change their attitude towards nature and nature's resources that are not unlimited.

**Figure 7. The change of economic performance in the case of limit to economic growth**



Source: own presentation.



A voluntary limitation of the number of human beings inhabiting the world and of the level at which they use the natural resources can in longer term induce a return of output increase, at least in per capita terms<sup>14</sup>. Of course, scarcity of territory to inhabit and lack of natural resources to use in economic activities can always be a real threat to human existence. Thus two kinds of checks described by Malthus will retain their importance for future human generations: the preventive checks in the first case and the positive checks in the second.

## 7. Cases of Economic Growth

Finally, one can distinguish three cases of economic growth that correspond to the three variants of the Ricardo–Solow production function:

- the Ricardian case of limited growth,
- the Solowian case of unlimited growth,
- collapse of the Solowian vision of permanent growth and return of the Ricardian limit to growth.

If the technological progress does not exist, then it cannot remove the Ricardian limit to growth and the Ricardian case of limited growth appears. It applies to economies of less developed countries in past centuries as well as at present, above all to those in Sub-Saharan Africa. As Walt Rostow concludes, Malthus and Ricardo developed a pessimistic kind of economics<sup>15</sup>: “The popular image of economics as the dismal science owes a good deal to what many have believed were the practical conclusions of Malthus and Ricardo on population and diminishing returns”.

If the technological progress is so advanced as to help permanently in historical terms remove the Ricardian limit to growth, the Solow case becomes a reality. The more developed countries have been going on along this growth path. With the exception of some countries in South Asia and pre-Colombian Central America, they have been located in the temperate zones.

Theodore Schultz was convinced that – thanks to the human capital or human knowledge – all natural limits could be definitively removed even in the tropical zones, hence in those regions a permanent increase in wealth, which is nowadays the case in temperate climate zones, could be achieved as well<sup>16</sup>.

But finally, if the technological progress causes the overuse of natural resources in human economic activities and leads inevitably to the growth limits,

<sup>14</sup> R. Bartkowiak, *Limits...*, *op. cit.*, pp. 145–152.

<sup>15</sup> W. Rostow, *op. cit.*, p. 70.

<sup>16</sup> T. Schultz, In *Menschen investieren. Die Ökonomik der Bevölkerungsqualität*, J. C. B. Mohr (Paul Siebeck), Tübingen 1986, ch. 1–2.

the unlimited growth in Solowian version collapses, and the Ricardian limit returns. Presently it is visible only on a regional scale, for example in Sub-Saharan Africa again, but one cannot exclude that it will overwhelm the entire world.

This evidently resembles the Darwinian approach in analysing economic issues. As early as in 1859 Charles Darwin in his breakthrough book wrote<sup>17</sup>: “And we have seen [...] that it is the most closely-allied forms – varieties of the same species, and species of the same genus or of related genera – which, from having nearly the same structure, constitution and habits, generally come into the severest competition with each other; consequently, each new variety of species during the progress of its formation will generally press hardest on its nearest kindred and tend to exterminate them”. In this case, the Malthusian positive checks appear<sup>18</sup>: “It is the doctrine of Malthus applied with magnifold force to the whole animal and vegetable kingdoms; for in this case, there can be no artificial increase of food and no prudential restraint from marriage. Although some species may be now increasing more or less rapidly in numbers, all cannot do so for the world would not hold them”.

## 8. Summary

It appears that the combined Ricardo–Solow model of economic growth is a good approximation of real economic processes in different times and places where human beings have lived. For the most part of their history, humans have been able to remove natural limits to output increase, thus the Solow case of economic growth is valid. But every disturbance in the growth process caused by the scarcity of natural resources restores the validity of the Ricardian case.

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# Factors of Development and Modelling of Future Mobility in Passenger Transport

## 1. Introduction

Everybody spends a certain portion of the daytime travelling, and devotes a predictable part of his or her income to travelling. We have time and money budgets, which are evidently stable as far as the place and time are concerned, and they can be thought of as factors for prediction of future mobility and volume of modes of transport. Fixed travel money budgets require mobility increase nearly proportional to the real income. Long distance travels with the same fixed money budget and travel time budget require from passengers transiting to faster modes of transport. Future selection of modes of transport is constrained by path dependence, because infrastructure changes very slowly. Demand for low-speed public transport is partially determined by urban population density and land-use patterns.

By prediction of the volume of means of traffic (car, bus, railway and high-speed transport, especially air and railway), the number of travels in a distant future can be estimated, along with modes of transport in a particular state or region – for example, within the EU. Answers to those questions are decisive for long-term planning of transport infrastructure and for assessment of the impact of mobility (e.g. on the environment). These matters are in the centre of interest as far as estimation of future market expansion for technical equipment for transport services is concerned. We try to create a simple, but radical model, which will help answering those questions.

Replying to them requires constructing large-scale long-term models of the transport system. But this development of mobility contrasts very sharply with the capacity of the existing modelling techniques. Regional and urban transport models, which are the most intensely developed tools of transport planning, must be orientated to prediction of local transport demand, flows and costs. These instruments optimise direct traffic flows by minimization of cost, or by maximization of consumer (passenger) utility. They can be used for calculating transport system details, such as the number of cars using roads during certain times, and average speeds of location of newly built transport infrastructure. It is

important, that these models are based on crucial mutually related variables, such as car ownership, loading and vehicles utilization, travel banded charges, relative prices of different modes of transport, urban travelling speeds and passengers' income. Considering insufficient knowledge of relations between those variables, the multi-variation methods quickly degrade, if used for a long-term perspective. Original requirements of transport planning models make these methods less adequate tools for development of long-term scenarios.

Generally, mobility development models are projected in order to make formularisation possible, e.g. the aggregate (regional or national) and long-term scenario. In essence, we work on transport planning tradition, and the model explains, how passengers can select particular modes of transport while satisfying their demand for mobility (term "mobility" used in a model represents traffic volume measured by personal kilometres). But this model requires aggregated data. The aim of the model is not the calculation of detailed estimations of travel distances and vehicle speeds, but rather prediction of total mobility, and of the suggested share of each mode of transport (the so called modal split) within the state and in aggregated regions in a distant future.

When we construct a model, first we examine the two budget constraints of a passenger – travel time budget and travel money budget – that are core elements of modelling methods. Next, we estimate future demand for services offered within the state, i.e. the total mobility. Then we estimate the share of suggested mobility for each main mode of motorized transport (in CR conditions we speak about bus, railway and car passenger transport). These estimations are conducted overall for the whole country or a region, and scenario sensitivities are calculated on the basis of changes of the most important or uncertain presumptions.

## **2. Travel Budget**

One example of a mobility development model is the Yacov Zahavi's opinion tool for aggregated planning of transport policy. Zahavi (1981) discovered that passenger behaviour is considerably determined by two basic constraints – the average fixed time and the money budgets devoted to travelling. In the next part of this paper, we discuss the two Zahavi's constraints.

### **2.1. Travel Time Budget**

Travel time budget (TTB) represents the budget of average fixed time volume spent by people on daily travelling. Results of travel time consumption surveys conducted in various cities and countries in the world suggest the TTB value

of approximately 1.1 hour per capita per day. In practice, TTB stability depends on income levels, and geographic and cultural factors. For example, the average travel time of commuters within particular districts in the Pardubice region was determined on the basis of the results of the 2001 Census (ČSÚ, Pardubice 2005). It amounts to, on average, 1.3 hour per capita per day.

Another discovery was, that while on average TTB is constant, behaviour of small populations and individuals can significantly divert from it. For example, travel time budgets are higher in overpopulated cities and inhabitants of large cities spend 30% more travel time than people in rural areas. Value and variation of TTB in cities are higher than the national or regional average. Travel times are generally highest in the largest cities, and TTB changes according to socio-demographic group as well. Surveys in Germany detected variability of travel habits according to profession. An average person travelled 1.09 hour per day, but university students and other employees spent much more time moving from place to place (1.27 and 1.32 hour per day). German pensioners – on the contrary: they were less mobile (0.94 hour per day). Further studies showed, that TTB per traveller is typically the higher, the lower the income (a passenger is defined in travel surveys as a person, who made at least one motorized travel during the examined day). Passengers with lower income are more constrained in their choices of housing and modes of transport, and they find it much harder to optimise travel times by their choice of housing area. The share of passengers in the total population is lower in societies with lower income; therefore, average TTB per capita is a more adequate measurement in the case of high-income societies.

Concern for home and family safety restricts exposure to travel risks too. Travelling is naturally restricted by other time-consuming activities, such as sleep, work and relaxation. Even if other types of demand shift in time, it is evident that TTB remains constant. In comparison with OECD countries, Japanese workers spend 25% more time at work, nevertheless their travel time budgets are nearly the same.

Travel time spent in particular modes of transport increases with income, and mobility increases according to passenger transition from slow to faster modes of transport.

For example in compliance with Shafer, Victor, it is possible to represent the relation between mobility and TTB by the equation (1):

$$TTB = a + \frac{b}{(TV - c)^d} \quad (1a)$$

$$a = - \frac{b}{(-c)^d} \quad (1b)$$

where:  $b$  is travel time budget per capita per day;  $TV$  is traffic volume in personal kilometres per capita – the data available through surveys in regions (the process estimation of their value in the region is dependent on the travel speeds used); parameters  $d$ ,  $a$ ,  $c$  can be determined by regression analysis.

## 2.2. Travel Money Budget

The second constraint is represented by the fixed part of income, devoted by particular passengers to travelling – the so-called travel money budget (TMB). We assume a stable budget on the aggregated level, but in practice, we can consider certain understandable variations, according to which TMB grows with motorization. It was discovered, that households without a personal car devote only 3–5% of their income to travelling.

TMB increase is explained as an effect of growing motorization in many studies, and that is why TMB grows along with car ownership, until stabilising at the level of 10–15%, when motorization rates exceed 200 cars per 1000 persons. TMB varies in particular countries and regions, depending on social and economic factors, such as the cost of travel services.

Another example illustrating and testing travel money budget stability are the petroleum shocks of the 1970's, which increased the cost of road transport overnight. In the USA, the country of the greatest share of total mobility carried out by car, it was important to monitor the seven indicators related to car transport:

- travel money budget (calculated as the share of consumer expenditures on passenger transport in the gross national product),
- retail selling price of petrol,
- annual travel distance per car,
- average fuel consumption of a new car,
- average price of a new car,
- traffic volume (mobility) per capita,
- gross domestic product per capita.

(Source: Davis (1994), Federal Highway Administration (1970–1991, 1992))

Due to the reaction to the increase of the selling price of fuel, passengers reduced other transport costs, e.g. they demanded less expensive and more fuel-efficient vehicles. Despite the rapid increase of the selling price of fuel (in the years 1970 and 1976), several economic recessions and fluctuations of the prices of new vehicles, travel money budgets remained nearly fixed in the years 1970–1990, and oscillated between 7.9% and 9% of income (GDP per capita).

### 3. Total Mobility Model and Scenario

When modelling and creating total mobility scenarios, we start with monitoring the total mobility in the past, and subsequently we use the historical data to construct a future mobility scenario.

Prognosticated TMB enables to assume a fixed relation between the income and the total demand for mobility. If income grows, travel expenditures must increase as well, according to the proportion defined by TMB. And vice-versa: higher transport expenditures facilitate higher mobility. The relation between income and mobility can be quantified. Income data are represented by the statistics of gross domestic product (GDP) development evaluated in fixed prices for a particular year (e.g. 1995). Mobility statistics are available from statistical and transport yearbooks, and on their basis, we can compile a time series. Complex composition of historical data (e.g. from 1990 to 2004) allows to test the statement, that TMB defines predictable quantified relation between income growth and total mobility<sup>1</sup>.

Investigation of the relation between income (independent variable) and mobility (dependent variable) within a state or a region shows, whether the mobility per capita and the income grow with identical slope, equalling one.

Total mobility projection is the function of stable TMB, which consists of two parts. The first part represents the amount allotted to mobility ( $TMB_M$ ). The second part represents the share of money devoted to service quality – comfort, accomplishment, safety and engine power ( $TMB_S$ ). Time series of studies in developed countries show, that the quoted proportions remain constant in time. This reflects the increase of the average retail purchase price of a new car (as a representation of quality of service) along with income growth per capita. E.g. in the USA, in the years 1970 and 1990, both new car prices and income increased by 40%. In Germany, new car prices doubled, while income grew by 52%. Thus the German car buyers devoted an increased share of income to service quality and to taxes. Data, in order to illustrate TMB stability, represent the sum of those two components, although we use only  $TMB_M$  for determination of the

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<sup>1</sup> TMB growth principally from 3–5% up to 10–15% with increased motorization should indicate faster mobility growth, because a higher part of income is devoted to travelling. The practice proves, that growing travel money budgets are completely compensated by travel unit costs increasing, if passengers shift from public transport (bus, railway) to individual car transport. Then even with low mobility, there is a direct relation between increasing income and growing mobility. No data exist for exact verification of this relation. We must conduct a partial test for demonstration of close correlation between income growth and total mobility. This test would confirm that the decisive fact for this prognosis is aggregate relation. Data also allow to make statistical regressions which are the tools of this model.



relation between income and mobility. This relation is described by the following simple equations.

Traffic volume ( $TV$ ) per capita depends on passengers' expenditures (i) on transport (ii) and on inverse unit transport cost  $\kappa$  (personal km/Kc). The first factor can be formulated as income product ( $GDP$  per cap.) and travel money budget ( $TMB_M$ ). Factor  $\kappa$  depends on several economic and technological parameters of the modes of transport used, such as capital costs and fuel efficiency. In the general case:

$$\frac{TV}{cap} = \left( \frac{GDP}{cap} \cdot TMB_M \right) \cdot \kappa. \quad (2)$$

If historical data for each variable on the right of the equation are available, equation (2) can be used for estimation of the future volume of mobility. Relation between mobility and income per capita can be approximated by the equation:

$$\log \frac{TV}{cap} = e \cdot \log \frac{GDP}{cap} + f \quad (3)$$

where  $e$  is the slope and  $f$  is the intersection point on the y axis. It also follows from the equation (3):

$$\frac{TV}{cap} = \left( \frac{GDP}{cap} \right)^e \cdot f^*. \quad (4)$$

A comparison with the equation (2) indicates, that factor  $f^*$  corresponds to  $TMB_M$  and the inverse unit transport costs. It is necessary to determine the estimation parameters (dispersion and standard error).

Calculation of total volumes of future mobility requires population estimations as well. The Prognosis of the World Bank of 1992 estimates the world population growth up to 10,1 bilion in 2050. The most intense growth in this prognosis is in the developing countries, where population multiplies more than doubly in the course of the period, and constitutes 85% of the global population.

#### 4. The Model and Scenario of Modes of Transport

It is necessary to work on shares of particular modes of transport (e.g. bus, rail, individual cars and air, including high-speed trains<sup>2</sup>) – operating at various

<sup>2</sup> High-speed trains (e.g. Shinkansen) form a part of aircrafts category. These trains already account for 5% of total mobility and 30% of all high-speed modes of transport mobility in Japan. Shinkansen operates at 220 kmph which forms 37% of average speed assumed for HST. It is considered that the next train generation (also maglev trains) will operate on speeds close to air speeds – 600 kmph.

speeds by creation of a model and a scenario. There are four constraints for unambiguous determination of four variables. The main constraint is the fixed travel time budget (TTB), which requires people to shift to faster modes of transport according to their total mobility increase. Other presented constraints are the path dependence, the land-use patterns and the balance equation.

#### 4.1. Travel Distance and Railway

Transport infrastructure, similarly to other massive technologies and infrastructure, does not change fast. Older mobility choices and contemporary mobility volume influence the possible future development. They limit the degree to which one mode of transport can substitute another. Financially demanding and long-term infrastructure blocks initial choices, and it can take decades, before a particular type of infrastructure can be substituted. The future of some modes of transport can be predicted on the basis of contemporary developmental models. This concerns primarily conventional railways, which decline systematically in all regions. Therefore, we can prognosticate future share of railway transport by hyperbolic regression function of last (degressive) trajectory that reaches zero share of railway at the traffic volume of  $y$  km per capita (e.g. 100 000 km per capita).

$$S_R = i \left( \frac{1}{(TV - j)^k} - \frac{1}{(y - j)^k} \right). \quad (6)$$

Parametres  $i$ ,  $j$  and  $k$  are determined by regression of minimum squares.

#### 4.2. Urban Land-use Patterns and Low-speed Public Transport

Even though we can expect the share of all low-speed modes of transport to be declining to almost zero in far-distant future (“the target point”), there are several possible scenarios for their transition from the present to that point in time. For example, in the countries of the former “European fifteen”, the share of low-speed modes of transport mobility (trains and buses) was significantly higher than in North America, but lower than in Asia with the same traffic volumes per capita. These differences in shares of low-speed public transport in those areas result from the transport infrastructure, constructed according to important models of urbanization, density of population and land-use patterns. North American cities are the least densely populated (14 persons/ha) and people utilise the least of low-speed public transport (8% of total mobility falling on the traffic volume of 10 000 km per capita). Density of settlement in European cities is fourfold higher than in North America, therefore the share of low-speed public transport is higher (19%) as well. Asian cities have typically higher settlement

density, with average density three times higher than in Western Europe, and consequently a 30% share of low-speed public transport (Newman and Kenworthy – 1989).

These three experiences set constraints for scenarios of low-speed public transport growth in regions with lower incomes and identical urban population and land-use characteristics. Ideally, land-use statistics could be used to compare characteristics of particular regions, and it could gradually limit the scope of possible scenarios of the proportion of low-speed modes of transport in the future. Unfortunately, these statistics are not available, and a prognosis does not exist. The curve for trajectory of low-speed public transport in regions with comparable land-use patterns of urban areas can be generally represented by:

$$S_{LS} = l \left( \frac{1}{TV - m} - \frac{1}{y - m} \right). \quad (7)$$

Parameters  $l$ ,  $a$ ,  $m$  are determined by regression of minimum squares.

With regard to the fact that railway shares were determined by the equation, bus travel share works on the relation:

$$S_B = S_{LS} - S_R \quad (8)$$

### 4.3. Travel Time Budget

The fixed travel time budget requires the average travel speed to increase proportionally to the prognosticated growth of total mobility per capita, since a larger travel distance must be covered within the same period of time. Because carriers operate only within a certain speed range, increasing average speed requires people to shift to faster modes of transport.

In general, the sum of daily motorized travel time per capita ( $TT$ ) within all modes of transport ( $i$ ) that operate at an average speed ( $V_i$ ) by traffic volume ( $TV_i$ ) must equal the travel time budget for motorized modes of transport ( $TTB_{mot}$ ).

$$\sum_i TT_i = \sum_i \frac{TV_i}{V_i} = TTB_{mot}. \quad (9)$$

Using the constraint  $TTB$  from equation (9) requires estimation of the average speed of each transport mode. It is possible to assume, that the average speeds of buses, trains and aircrafts are identical in particular regions. On the other hand, average car speed varies according to region.  $TTB_{mot}$  can be derived from the equations (1a) – (1b).

#### 4.4. Balance Equation – the Total Volume of Traffic

The fourth constraint lies in the fact, that traffic volume of each motorized transport mode ( $i$ ) must be summarised according to the total projected traffic volume for each region:

$$TV = \sum_i TV_i. \quad (10)$$

The equation for shares of high-speed modes of transport in the future can be derived from the equations (9) and (10).

$$S_{HST2050} = \frac{1 - S_B(1 - V_C/V_B) - S_R(1 - V_C/V_R) - V_C \cdot TTB_{mot} \cdot 365/TV}{(1 - V_C/V_{HST})}. \quad (11)$$

It is particularly difficult to estimate the future average car speed, because there is no relation that could describe how speed relates to income and mobility. That is why we cannot create a continuous prognosis for the entire period of time (e.g. 2005–2050) using the equation (1), so we use the equation (11) with previously estimated speeds for calculation of the share of high-speed transport in the target year. Then we can fluently forecast the share by asymmetric logistic (Gompertz) regression equation, using historical data concerning this mode of transport:

$$S_{HST} = s \cdot \exp(e^{-t(TV-u)}) + v. \quad (12a)$$

Parameters  $s$  and  $v$  will be determined for construction of the trajectory through the projected value (e.g. the year 2050) and the target point from the relations:

$$s = \frac{S_{HST2050} - 1}{\exp(e^{-t(HST_{2050}-u)}) - \exp(e^{-t(y-u)})} \quad (12b)$$

$$v = 1 - m \cdot \exp(e^{-t(y-u)}). \quad (12c)$$

Parameters  $t$  and  $u$  are estimated by the least-square regression<sup>3</sup>.

Finally, we can derive car transport share  $S_C$  according to the relation:

$$S_C = 1 - S_{LS} - S_{HST}. \quad (13)$$

<sup>3</sup> Results of this regression enable us to calculate average car speeds. It could be needed for fluent projection of high-speed transport share. This use brings average car speed, which rises by 0.8% per year and it is in accord with historical data in the USA (1968–1988). After 2015, the calculated average car speeds decrease back to their 1990 values in 2050, which is a consequence of external presumptions of vehicle speeds, but it is in accord with the expectation, that majority of car travels will be short-distant and in urban areas. Longer-distance travels will be substituted by higher-speed modes of transport.

#### 4.5. Market Niches of High-speed Transport

Principally, we can derive all regional forecasts for high-speed transport shares (*HST*) from the equation (11). Apart from the last term in the numerator, all terms in this equation are determined by external assumptions of speed, or calculations. The value of the term depends on the  $TTB_{mot}$  value, which is particularly sensitive in the low-income regions (with a low volume of traffic). For example,  $TTB_{mot}$  decreasing by 10% could cause only a 6% increase in *HST* share, and vice-versa: in another region, the same change would cause a 50% increase of the share of *HST*. Furthermore, the method is not suitable for the regions with low volume of traffic, since the data concerning speed of modes of transport and  $TTB_{mot}$  in volume, practically do not exist. The marginal value of the volume of traffic at which a unit change of  $TTB_{mot}$  would lead to the same unit change of  $S_{HST,2050}$ , can be calculated as follows: we set the first derivative of the equation (11) -1 (e.g.  $dS_{HST,2050}/dT B_{mot}$ ). The calculated marginal value will vary according to the average car speed in a particular region.

In regions where the equation (11) cannot be used, in order to determine the share of *HST*, models of historical development of *HST* market niches in the industry are used. Commercial air transport was developed in North America, and that is why the growth rate is comparably slow in this region, but it has a long-term character. In regions where high-speed technologies have been introduced, innovation is less costly and can be introduced more easily. This fact enables faster growth in the market niche. Other factors, which influence the demand, include travel length and policies regulating the market share (e.g. subsidies). For example, the *HST* introduction rate in Western Europe (represented by *HST* share as a total traffic volume function) was the same as in North America. In Asia, *HST* share grew markedly because dense settlement impedes the use of long-distance road transport, and subsidies to Shinkansen encouraged travellers. Initial growth rates in market niches can be used for *HST* share calculation e.g. for the year 2050, which corresponds to a certain region, and also with the urban land constraint. Generally, the equation can assume the following form:

$$S_{HST,2050} = SHST_{HST,2005} \cdot w^{(TV_{2050} - TV_{2005})}. \quad (14)$$

In order to calculate sensitivity of *HST* share results (for example in 2050), we change the factors, which influence the equation (11), i.e. transport speeds and  $TTB_{mot}$ .

## 5. Summary

Future mobility development is determined by specific values of each of the modes of transport in a particular region or state. Within global mobility, the share of air transport will increase in the future, but the shares of other modes of transport will decrease. In compliance with Schafer, Victor, it is estimated that total mobility will grow fourfold in 2050, compared to 1990. For example, car mobility will grow by 260% and *HST* mobility 28 times. The estimated strong growth in air transport can appear unrealistic because air corridors are already dense and in some regions congested. However, we can expect that during the future five decades, an array of technological possibilities will be developed and they will be generally easily used. Airplanes with capacity to carry 1000 persons can be operated before 2020 (e.g. Covert et al., 1992). The scenario for air transport includes all *HST* modes, operated at an average speed of 600 kmph, and can include ground *HST* systems, such as “wheel on track” and maglev trains. Nowadays such trains serve a minority (4%) of the global *HST* mobility, but a range of plans for a wider construction of networks does exist.

As far as regional forecasts are concerned, it is estimated, that the share of traffic volume by conventional railways and *HST* have identical rate of development in all the world’s regions. However, this uniform trend is not reflected in any scenarios for cars and buses, although transparent trends are evident for these modes of transport in a majority of regions.

In compliance with the future development of mobility, slower modes of transport will be substituted by faster ones. It is estimated, that low-speed transport will prevail on levels of mobility under 5000–7000 pkm per capita. Demand for travelling will increase in the regions with positive economic growth, due to the fact that longer travel distances must be covered within the same fixed time budget, therefore the share of faster cars will grow. Cars already dominate the mobility level of approximately 10000 pkm per capita. On permanently higher mobility levels the car share decreases along with growth of faster modes of transport, in order to satisfy (especially the air transport) the increasing demand for mobility within a fixed travel time budget. This relative decrease must lead to total decrease of car traffic volume on a sufficiently high level of the total mobility. In spite of the prognosticated total decrease of car mobility in OECD countries, and strong growth of air transport, cars still will remain the dominating mode of transport. Travellers hereafter will continue to spend majority of their travel time in a car.

A multiple growth in mobility per capita causes demands for extreme mobility, which is proven by increasingly frequent, longer-distance commuting. Because extreme mobility depends on approach to high-speed modes of transport,

sparsely inhabited areas will continue to exist in certain regions. It relates to the areas, where travelling to traffic junctions (airports and stations of high-speed trains) is time-consuming.

Modelling of future mobility development is nowadays simplified by the fact, that neither a model nor a set of historical data distinguishes between urban travelling, and rural travelling, and neither the rate of travels, nor their length is calculated. Thus a model scenario cannot be used in order to adapt the transport mode to particular types of the most appropriate transport services. The prognosis is necessary to make improvement as well, and such forecast will be based on *TTB*. This constraint can be fully implemented only with improved data, and improved prognoses of speeds of means of transport and *TTB\_{mot}*.

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## The Polish Industry during Transformation<sup>1</sup>

### 1. Introduction

Until the outbreak of the Second World War, the Polish economy depended on farming and basic industries. The years 1945–1989 were the period of dynamic industrialization of the economy. Consequently, the industry's share in the process of generating GNP, as well as in absorption of workforce, increased throughout that period.

In 1989, the industry's share in generating GNP amounted to 47.9%, and in employment to 28.6% of the total number of employees (4 894 000)<sup>2</sup>. Therefore, in comparison with other sectors of the economy, it had the largest share in generation of GNP, and in the number of jobs.

The industry's structure was generally obsolete with the basis of production clearly constituted by branches of basic character (mining, fuel and energy, metallurgy and food). In 1989 their share amounted to almost a half of all industrial production (46.7%).

**Table 1. Structure of production of goods, according to their final destination (% , in fixed prices for 1992)**

Specification	1989	1992	1993	1994	1995	1996	1997	1998
Total industrial production	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
High-technology products	6.0	4.3	4.4	4.4	5.0	5.6	5.7	5.8
Production and investment goods	27.8	20.0	19.7	21.1	22.0	21.5	21.4	21.6
Consumer products	34.6	39.0	39.9	39.9	40.8	43.6	45.8	47.2
Energy and mineral raw materials, as well as metallurgical semi-finished products	31.6	36.7	36.0	34.6	32.2	29.3	27.1	25.4

Source: RCSS Transformacja społeczno-gospodarcza w Polsce. Warsaw, July 2002.

<sup>1</sup> Most of the information presented in the article comes from the Central Statistical Office (GUS) and from the Government Centre for Strategic Studies (RCSS).

<sup>2</sup> GUS, Year Book for 1991, p. XXV.



**Table 2. Branches of the highest dynamics of growth**

Ranking position	Branch (product group)	1998	
		1992 = 100	1989 = 100
1	Computer systems, electronic computational technologies	1697 <sup>a)</sup>	X <sup>a)</sup>
2	Office equipment	1230 <sup>a)</sup>	410
3	Car vehicles	465	357
4	Mineral waters and non-alcoholic beverages	417	912
5	Processed fruit, vegetables and fungi	391	515
6	Bearings	391	244
7	Starch and potato products	381	220
8	Plastics	364	289
9	Electronics and teletechnical products	355	264
10	Crude steel	337	126 <sup>a)</sup>
11	Ceramics and pottery	323	259
12	Electrotechnical products, not listed otherwise	319	240
13	Furniture and carpentry products	318	601
14	Equipment for trade and other branches of the economy	307	70
15	Timber buildings and building materials	302	164
16	Egg and poultry products	295	197
17	Fat-like products and derivative washing products	291	419
18	Industrial animal feed mixes	284	181
19	Remaining wooden and wicker products	269	136
20	Building glass	267	251
21	Stoneware products	266	228
22	Semi-finished steel products	264	86
23	Sanding tools and materials	263	127
24	Processed paper products	257	185
25	Water	249 <sup>a)</sup>	•
26	Boards, plywood, veneers	241	230
27	Products from non-ferrous metals and their alloys	238	99
28	Food concentrates	238	279
29	Winemaking products	235	292
30	Road building and reclamation equipment	231	96
31	Machine tools, metalwork equipment	228	66
32	Equipment for chemical industry	226	157
33	Other products of clothing industry	224	102
34	Metal constructions	222	129

Ranking position	Branch (product group)	1998	
		1992 = 100	1989 = 100
35	Rubber products	221	139
36	Industrial metal products	220	123
37	Clothing and textile underwear	218	171
38	Other general purpose equipment	217	87
39	Universal farming tractors	210	50
40	Metal cast products (including fittings)	209	125

a) The data is not fully comparable (explanation in A. Karpiński, S. T. Paradyz, J. Niemiecki, *Zmiany struktury gospodarki w Polsce do roku 2010 – Polska na tle Unii Europejskiej*, ELIPSA, Warszawa 1999, p. 64).

Source: RCSS *Transformacja społeczno-gospodarcza w Polsce*, Warszawa, July 2002, p. 109.

**Table 3. Work efficiency<sup>a)</sup> in the industry (in fixed prices)**

Dynamics	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
1989 = 100	80.6	101.0	112.7	108.8	113.1	106.6	109.1	111.6	105.2	111.5	113.9	105.0
the year before = 100 Rok 1989 = 100	80.6	81.4	91.7	99.8	112.9	120.4	131.3	146.5	154.1	171.9	188.0	197.4

a) Measured by production sold per 1 employee.

Source: GUS.

More modern branches, carriers of technological progress – such as the pharmaceutical industry and the beginnings of the electronic industry – existed as well.

In the years 1989–1991, there was no industrial policy in Poland, and the directions of industrial development were determined by the stabilising policy. The prevailing point of view was, that the best “(...) industrial policy was no industrial policy (...)”<sup>3</sup>.

A strong liberalisation of customs policy adversely affected the industry (“customs duties for certain products were suspended, and their rate for the remaining goods was fixed at the level of 5%”)<sup>4</sup>. Another harmful factor was the lack of a complex development strategy. The fall of production in the years 1989–1991 was dramatic: over 31%!

<sup>3</sup> J. Kaja, *Polityka gospodarcza*, G. Kołodko, *Od szoku do terapii. Ekonomia i polityka transformacji*, Poltex, Warszawa 1999, p. 134.

<sup>4</sup> J. Kaja, *Polityka...*, *ibidem*, p. 134.

**Table 4. Chosen indicators of modern technologies**

Specification	1990	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
The number of robots working in the industry	201	334	354	342	377	422	572	651	785	893	1160	1944	2377
Computer steered production hubs and lines in the industry	•309	887	1265	1568	2148	2531	2914	3662	4493	5014	5848	6758	7758
Computers in technological processes in the industry	2743	5599	6578	7909	9122	10553	11509	13390	15779	16988	18626	21964	24296

Source: original research on the basis of the data from the Polish Central Statistical Office GUS.

The changes in structure of production were equally adverse. The share of basic branches of industry rose from 46.7% (1989) to 62.2% (1991)<sup>5</sup>, while the share of the electro-mechanic industry fell from 25.3% (1989) to 19.8% (1991) and the share of the light industry from 12.2% (1989) to 6.7% (1991).

In 1992, an attempt was made to abandon the radically liberal economic policy. On 14.9.1993, the council of ministers issued the document “Industrial Policy. The Objectives. Programme of implementation for the years 1993–1995”, as an element of the national social and economic strategy focusing on the problems connected with re-structuring of the industry.

In the “Programme of industrial policy for the years 1995–1997” the main objective was formulated: increasing competitiveness of the Polish industry. It provided for the transition from a defensive to a proactive policy, promoting the “high chance” future-orientated branches.

In 1992, for the first time in the transformation period an increase of industrial production (by 2.8%) could be observed. The Polish economy entered the phase of recovery during the years 1993–1997. The most apparent boom period begun from 1994. It involved an increase of export, agricultural production, and a sharp growth of investment.

The contributing factor for the economic recovery of the discussed period was the growth of industrial production (by 57% with the GNP rising by 33%). The growth of industrial production was therefore higher than the growth of GNP. The stimulating factor for the economic growth was the development of export (by 50% in 1994). A vast majority of the volume of export was supplied by the industry (over 80%). This signifies, that the cause of the economic boom of the years 1994–1997, was the growth of industrial production, which indicates the decisive role of the industry in the Polish economy.

“In the analysed period, Poland was one of the top 10 countries in the world, as far as the dynamics of GNP growth was concerned, i.e. it was one of the leading countries in that aspect during the period in question”<sup>6</sup>.

According to some experts, Poland was prematurely described by the press as “the tiger of Europe”. Contrary to the “Asian tigers”, the economic growth in Poland was based on a traditional economic structure, while in the Asian countries – mainly on development of the most modern and avant-garde industries, in particular the high-technology industry.

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<sup>5</sup> P. Bożyk, *Polityka gospodarcza Polski 1985–2000*, Wyższa Szkoła Handlowa, Warszawa 1995, p. 19.

<sup>6</sup> A. Karpiński, S. Paradyz, J. Niemiecki, *Zmiany struktury gospodarki w Polsce do roku 2010, Polska na tle Unii Europejskiej*, Dom Wydawniczy Elipsa, Warszawa 1999, p. 35.

## 2. Factors Determining Development of Industry during the Period of Transformation

Some analysts name the following factors of the structural transformation of the industry<sup>7</sup>:

- 1) the change of the economic system, i.e. the transformation from the centrally planned economy to the market economy, and the introduction of modern methods of management, and business principles to the industry.
- 2) privatisation of the industry.
- 3) inflow of foreign capital (55% of the foreign capital was invested in fixed assets, the rest in portfolio investments. It is estimated, that 62% of fixed assets investment was allocated to the industry).
- 4) opening of the internal market to foreign competition, which resulted in a significant increase of the share of import in satisfying the needs of the internal market. The share rose consistently, and consequently the access to modern technologies was broadened, and the market offer was expanded.
- 5) re-orientation of foreign trade (the share of the CMEA countries in the mid-eighties amounted to 60% of export; in 2000, 70% of export went to the countries of the EU).
- 6) dynamic growth of consumer demand in the internal market. The unsatisfied demand, created by the shortages occurring before 1989, emerged forcefully, and became the main factor of production growth. The falling demand (in the years 1998–2001) resulted in problems with sales, and diminishing growth of production.
- 7) de-concentration of industry. Large companies were divided into smaller units, and new small businesses were created. In 1989, employment in small businesses constituted 8.8%, and in 2000 – 23.1% of the total number of employees.
- 8) liquidation of the pre-1989 system of co-operation and networks, and their re-construction according to market principles.

The above factors had both positive and negative influence upon the development of the Polish industry. Usually, inflow of foreign capital is considered a welcome phenomenon. However, it used to happen, that a purchased enterprise seized its production, and became a mere base (assembly plant), which enabled a foreign investor to control the market. The inflow of new technologies and technical

<sup>7</sup> RCSS, *Transformacja społeczno-gospodarcza w Polsce*, Warszawa, July 2002, pp. 103–105.

solutions has to be considered a positive effect. A negative one was the break-up of the existing system of co-operation and networks between local companies, and the creation of a new one, usually between purchased companies and their foreign headquarters, which increased the import-intensity of the Polish economy<sup>8</sup>.

Subordinating the production to the needs of buyers was generally a positive phenomenon, although sometimes high-tech industries abandoned new technologies, producing uncomplicated goods instead, in order to obtain short-term profits.

### 3. Technological Modernisation

Very positive and far-reaching changes concerning technological modernisation of the industry took place during the years 1989–2004. The process involved mainly updating technologies and the range of products.

The positive changes in the industry included:

- 1) Increased share of new and modernised products. Their share in the total industrial output in 1989 amounted to 5.3%, and in 1999 to 9.5%. Certain branches were more susceptible to this process than others. In the machinery and equipment branch the share grew from 8.6% in 1989 to 30.6% in 1999; and in the metallurgical industry from 1.1% in 1989 to 4.4% in 1999. In some branches, the process underwent a certain fluctuation. After a relatively even growth until mid-1990's, a fall could be observed in the final years of the decade. For example, the share in the means of transport in 1989 amounted to 10.7%, in 1995 it rose to 32.1%, and fell to 15.8% in 1999; the analogical figures for the paper industry were 0.3% in 1989, 16.7% in 1996, and 8.6% in 1999.

In the electronic and precision industry, negative tendencies could be observed. The share in the electronic industry rose from 18.9% in 1989, to 27.8% in 1997, to fall to 11.3% in 1999.

The situation was worst in the precision industry, where the share of new and modernised products fell from 29.1% in 1989 to 9.3% in 1998 (there is no data for 1999).

After 1999, there was a growth tendency in the share of new and modernised products, and in 2004 it amounted to 19.2% in total. The share in the machinery and equipment branch amounted to 16.7%, and in the metallurgical industry to 11.4%. In production of means of transport, after the reduction in 1999, thank to a certain inflow of

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<sup>8</sup> Data from RCSS, *Transformacja społeczno-gospodarcza w Polsce*, pp. 115–116.

foreign capital, there was a significant increase of the share to 66.5%. Similarly in the paper industry – after the reduction in 1999, there was a renewed growth to 14.4%.

- 2) A significant increase in the number of modern technologies (although slower than in the countries of the European Union). The chosen indicators of modern technologies are presented in Table 4.
- 3) Increased dynamics of growth of work efficiency. The growth had a consistent character. In comparison with 1989, the excessive employment was greatly reduced, which doubled the work efficiency, in spite of slow increase of saturation of a workplace with machinery and equipment. The work efficiency in industry (in fixed prices) is illustrated by Table 5. In the years 2002–2005, the increase of work efficiency in the industry (in fixed prices – the previous year = 100) looked as follows:  
2002 – 7.5%; 2004 – 12.8%; 2005 – 2.9%.
- 4) Improving economic effectiveness. The consumption of energy carriers and metallurgical products by the industry fell significantly. In comparison to 1989, the industrial output in 2000 was higher by 31.4%. Energy-intensity of production decreased by 38% (coal-intensity by 49%, and steel-intensity by 59%).
- 5) Diminished danger to the environment. Emission of industrial gases and dusts was reduced. This was not an effect of the state's ecological policy, but of reduction of activity of certain industries. The authors of the report "The social and economic transformation in Poland" regard the following to be the positive changes in the structure of the Polish industry:
  - increased share of the private sector in industrial production (from 18.3% in 1990 to 76.1% in 2001);
  - increased share of foreign capital companies (9.1% in 1993, 41.0% in 1999);
  - increased share of consumer product industries (34.6% in 1989, 47.2% in 1998 of the total industrial output);
  - increased similarity of the Polish industrial structure to the one prevailing in the EU.

#### **4. Restructuring of the Coalmining Industry and the Steel Industry**

Those were the two industries playing a significant role in production in the socialist economy. There were several reasons for that situation. For a long time, Poland earned hard currency selling coal. When financial relations changed (global

prices were introduced in Poland, and separate currency areas seized to exist), the mining industry became less profitable<sup>9</sup>.

The basic objective was to reduce the output of the mining industry, and lead to positive profitability of mining. This state was achieved in 2001, thank to reduction of output and employment. The mining output decreased from 200 million tons in the 1980's, to 103,9 million tons in 2001. The reduction of output of the coalmining industry was accompanied by cutting 100 thousand jobs (to 243 thousand in 1997).

In the following years, the output was systematically reduced, to reach 101,3 million tons in 2004. Further reduction of employment meant, that in 2004 189,8 thousand people were employed in the coalmining industry.

The steel and iron industry experienced a reduction of production and sales. In the years 1998–2001, the production of steel sheets fell by 31%, crude steel by 23.9%, steel pipes by 12.2%, which adversely affected financial balance of steelworks, and put them in a very difficult situation. In comparison with 2001, there was an increase of output by 2004: of crude steel by 20%, and of steel sheets by 17.7%, nevertheless in comparison with 1989, the production was lower by, respectively, 30% and 33%. The production of steel pipes decreased in 2004 in comparison with 2001 by 15%, and with 1989 by as much as 61%. Indebtedness posed the biggest problem. A program of restructuring the steelworks was introduced, involving job cuts from 80 thousand in 1998 to 38.7 thousand at the end of 2001. Since the beginning of the 1990's, the arms industry fell into crisis: during the years 1998–2001, it reduced output, usage of production power, and employment by 38%.

A reduction of output of the so-called declining industries was a welcome change. Those were the industries, affected by technological exchange: the cocking industry, certain types of electronic lamps, transistors, etc., also certain basic industries (non-ferrous metals – copper, zinc, lead), sulphur, coal, raw materials for metallurgical production.

## 5. Transformation of the Processing Industry

There was a reduction of output of the non-organic and fertiliser industry. The reduction or stagnation in the industries producing from local raw materials must be considered a negative tendency. Those industries included the linen industry (of the 30 large linen plants only 2 survived), or the structuring industry, e.g. the production of scientific equipment, electronics, or power industry equipment. There was a large-scale wave of bankruptcies of knitting plants, carpet-making

<sup>9</sup> M. Mindur, *Rozwój polskiej gospodarki w latach 1945–1990*, Studia i Prace No. 49 SGH, Warszawa 2004, pp. 99–113.



plants, hosiery plants, linen factories, shoe-making plants and tanneries. The competitive pressure from import causes those industries to further reduce their output; the largest reduction was observed in the leather and clothing industries (during the last three years respectively by 18% and 21%).

“In general, the liquidation of potential of a number of branches happened at the scale unmatched in the entire post-war period, and with little equivalent in modern Europe (perhaps outside of the former GDR)”<sup>10</sup>.

In many cases, the demise of certain types of industry was not inevitable, but resulted from mistakes in the economic policy. The experts reckon, that those industries would have had a chance of survival, were they granted appropriate assistance. “The result was a serious devastation of Polish companies. Unfortunately, among them were enterprises of crucial importance for the country’s future”<sup>11</sup>.

The output of certain products, in particular certain consumer goods, rose:

- mineral waters and non-alcoholic beverages (nine times);
- furniture (6 times);
- processed fruit and vegetables (over 5 times);
- household chemicals (over 4 times);
- cars (3.5 times);
- plastics (3 times);
- paper products (over 2 times).

There was an increase of output of the supplies industry, raw materials and semi-finished products for further production. Usually, they were technologically primitive products, such as steel constructions, casts, boards, rubber products etc.

“The highest values of export flexibility indicators during the years 1989–1993 could be observed in the important branches of international trade, such as products of metallurgical industry (export flexibility indicator 2.9), of which the steel industry – 2.5; non-ferrous metals – 3.8; products of mineral industry – 6.4; building materials – 13.6; fuel industry – 4.6 and metal industry – 4.6. Most of the branches of the highest indicator of export flexibility do not have favourable prospects for development. Achieving high levels of the indicator in those branches could not play a creative role in the transformation of the country’s industrial structure”<sup>12</sup>.

Negative tendencies in the development of the structure of production were enhanced by the inflow of foreign capital: “(...) an alarming tendency could be observed: production moved from products requiring more advanced technologies

<sup>10</sup> RCSS, *Transformacja...*, *ibidem*, p. 122.

<sup>11</sup> RCSS, *Transformacja...*, *ibidem*, p. 118.

<sup>12</sup> M. Perczyński, *Szansa i zagrożenia na drodze do Unii Europejskiej*, Komitet Prognoz, Polska w XXI wieku, after A. Karpiński, *Zmiany...*, *ibidem*, p. 138.

to primitive, low-processed products. The disparities concerning the per-capita level of industrial production between Poland and developed countries grew, instead of diminishing”<sup>13</sup>.

In addition, “(...) foreign companies operating in Poland did not associate their future with the most modern industries (...)”.

A very high (over 60%) level of “import penetration” (measured for 30 basic groups of products) has to be considered a very unfavourable phenomenon. In the case of industrial goods, it amounted to 44%, while in the EU countries it oscillates around 16–17%<sup>14</sup>.

The following products belong to the group of highly import-dependent goods:

- high-tech products (branches of the information civilisation);
- investment goods (e.g. power plant equipment), including (which makes the situation worse) goods, which used to be produced in Poland;
- light industry products (it is estimated, that the situation was worsened by smuggling, worth a third of the national output);
- pharmaceutical products (in spite of higher prices of imported medication – hence the alarming character of the phenomenon);
- cars, railway carriages and other means of transport.

The result of excess import is high unemployment. According to the estimation by IKCHZ, in 1998, during the period of trade deficit with the EU (over euro 12 billion), the export to the EU created 1,4 million jobs, while the import cut 1,8 million of them: 0,4 million jobs were lost.

According to another estimation, by professor Mieczysław Czabaj, as a result of abolition of the import tax, average customs duties for industrial products were reduced from 23% in 1994 to 2.1% in 1999, and the national currency underwent excess appreciation, which led to lowering competitiveness of Polish businesses (by around 30–40% of import, of which 16% were components and high-technology goods). A significant proportion of import was substitutive (the imports included shoes, nails, buttons, umbrellas, envelopes, pencils, scrap metal, waste paper etc.). This led to a loss of 0,5–0,6 million jobs<sup>15</sup>.

The most harmful phenomenon was the so-called process of extensification of the industrial structure. In 1998, the share of high-processing branches decreased to the level lower, than in 1989. Similarly, the share of investment goods in 1995 was no higher than in 1989.

<sup>13</sup> RCSS, *Transformacja...*, *ibidem*, p. 123.

<sup>14</sup> CSRS, *Transformacja...*, *ibidem*, p. 129.

<sup>15</sup> M. Kabaj, *Strategia rozwoju Polski do roku 2020*, Synteza, Dom wydawniczy Elipsa, Warszawa 2000, pp. 105–106.

A profound regress could be observed in the pharmaceutical industry (one of the five most profitable branches in the world). During the years 1990–1999, the production fell by 40%. This produced an adverse effect upon the budget, forced to spend more on healthcare refunds. The pharmaceutical industry is one of the few branches with appropriate research and development infrastructure in Poland.

The research and development area was among those most affected by job losses. In 2000, employment in the research and development infrastructure amounted to 36% of the 1989 level.

The highest decrease of production was observed among electronic industries of significant importance for technical advancement: modernisation of production of electronic elements (almost 6 times), optical instruments (by 61%), aviation (by 51%), telecommunications (by 10%), measurement instruments (by 31%), engines and generators (by 25%), pharmaceuticals (by 24%), steering equipment for industrial processes (by 9%). The decrease took place between 1989 and 1998.

A very high increase of production of the processing industry took place in the years 2003–2005 – particularly in the branches of high share of export – due to an inflow of foreign capital. The highest increase took place in medical instruments, clocks and watches (in total 34% over the 3 years), machinery and equipment (by 60%), plastics (by 49%). Car production rose 2.1 times.

Throughout the world, in the 1990's the share of the industry in generation of GNP was decreasing, which was due to the dynamic development of the service sector. The industrial production continued to grow in the United States (1991–1999) by 34%, while in the other most industrialised countries by 5–15%.

In Poland, actual disindustrialisation took place. After 1989, the process of industrialisation was halted in the country, which was not yet fully industrialised, and where the industry did not enter the post-industrial phase.

Disindustrialisation in Poland begun when GNP per-capita amounted to USD 5 thousand, while in other countries it did not commence before the level of GNP per capita of USD 10-15 thousand. In the EU, this process was taking place, when the level of production of so-called hard goods (satisfying the basic social and material needs) was high.

## 6. Summary

It is difficult to predict the most appropriate directions for industrial development. However, the facts quoted above indicate, that the development is still necessary.

The Polish experiences of the years 1989–1991 proved, that there is a necessity for existence, and implementation by the state, of an industrial policy constituting an element of a national long-term development strategy.

In the context of European integration, and globalisation, the basic objective should be determining the industrial specialisation. It could be the pharmaceutical industry, as the one with the broadest perspectives for development, and the existing research and development infrastructure.

The state should facilitate development of the industries considered strategic by the authors of the Strategy for Poland's development up to the year 2020, i.e.<sup>16</sup>:

- production of software for construction and application of information infrastructure, constituting a part of the computer industry;
- construction of telecommunications equipment for information infrastructure, computer and telecommunications equipment, and equipment connected with electronic media;
- micro-and optical electronics for information and telecommunications technologies;
- road and motorway construction, urban transport systems;
- biotechnology for health and longevity;
- ecology.

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## **Innovation and Technology-related Conditions of Development of Small and Medium-sized Enterprises in Poland**

### **1. Introduction**

In order to increase their competitiveness, small and medium enterprises (SME) must introduce innovation. Unfortunately, of all 25 EU countries, Poland has the lowest innovation ratio, and a very low level of invention ratio (which is the number of patent applications per 10 thousand people) – in 2003, it amounted to 0.6, while the EU average at the time was 2.6<sup>1</sup>. The main reason for such state of affairs is the low level of expenses on science, research and development, which for years has amounted to about 0.5% GNP. Furthermore, Poland lacks system solutions, which could speed up introduction of innovation by Polish businesses. Certain programmes within the quoted areas have already been introduced, which should intensify absorption of innovation into companies, including SME. This article is devoted to conditions of operation of the business sector, as far as innovation and technology are concerned.

### **2. Programmes Stimulating Implementation of Innovation in Polish Small and Medium Businesses**

The government document facilitating development of SME as far as the support for innovation and updating technology is concerned, is the programme designed by the Ministry of the Economy, approved in the year 2000, entitled **“Enhancing innovativeness of the economy in Poland, until 2006”**<sup>2</sup>. It is a part of the “National Development Plan Until 2006”, and originates from similar earlier programmes: “The Conception of medium-term national economic development

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<sup>1</sup> European Innovation Scoreboard 2004; the indicator is calculated on the basis of 20 fragmentary parameters, including the structure of education, expenses on research and development, patents, licences, expenses on purchase of innovation, the number of mobile telephones, the number of Internet users etc.

<sup>2</sup> The Ministry of the Economy, Department of Economic Strategy: “Zwiększanie innowacyjności gospodarki w Polsce do 2006 roku”, Warsaw 2000.

until 2002” and “Guidelines for the state’s innovation policy until 2002”, and maintains the priorities assumed by those documents, i.e.:

- 1) The creation of mechanisms and structures facilitating innovation,
- 2) The formation of innovative attitudes,
- 3) Increasing the efficiency of introduction of modern solutions into the economy,
- 4) Changing patterns of consumption and models of production in Poland to the ones more favourable to a stable, balanced growth.

Based on an earlier analysis, the document states, that the level of innovativeness of the Polish economy is relatively low. The following were quoted as the main reasons for the situation:

- shortcomings in the area of forming innovative attitudes among young people and entrepreneurs,
- insufficient scientific and technological infrastructure capable of providing research support to businesses,
- shortcomings of transfer of innovation from the science sector to businesses,
- poorly developed system of financing technological innovation from venture capital funds and non-repayable loans guaranteed by the state,
- lack of legislative solutions in the form of a single legal act regulating the general rules concerning scientific research and development,
- high costs of credit and implementation of innovation, extending far beyond financial capacity of businesses, particularly of the SME sector,
- high financial risk, shortage of qualified personnel and the persisting low absorptiveness of the market for the existing solutions<sup>3</sup>.

The quoted programme “Enhancing innovativeness...” includes two types of projects: those run by the national government, and the ones conducted by regional institutions, entrepreneurs, or other units. The implementation guidelines and project budgets are prepared according to the requirements of the European Commission, in connection with national, regional and local institutions.

The priority “Creating mechanisms and structures facilitating innovation” includes implementation of the following objectives:

- 1) including Poland into the European system of monitoring and forecasting development trends and technologies;
- 2) preparation and introduction of the Act on research and development;
- 3) creation of an institution promoting and supporting foundation of new innovative companies – “Innocentrum”;

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<sup>3</sup> *Ibidem.*

- 4) promotion of design, i.e. improving quality and competitiveness of Polish products via development of design as an integral element of economy and culture;
- 5) promotion of Innovative Local Segments (ILS);
- 6) supporting the creation and operation of a network of regional centres of innovation and technology transfer;
- 7) construction of technology parks;
- 8) supporting the creation of industrial parks.

The priority "Formation of innovative attitudes" includes the following actions:

- 1) supporting development of interests and knowledge of children and youth in the field of technology and science;
- 2) permanent education in the area of innovative entrepreneurship;
- 3) instruments of support for participation of SME in the V and the VI EU Framework Programme of Research, Technological Development and Demonstration.

The priority "Increasing efficiency of introduction of modern solutions into the economy" includes the following objectives:

- 1) promotion of information technologies, including:
  - developing modern supra-institutional information infrastructure,
  - creating and supporting operation of centres of information, training and transfer of information technologies, in particular in order to support broad use of those technologies in small and medium businesses,
  - support for innovative projects of small and medium businesses, aimed at applying information technologies in products,
  - undertaking legislative work in order to regulate, along with other EU countries, the legal problems resulting from new applications of information technologies (security and confidentiality of information, adjusting the legal code to characteristics specific for on-line transactions),
  - creation of information society through a broad use of information technologies in training and education, company management, services (including development of e-services and on-line trading),
  - publicising the knowledge about advantages of applying information technologies in products, processes and services,
  - promoting Polish scientific and technological advancement abroad;
- 2) development of regional co-operation;
- 3) attracting foreign investment into innovative and technologically advanced sectors;
- 4) creating conditions for development of venture capital in Poland.



The projects included in the programme will be financed from:

- public resources, including EU assistance funds, the state treasury, and budgets of local authorities,
- private resources.

During the pre-accession period, the basic sources of financing were the PHARE programme funds, and after the Polish accession, the resources from Structural Funds and the Cohesion Fund. The principles of assigning resources require a certain level of co-financing the development enterprises from own resources of interested countries. This share must not be lower than 25% of expenses necessary for implementation of individual enterprises. At the point of programme's creation, the amount of Polish input into funding of the programme during the years 2001–2006 was estimated as follows (Table 1).

**Table 1. Estimated value of Polish input into financing the programme "Enhancing innovativeness in Poland until 2006" during the years 2001–2006**

No.	Priority	Polish input in total (PLN million)	
		minimum	maximum
1.	Creation of mechanisms and structures facilitating innovation	867	1196
2.	Formation of innovative attitudes	1040	1436
3.	Increasing efficiency of introduction of modern solutions into the economy	520	718
4.	Changing patterns of consumption and models of production in Poland to the ones more favourable to a stable, balanced growth	3467	4786
	<b>Total</b>	<b>5894</b>	<b>8136</b>

Source: Zwiększanie innowacyjności gospodarki w Polsce do 2006 roku, Warszawa 2000.

One of the outcomes of implementation of the programme was the creation of a network of innovation centres, the objective of which was the broadly understood co-operation with the SME sector, as far as transfer of technology and increasing competitiveness and innovativeness were concerned. At the end of 2004, the following units were operating within the network:

- 29 centres of technology transfer,
- 55 incubators of entrepreneurship,
- 12 scientific and technological parks<sup>4</sup>.

<sup>4</sup> Przedsiębiorczość w Polsce w 2005 r., The Ministry of Economy and Labour, Warsaw 2005, p. 116.

In order to stimulate innovation processes in the Polish economy, and implement the strategy of enhancing innovativeness of businesses, the **Act on certain forms of support for innovativeness** was passed in July 2005<sup>5</sup>. The main benefit for businesses, resulting from the act, is the opportunity to obtain technological credit from the resources of Technological Credit Fund at the BGK Bank. The credit is provided for purchasing new technology or inventions from research and development units, as well as from academic institutions. The above includes purchase of licences and unpatented technological know-how, or know-how concerning organisation and management. The quoted investment increasing a company's level of innovativeness requires from the entrepreneur a minimum input of 25%. The maximum amount of credit must not exceed euro 2 million. An important rationale behind using the technological credit is the possibility of its partial amortisation – of up to 50% of the value. It seems, that it can constitute a sufficient encouragement to use this type of funding for expenses on innovation carried out by businesses.

The EU programme available to Polish SME, concerning transfer of innovation and technology to businesses, is “**The Sixth Framework Programme for research, technological development and demonstration (2002–2006)**”. One of its main objectives, implemented via financing research projects, is enhancing technological capacity of the SME sector, as well as providing access to the latest technologies to subjects possessing the potential to utilise them. The support ought to lead to facilitating economic operation both at the national, and the international market, as well as developing the scientific and research environment. Consequently, the participants of individual projects are obliged to form consortia in order to carry out all the actions necessary for implementation of the assumed goals<sup>6</sup>. The EU authorities put a great emphasis upon the participation of small and medium businesses in the programme, hence the amount of almost euro 2,2 billion provided during the years 2002–2006 in order to support development of innovation in the quoted sector of companies. It is estimated, that the programme is going to be one of the most significant instruments of financial aid granted to the SME sector in the world. All the more important is the access of Polish companies to the programme since 2002.

The aid granted to SME within specific research projects takes a form of specified actions, constituting at least 15% of the total project budget. In addition, considering regional and social differences, a number of specific actions

<sup>5</sup> Ustawa o niektórych formach wspierania działalności innowacyjnej, Dz.U. No. 109/2005 pos. 1158.

<sup>6</sup> Although the minimum number of consortium members is three, the European Commission prefers the consortia to consist of more members. It is necessary for at least two of them to originate from EU member countries.

are planned. The projects can assume two forms: of a research programme, or a demonstration project. The objective of the former is facilitating access to new knowledge and methods matching social demands. The latter concentrates on practical implementation of research results.

The following types of actions supporting small and medium businesses are provided for by “The Sixth Framework Programme for research, technological development and demonstration (2002–2006)”:

- co-operative research projects proposed by a number of businesses from different countries,
- collective research projects proposed by associations or federations of the above institutions within a particular sector of the industry.

In the case of co-operative research projects, the main addressees are small and medium businesses characterised by innovative potential, but without appropriate research infrastructure. Apart from SME, the programme provides for participation of scientific research units, as well as other companies, as long as they do not assume a dominating role within the project, and they provide input into the project’s budget. In the case of small and medium businesses, the input can be brought in research materials, labour costs and other elements described as input in kind. Projects ought to last between one and two years, and their budget ought to amount to between euro 0,5 and 2 million. Furthermore, it is important, that not more than 40% of costs should be covered by one SME party, and not more than 60% by partners from a single country. Another condition is evaluating the cost of research and development tasks, which must exceed 40% of the total budget. In the case of this type of projects, the European Commission finances 50% of the project in connection with research, and 100% in connection with management of the consortium created for project purposes. The research expenses carried by small and medium businesses are covered in full. The budget provided for the entire duration of the programme amounts to euro 295 million.

In the case of collective research projects, the participants can be a group of small and medium businesses actively participating in implementation of the project (SME Core Group), and industrial associations, commercial chambers and scientific research units. In this case, projects should be signed for the period of two to three years, with a budget of between euro 2 and 5 million. The objectives of such projects may include:

- research orientated towards solving shared problems,
- research orientated towards setting new European norms and standards,
- research improving technological infrastructure of a particular sector,
- transfer of technology,

- designing “technological tools” connected with diagnostics, safety and inspection.

The European Commission grants 50% financial support for projects, and the cost of ordered research is fully covered. The budget for the entire duration of the programme amounts to euro 100 million.

The Sixth Framework Programme provides for numerous information services. They include all sorts of electronic information services, as well as actions concerning transfer of technology, protection of intellectual property, access to heightened risk capital and operation of Innovation Relay Centres (IRC). The task of the Centres is to strengthen competitiveness of businesses by supporting processes of creation of innovations, international technological co-operation and the related transfer of technology, as well as assisting the implementation of innovations. In connection with carrying out those tasks, IRC provide services such as seeking partners and organisation of events related to transfer of technology. All the offers of technology transfer received by the Centres are placed in a national or European database. The latter activity results in events, such as technology transfer days, or training concerning modern methods of production and management. Furthermore, the Centres provide advice and information concerning transfer of technology in bulletins, catalogues of offers and via Internet sights. There are 7 such units operating in four zones: the Eastern, the Central, the Southern and the Western one.

### **3. The Programmes of Support for Technological Development of Small and Medium Enterprises**

An important area of development of small and medium businesses in Poland is the use of particular computing solutions determined by development of the Internet and the creation of the “**Information Society**”. This is connected with implementation of the government strategy concerning this area, which takes into account the Polish conditions.

In June 2000, as an answer to the EU document entitled eEurope, the candidate countries, including Poland, approved their own equivalent – “eEurope+ – the Co-operative Effort to Implement the Information Society in Europe”. eEurope+ called for a reform of the economies of candidate countries, directing them towards the information society. What distinguished the document from eEurope was, that it complied with local specifics of its signatories, and did not hide serious collapses that could be observed in the sectors in question. The programme’s chief objectives included:

- levelling of the information gap between the economies of the candidate countries and the EU,
- co-operation towards the creation of the information society throughout Europe,
- exchanging views and observations made locally,
- universally available, cheaper and faster Internet,
- investing in people and qualifications,
- stimulating the use of the Internet<sup>7</sup>.

The document specified the year 2003 as a breakthrough moment for eradicating differences between eEurope+ member countries. The candidate countries imposed the same indicators for control, as the 15 EU member countries. Financing of the enterprise was based mainly on the national budgets of candidate countries, the World Bank, and PHARE programmes<sup>8</sup>.

On the basis of eEurope and eEurope+, Poland designed and approved in 2001 the document “**e-Poland – the Action Plan for the Information Society Development in Poland for the years 2001–2006**”<sup>9</sup>. The strategy defines the inclusion into the process of construction of the information era by application of modern technologies of the information society, as the key task facing Poland. The task requires adjusting Polish solutions and standards to the emerging modern information society, which is necessary in the process of integration with EU structures.

The plan was formulated into 6 topical objectives developed into detailed implementation schedule, containing the budget, and indicating the parties responsible for implementation. The “0” objective: *Development of telecommunication infrastructure* – provides for creation of strong competition within the telecommunication sector, which should result in falling prices of access to telecommunication networks. The objective “1”: *Universally available, cheaper and safer Internet* – provides for creation of favourable conditions for strong competition between operators providing access to the Internet, as well as for development of local neighbourhood networks by providing support for their creation, and guaranteeing high level of network security, and secure access to electronic services. The development of knowledge and skills connected with information technologies is served by the objective “2”: *Investing in people and qualifications*, and within this objective, by development of professions related to application of information and communication technologies, as well as using information technologies for job-creation and reducing the unemployment.

<sup>7</sup> [www.spoleczestwoinformacyjne.pl](http://www.spoleczestwoinformacyjne.pl)

<sup>8</sup> [www.spoleczestwoinformacyjne.pl/eeuropeplus2003.html](http://www.spoleczestwoinformacyjne.pl/eeuropeplus2003.html)

<sup>9</sup> The Ministry of the Economy, Plan działań na rzecz rozwoju społeczeństwa informacyjnego w Polsce na lata 2001–2006, Warsaw 2001.

The program concentrates particularly on the issues of e-commerce: objective “3” – *Stimulating better use of information technologies; The electronic economy* – by frequently reminding, that future relations between business partners will be based upon Internet contacts, and by emphasising the importance of e-commerce solutions for building up company value. In the field of e-commerce, the programme provides for:

- introduction of the necessary legal regulations, consistent with European standards,
- ensuring security and high reliability of e-commerce,
- increasing the share of small and medium businesses in the electronic economy,
- increasing social confidence in e-commerce,
- increasing the significance of Polish industries based on information and communication technologies,
- improving the system of public orders by usage of telecommunication networks<sup>10</sup>.

The document complementary to “e-Poland” was the “National Strategy of Computerisation – e-Poland, for the years 2004–2006”, published by the Ministry of Science and Information Society Technologies in December 2003. The document explained the benefits of computerisation of private and public life; it presented the direction our country should follow in order to build the information society, as well as a detailed action plan. The following were quoted as the necessary conditions for implementation of the above strategy: universal availability of electronic content and services; development of diverse and valuable content and services available via the Internet; universal ability to utilise computer and communication systems. At the same time, the Strategy indicated the areas, where fast advancement was necessary. Those were: broadband Internet access in every school, an integrated platform of public administration services available to the knowledge-based society (“Gateway to Poland”), Polish content on the Internet, universally available IT education. The above strategy resulted, among others, in the introduction in February 2005 of the **Act on computerisation of operation of parties implementing public tasks**<sup>11</sup>. It sets norms for operation of electronic administration, which ought to contribute to the creation of a friendlier administrative environment for businesses. It opens the possibility of on-line registration, electronic clearing of accounts and formalities connected with taxes and social insurance, as well as clearing of all administrative formalities on-line, 7 days a week, 24 hours a day. This can significantly speed up administrative

<sup>10</sup> Ministry of Science and Information Society Technologies, [www.mnii.gov.pl](http://www.mnii.gov.pl)

<sup>11</sup> Ustawa o informatyzacji działalności podmiotów realizujących zadania publiczne, Dz.U. No. 64/2005 pos. 565.

procedures and eliminate certain bureaucratic barriers complicating business operation.

#### **4. Summary**

Competitiveness and economic growth is increasingly based on entrepreneurship and innovation, optimisation of economic processes. There are two dimensions of EU policy in this field: international and national. The international dimension involves support for entrepreneurship provided by the Union's structures and programmes, e.g. "The Sixth Framework Programme for research, technological development and demonstration (2002–2006)", PHARE programmes, aid from structural funds (the one most important for SME is the European Regional Development Fund), and aid granted by the European Investment Bank. The national level is represented by policy solutions for SME, including the institutional system of business environment, and the tools used within it. In Poland, this environment was shaped by programmes like "Entrepreneurship First", "Government Policy Guidelines for Small and Medium-sized Enterprises for the years 2003–2006", "e-Poland – The Action Plan for the Information Society Development in Poland for the years 2001–2006", and the National Development Plan 2004–2006 connected with the necessity to prepare Poland for absorption of structural funds. The changes occurring in this field reflect gradual eradication of administrative, formal and legal barriers, and a friendlier business environment. Nevertheless, many barriers still exist, impeding the development of companies of the SME sector. For years, the most serious ones have been the financial problems connected with starting and running a business, the innovation/information barriers resulting from difficult access to new technologies and information, and barriers concerning internal management procedures, i.e. extensive responsibilities and low specialisation of management staff, recruitment problems, insufficient knowledge, skills and competence. Therefore, continuous efforts of all types of institutions, the business environment, and entrepreneurs themselves, are necessary in order to limit the strength and intensity of those barriers.

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# The Significance of Quality in Services

## 1. Introduction

Quality is an important category in the modern, competitive world. The principles of complex quality management are an object of growing interest, particularly from businesses operating in the market. Many companies have discovered the link between quality and market success. Consequently, for many businesses developing their own quality strategies has become crucial.

In the modern volatile environment, knowledge is central to coping with change, enabling companies to swiftly adjust to the up-to date needs of the environment – they became modern and attractive to participants of the market. Only the companies facing up to new challenges, and improving quality of their services, can stay in the increasingly competitive market. This also concerns organizations providing services in education.

## 2. Conditions for Development of the Service Sector of the Economy

In the developed countries, services gain significance. A term “service-based society” has been coined. In the highly developed countries, services constitute 1/3 to 2/3 of the total production. Development of services is possible thank to<sup>1</sup>:

- increasing complexity of economic and social life,
- increasing risk factor (complexity of the modern technology), and the consequent wish of consumers to reduce this risk (insurance, healthcare, etc.),
- time deficit, and consequent involvement of specialized services.

The end of the World War II was a turning point in the development of the service sector. The subsequent social and economic changes brought about the transformation of the Western economies. Europe’s economic potential, destroyed as a result of military operations, was rebuilt according to modern technologies and investment projects, which required new solutions in the field of banking

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<sup>1</sup> J. Chabiera, S. Doroszewicz, A. Zbierchowska, Zarządzanie jakością, CIM, Warsaw 2000, p. 202.

and financial services. Furthermore, specialization of all branches of industry forced companies to apply service outsourcing<sup>2</sup>.

The dynamics of growth of consumer service expenses was equally impressive – from 30 to 50% of income over the last 30 years. An increasing proportion of consumers' income is spent on recreation, entertainment and travelling; telecommunication and postal services, since this is what the rapidly changing reality demands; and medical and educational services (consumers are prepared to pay for higher quality).

Complicated procedures in banking, insurance, investment, accounting and law, contributed to growing demand for financial advisory services and professional assistance in each of those fields. Over the last 40 years, the service sector dominated the economy. The domination was so strong, that it was described as “the second industrial revolution”<sup>3</sup>.

Therefore, the reasons for the dynamic development of the service sector belong to three groups of factors<sup>4</sup>:

- limited state intervention in the financial and job markets;
- wide use of new technologies and modern methods of organization of work;
- tendencies to specialize occurring in all sectors of the economy.

Apart from the above factors, the shifting of trade barriers within the European Union led to increased demand for services of foreign specialists.

The development of the service sector was facilitated by many factors, which in turn resulted from demographic, social, economic and political changes<sup>5</sup>.

The consequences of the demographic changes for the development of the service sector included mainly<sup>6</sup>:

- the increased number of retired people, as a result of growing average longevity – this results in increased demand for recreation and tourism, as well for medicine and rehabilitation;
  - the higher mobility of workforce, resulting from structural changes – leading to development of new agglomerations and increased demand for services connected with infrastructure, as well as other consumer services.
- Social changes, which influenced the development of services, included<sup>7</sup>:

- professional activation of women, contributing to rapid development of production, for example, of products facilitating fast preparation of

<sup>2</sup> A. Payne, *Marketing usług*. PWE, Warsaw 1997, p. 15.

<sup>3</sup> *Ibidem*, p. 15.

<sup>4</sup> K. Mazur, *Marketing usług edukacyjnych*. Wyd. Akademii Pedagogiki Specjalnej, Warsaw 2001, p. 49.

<sup>5</sup> A. Payne, *Marketing usług...*, *op. cit.*, p. 16.

<sup>6</sup> K. Mazur, *Marketing usług...*, *op. cit.*, p. 49.

<sup>7</sup> *Ibidem*, p. 50.

meals; and to the rising demand for professional childcare, as well as to development of other personal services;

- increasing household income, thank to women's earnings, and consequent demand for services provided by retailing, real estate and advisory businesses;
- smaller, double income families, capable of spending more of their earnings on entertainment and travel, thus improving their quality of life. Freedom to travel facilitated comparisons between standards and scopes of services available locally and abroad, which led to improved quality and broader range of those services;
- travelling, development of telecommunications, and rising aspirations of consumers, led to broadening their education and to introduction of modern teaching methods facilitated by increased demand for education services in the form of courses, trainings, and academic education in different types of academic schools.

The economic (globalisation of the economy), technological and organisational changes result in<sup>8</sup>:

- increased demand for services connected with transfer of information and communication;
- increased demand for specialised services, e.g. in the field of market research;
- demand for highly qualified staff (specialised in narrow areas of science); this results from the technological requirements of the industry and other branches of the economy, and leads to development of a network of academic schools, and other institutions providing educational services, as well as of science and research, implementation and other, related institutions.

Political and legislative changes influence the development of the service sector, because<sup>9</sup>:

- the number of officials of the national government increases, and the structure of government expands, which is accompanied by development of service infrastructure;
- international connections lead to increased demand for legal services, and specialised advisory in other fields.

In Poland, the services have always been treated as a so-called residual part of the national economy. This placed them in a secondary position, and deepened

<sup>8</sup> K. Mazur, *Marketing usług edukacyjnych...*, *op. cit.*, pp. 50–51.

<sup>9</sup> *Ibidem*, p. 51–52.

the disproportion between their social importance, and the actual influence upon the social and economic development<sup>10</sup>.

The results of research on actual transformation of the service sector in Poland were complemented by global and European maps of economic development. They showed, that as far as development was concerned, countries could fall into three categories: dominated by agriculture, dominated by industry and dominated by services. What then was Poland's place on the maps of development? During the last 25 years, a tendency to increase employment in the service sector could be observed. This growth was systematic, but too slow to deserve a positive rating. In 2001, Poland reached the level of development of several European countries in 1960. The prevailing pace of development in Poland significantly hinders international co-operation, because the distance to cover is longer than a generation<sup>11</sup>.

We live in a service-based society. The increasing proportion of GNP is originated by consumption of services<sup>12</sup>. At present, Poland aims at fulfilling the EU requirements concerning fast development of the service sector, which becomes increasingly important for the economy<sup>13</sup>. The increasing interest in the service sector is accompanied by diversity of opinions on the definition of a service.

### 3. The Concept of Services

In marketing, a service is a non-material product. This broad definition results from the fact, that the concept of "product" in marketing includes anything of use value to purchasers/consumers, and anything they benefit from. Apart from purely material goods, the category of "products" includes services, ideas, persons and objects<sup>14</sup>.

A service is any activity including an immaterial element, involving influencing customers, objects or property in their possession, which does not result in transfer of property rights. However, the transfer of property rights may occur, and servicing may, or may not be tightly connected with a material object<sup>15</sup>.

The following groups of "offers" made to clients by way of a service can be identified<sup>16</sup>:

- a classic material good (pure product), e.g. soap, toothpaste, salt. Such products are not accompanied by any service;

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<sup>10</sup> *Ibidem*, p. 11.

<sup>11</sup> *Ibidem*, p. 13.

<sup>12</sup> P. Mudi, A. Cottam, *Usługi*, PWN, Warsaw 1998, p. 7.

<sup>13</sup> *Odkrywamy Unię Europejską*, WSiP, Warsaw 2003, p. 42.

<sup>14</sup> A. Styś (ed.), *Marketing usług*, PWE, Warsaw 2003, p. 32.

<sup>15</sup> A. Payne, *Marketing usług...*, *op. cit.*, p. 20.

<sup>16</sup> *Ibidem*, p. 21.

- a material good along with an accompanying service emphasising attention paid to the customer, e.g. a computer;
- a service as the basic element in a package with accompanying secondary goods and services of a lesser significance, e.g. a flight trip;
- a classic service (pure service), e.g. childcare, psychotherapy.

Diversification of services depends on several questions, including whether they are targeted at businesses, or individual customers; whether physical presence of a customer is necessary, and whether it requires mainly people (e.g. training), or mainly equipment (e.g. a laundry).

The most characteristic features of services are<sup>17</sup>:

- incorporeality – services are not connected with producing material goods,
- diversity – services are not homogenous, not standard, and varied,
- integrity – services are supplied by their provider, and at the same time consumed by a customer,
- impermanence – it is impossible to store services.

Incorporeality of a service is its basic characteristics. It constitutes the source for the remaining features, such as the impossibility to store services, and it is not necessary to transfer ownership in the process of sales. A consumer in a service company is more than just a purchaser: He or she is a co-creator of the service process.

There are several criteria for classification of services, e.g. according to branch, according to type of service, type of purchaser, character of need, degree of incorporeality, motives of purchase, degree of equipment or personnel involvement, frequency of contacts with a customer, labour intensity, level of individuality and conditions of delivery.

The most general classification can be conducted by way of elimination. A service is a product of the part of the economy remaining after elimination of agriculture, industry and mining<sup>18</sup>.

Competition between service providers means maximising adaptation of their market offer to expectations of customers. It is crucial to recognise all the clients' expectations concerning the entire service process. Services can be categorised according to the expected standard, into the following groups<sup>19</sup>:

- anticipated – reflect the standard of service expected by the consumer; the service is supposed to take place in accordance with those expectations;
- desired – reflect the “ideal”, i.e. the perfect standard of service. The desired service embodies the standard, which a customer would like to receive,

<sup>17</sup> A. Styś (ed.), *Marketing usług...*, *op. cit.*, p. 38.

<sup>18</sup> A. Payne, *Marketing usług...*, *op. cit.*, p. 25.

<sup>19</sup> A. Styś (ed.), *Marketing usług*, PWE, Warsaw 2003, p. 42.

as well as what “can be obtained” and “should be obtained”. It has to be emphasised, that certain factors (e.g. economic) limit the possibility of receiving perfect services.

- appropriate – reflect the minimum acceptable standard of service.

While evaluating expectations from a service, a consumer compares three types of expectations (anticipated, appropriate, desired) with his or her perception of the actual service. The acceptance of the perceived service, resulting from comparing it with the appropriate standard, and the advantage of the perceived service, constitute measurements creating the standard of service quality<sup>20</sup>.

#### 4. Conditions of Service Quality

One of the basic conditions for business success in the service sector is consistently providing services of quality higher, than the competition. It is crucial to meet the expectations of final clients, or even exceed them. Customers’ expectations are determined, among others, by previous experiences, mouth-to-mouth opinions, and by public relations. On this basis, clients choose their service provider, and having received the service, they confront it with the expected standard. If the quality of the service received does not correspond with the expected standard, customers are discouraged from re-using the service. If the received service equals, or exceeds their expectations, they are willing to return to the same provider<sup>21</sup>.

The main requirements concerning service quality are defined by the model formulated by Parasuraman, Zeithaml and Berry. The model identifies five gaps responsible for inappropriate service quality. The model’s authors indicate five situations, when gaps are created between two evaluations of quality, i.e.<sup>22</sup>:

- the gap between customer expectations and their evaluation by company management,
- the gap between the management’s evaluation and the normative quality of a service,
- the gap between technological quality norms of a service, and the service actually supplied,
- the gap between the service supplied, and the contents of communication with consumers,
- the gap between the expected, and the received service.

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<sup>20</sup> *Ibidem*, pp. 43–44.

<sup>21</sup> P. Kotler, *Marketing. Analiza, planowanie, wdrażanie i kontrola*, Gebethner i S-ka, Warsaw 1994, p. 434.

<sup>22</sup> A. Payne, *Marketing usług...*, *op. cit.*, pp. 265–266.

The gap between the expected, and the received service concerns quality shortcomings according to clients, and the gaps 1–4 relate to deterioration of quality within the company. Gaps 1–4 are largely responsible for the creation of gap 5.

The first gap is created as a result of differences between consumer expectations, and perception of those expectations by company management. If the management does not receive any signals from clients, they are convinced, that they evaluate customers' expectations correctly. The second gap results from a difference between the way management perceives consumer expectations, and the normative quality of a service. The company focuses on technological parameters, while purchasers are more interested in quality of the service process. The third gap indicates differences between the service quality according to technological norms, and the one actually supplied. The reason for the fourth gap is the disparity between the delivered service and the information about it communicated to customers. On the basis of this information, clients formulate certain expectations, which are not necessarily satisfied in practice. The reason for this gap can be insufficient communication with purchasers. The fifth gap results from disparity between the service received, and the one expected by the customer. Subjective opinion about service quality is determined by several factors, each of which can change the evaluation<sup>23</sup>.

The service quality gap model has a wide practical application, and not only provides a better understanding of the reasons for problems concerning service quality, but it indicates quality shortcomings, and appropriate remedies as well.

Research indicates, that there are five basic factors contributing to quality of service<sup>24</sup>:

- reliability, i.e. capacity to fulfil promises, providing the client with exactly what he or she ordered, at the agreed moment;
- prompt reaction, i.e. willingness to provide assistance and swiftly deliver the service;
- dependability reflects professionalism and politeness of employees and their ability to win customers' confidence;
- empathy facilitates individual approach towards every client;
- tangibility, i.e. providing signs of reality in the form of equipment, personnel and material means of communication.

Service companies employ different management methods, which significantly influence quality of services they provide, as well as their market position. Those methods include<sup>25</sup>:

<sup>23</sup> *Ibidem*, p. 267.

<sup>24</sup> J. Brillman, *Nowoczesne koncepcje i metody zarządzania*, PWE, Warsaw 2002, p. 111.

<sup>25</sup> P. Kotler, *Marketing...*, *op. cit.*, pp. 436–438.

- strategic approach – the strategy of satisfying consumer needs, thank to which a company wins its clients' loyalty, and a leading market position;
- management's dedication to quality – the management is concerned not only about profits, but about quality as well, since it has a significant influence upon maximisation of profit;
- setting high standards – the leading companies set high quality standards;
- systems of service quality control – leading service companies regularly monitor service quality, both concerning their own services, and those provided by competitors;
- systems of reacting to customer complaints – well managed service companies react promptly to customer complaints, ensuring, that clients are compensated for their distress;
- caring for employees, as well as customers – excellently managed service companies believe, that relations with staff are reflected in relations with clients. Management creates an atmosphere of support, and rewards employees for good service quality.

The above analysis suggests, that service quality is a result of a company's ability to satisfy expectations of customers, or even surpass them, and the expression of this capacity is the actual service quality. Experts agree, that service quality is determined by two main elements: technological quality resulting from operational processes, and functional quality resulting from contacts between a service provider and a customer<sup>26</sup>.

The two dimensions of service quality emphasise the subjective character of quality evaluation. For example, clients of advisory companies, such as accounting offices or law firms, have problems identifying the appropriate technical quality of services, so their judgement is often based on purely subjective impressions, mainly on the way they were treated. A company's public image is important as well, since the technical and functional dimensions of quality determine company image, which in turn influences customers' opinion about service quality<sup>27</sup>.

At present, customers are met by a broadening offer of services and products. They make their choices on the basis of their own perception of qualities and values they are offered. Companies must be aware of the factors determining value and customer satisfaction. Customer satisfaction is the state felt by buyers as a result of the product's congruence with the firm's offer. Clients feel happy, when their expectations are satisfied, and delighted, when they have been surpassed<sup>28</sup>.

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<sup>26</sup> A. Payne, *Marketing usług...*, *op. cit.*, p. 267.

<sup>27</sup> *Ibidem*, p. 268.

<sup>28</sup> P. Kotler, *Marketing...*, *op. cit.*, p. 54.



The increasing interest in service quality measurement observed at the moment in the Polish market, results mainly from the fact, that companies, which operate in a competitive market, are constantly forced to enrich their offer, and simultaneously to improve its quality. This applies to education services as well.

## 5. The Importance of Service Quality in Education

One conclusion of the international conference on *Globalisation of human resource management*, which took place in April 1999 in London, was that the 21<sup>st</sup> century, and the upcoming thousand years are going to be the millennium of the brain. We live in a century founded on knowledge and information. The crucial problem will be the creation of conditions for development of human potential, development and learning of applications for the intellect. Material and financial capital will merely serve as tools for the human capital. Hence the immediate future should be focused on effective management of everyone's intellectual resources. Every human is a vast reservoir of potential. The challenge is to properly use this potential in professional career and life, in order to create good<sup>29</sup>.

Science and knowledge are instrumental in development of the economy and civilisation, and they rise national prestige in the contemporary world. The most important objective of scientific and technological policy of a nation is to achieve results supporting, in a short-term, the process of social and economic transformation, and, in a long-term, securing economic growth and development of the country. Science and education are chief factors of economic growth of any country. It was Winston Churchill who said, that "the empires of the future are the empires of the mind"<sup>30</sup>.

In the conditions of huge variability of the environment in which organisations operate, new problems and challenges arise for the system of education. How do we form people ready to face up to the demands of civilisation? How do we educate to prepare people for a productive life? How do we equalise educational opportunities of the young generations, and how do we level disproportions between countries? How do we shape dynamic and creative personalities?<sup>31</sup>

Poland's joining the European Union coincided with the discussion on the effects of introduction of the Lisbon Strategy after five years, i.e. halfway through its implementation. As other member countries, Poland had to consider

<sup>29</sup> Ch. Maige, J. Muller, *Walka z czasem*, Poltext, Warsaw 1995, p. 115.

<sup>30</sup> *Ibidem*, p. 115.

<sup>31</sup> E. Skrzypek, *Jakość i efektywność*, Wyd. Uniwersytetu Marii Curie-Skłodowskiej, Lublin 2000, p. 287.

the effectiveness of the actions taken, which were to contribute to economic growth, increased competitiveness and higher employment<sup>32</sup>.

The role of education – commonly accessible and of the highest possible quality – in pursuing the goals of the Lisbon Strategy, is beyond discussion. Therefore, the draft of the National Development Plan for the years 2007–2013 includes the operational programme “Education and Competence”, the main objective of which is to improve the level of education of the Polish society. The way to achieve the main objective of the Lisbon Strategy by actions concerning education is presented in the programme “Education and training 2010”, accepted by EU Ministers of Education and the European Commission, which names three groups of strategic targets, of which the improvement of efficiency and quality of systems of education in the EU countries, in the context of new tasks of a knowledge-based society, is the most important<sup>33</sup>.

Effective, high-quality education is the key condition for a society’s development, as well as the way to improve quality of life, both in the individual, and the social dimension. Quality, accessibility and openness of education facilitate development of a society based on the principle of social cohesion. Preparation, and participation in the life-long process of learning facilitates readiness to face up to challenges and undertake innovative actions, as well as strengthening the sense of self-worth; it supports people’s personal development, and gives confidence in the demanding labour market.

The Lisbon Strategy assumes sustainable, balanced economic growth, linked with the increase of employment. Implementation of those plans will not be possible without increased investment in the human capital, and modernisation of the systems of education and training, as well as actions aimed at improving quality and effectiveness. The main goal of development of education in Poland is to make the A-level standard common (70%) in the age group of 25–45 years in 2013, while maintaining high quality of education<sup>34</sup>.

Increasing importance is attributed to quality of education, since it constitutes a basis for effectiveness. Discussions on contemporary education focus on effectiveness, which becomes a priority in theory, and in pedagogical practice, and is diversely understood, researched and evaluated. One of the reasons for this situation is, that education itself, its objectives, organisation, educational and social functions, can be understood differently.

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<sup>32</sup> *Strategia Rozwoju Edukacji na lata 2007–2013*, Ministerstwo Edukacji Narodowej i Sportu, Warsaw 2005, p. 4.

<sup>33</sup> *Ibidem*, p. 5.

<sup>34</sup> *Ibidem*, p. 26.

Effectiveness of education can be discussed in the context of internal and external results of operation of educational establishments, social needs and functions, which those establishments implement, and their reactions to social changes<sup>35</sup>.

There are many arguments for concentration on the quality of education. They include the reaction to the era of growth – the increasing number of unemployed graduates and increasingly difficult accommodation of education to the needs of the dynamically developing world<sup>36</sup>. Education becomes a social matter. The society is expected to obtain full information about the rewards for the expenses spent on education.

Another reason for rising quality of schools is the problem of actual equalising accessibility of education. A school must create conditions to satisfy ambitions of the more talented pupils, and, at the same time, to educate the average pupils, and look after those, who benefit the least<sup>37</sup>.

Yet another reason are the social and economic requirements. The importance of investing in human capital is broadly understood. Educational establishments must prove, that they adequately perform their tasks, such as teaching, socialisation and care.

Answering the increasing social expectations, the system of education must balance the creative autonomy of schools and public responsibility. The crucial element of operation of schools is the quality of work of their employees – ensuring the professionalism of teachers.

## 6. Summary

In time, models of corporate management undergo modifications. The evolution of systems of management is natural in the changing environment. However, it seems, that the recent models of management become similar, in the name of the main goal of any organisation – maximisation of satisfaction of the external customer. The following are among the shared characteristics of the dynamic concepts of management<sup>38</sup>:

- the process attitude to organisation,
- employing creativity of every employee,

<sup>35</sup> Encyklopedia pedagogiczna XXI wieku, t. 2, Wyd. Akademickie Żak, Warsaw 2004, p. 996.

<sup>36</sup> I. Dzierzowska, Międzynarodowy raport: Szkoły i jakość, w: Gimnazjum [online] 2000, Nr 4, Available at [http://www.gimnazjum.pl/jakosc/raport-szkoly\\_i\\_jakosc.phtml](http://www.gimnazjum.pl/jakosc/raport-szkoly_i_jakosc.phtml).

<sup>37</sup> *Ibidem*.

<sup>38</sup> E. Tobaszewska, Total Quality Management w przedsiębiorstwie polskim i japońskim, „Ekonomika i Organizacja Przedsiębiorstw” 2003, No. 12, p. 82.

- constant improvement of actions, involving collection of statistical data,
- creation of early warning systems facilitating preventive actions,
- monitoring and measuring effectiveness of the implemented processes.

Directly connected with the above is the aiming at high quality of work. It cannot be achieved by influencing chosen areas of the organisation. The supreme goal of a company, connected with satisfying expectations of customers, ought to be included in the entire management process, in all areas and on every level of the organisation. This is connected with the holistic approach to corporate management orientated towards achieving qualitative goals.

Quality has several meanings. It is rooted in multi-dimensional philosophy, and can be summarised as the “total quality”, i.e. compatibility between the quality of execution of a product, and the quality determined in the design (the set standards) prepared on the basis of customer requirements.

Devoting attention to quality of school education constitutes a priority in the countries of the European Union. Without a doubt, this situation will prevail during the upcoming years, because it is impossible to improve quality overnight, within a single action. In case of many systems of education, it is a question of putting in order the many reforms conducted during the past few years, and undertaking the effort to improve almost every aspect of education.

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## Qualitative Aspects of Leisure Research

### 1. Introduction

In the modern world, leisure is a crucial category in terms of individual lives, as well as lives of entire societies. It fills the important space, alternative to the time of work.

The common understanding of leisure is, that it is the time of “rest”, “relaxation”, “recreation”, “entertainment”, “inactivity”. The meaning of the term is blurred, since it can be interpreted in several ways. It is a phenomenon of modern life, treated by individuals as a sphere of uninhibited and free choice.

Leisure remains within the scope of interest of several scientific disciplines; nevertheless, its interpretation is conducted mainly from the sociological point of view. There is no doubt, that it constitutes an important component and an immanent feature of modern social structures. It reflects the position and place of an individual within those structures, although it is conditioned by human biological and physiological aspects. Re-generating energy, and rest, ensure restoration of vitality necessary for everyday activities. It is also worth remembering, that leisure is an important element of individual mental structure and identity<sup>1</sup>.

Literature presents several definitions of leisure. For example, according to J. Dumazeidier, leisure comprises of activities free from professional, family, social or political duties, orientated and directed towards personal development and self-fulfilment<sup>2</sup>. It is the time outside sleeping and physiological activities, devoted to rest, play, and disinterested personal development. According to this formulation, leisure activities are subject to rules different than work activities, they are characterised by minimal social obligations and pressures, psychological sense of freedom, disinterestedness and autotelism<sup>3</sup>.

J. Robinson and G. Godbey understand leisure as the time free from paid work, household duties, the so-called private time activities (sleep, physiological functions, hygiene) or transport and travel. The category of leisure includes all the remaining activities, with emphasis upon maximum individual choice. Such

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<sup>1</sup> M. Bombol, *Ekonomiczny wymiar czasu wolnego, Monografie i Opracowania No. 537, SGH, Warszawa 2005*, p. 19.

<sup>2</sup> J. Dumazeidier, *Sociologie empirique du loisir. Critique et contre-critique de la civilisation du loisir*, Paris 1974, p. 93 after: *Kobieta i kultura czasu wolnego*, ed. A. Żarnowska, A. Szwarc, DIG, Warszawa 2001, p. 19.

<sup>3</sup> B. Sułkowski, *Czas wolny*, in: *Encyklopedia socjologii*, Vol. 1, Oficyna Naukowa, Warszawa 1998.

definition of leisure includes not only the traditional leisure activities (i.e. using the media, social life, hobbies, culture, recreation), but also the activities described as “semi-leisure”, such as adult education, religious practices, or organised activism. Some of those can hardly be considered voluntary or autotelic – they are, so to speak, forced by roles people take on<sup>4</sup>.

## 2. Analytical Dimensions of Leisure

The issues of leisure can be considered from diverse angles. The most discussed one is the individual aspect of leisure, satisfying the needs resulting from all dimensions of human activity, i.e. the biological, the psychological and the social dimension. Particularly the last one allows for integrating an individual existence into diverse social groups and, in a broader sense, into the cultural and economic reality.

Modern sources emphasise, that leisure has become one of the objective social needs, as well as an indicator of societies’ standard and style of living<sup>5</sup>.

The research issues concerning releasing and utilising free time are very broad, both in objective, and in subjective terms (Figure 1). The psychological (needs, motives and aspirations connected with leisure), civilisation and cultural patterns (models and norms concerning time economy, goods and services, media, etc.) intertwine, stimulating and co-creating the framework of modern human life.

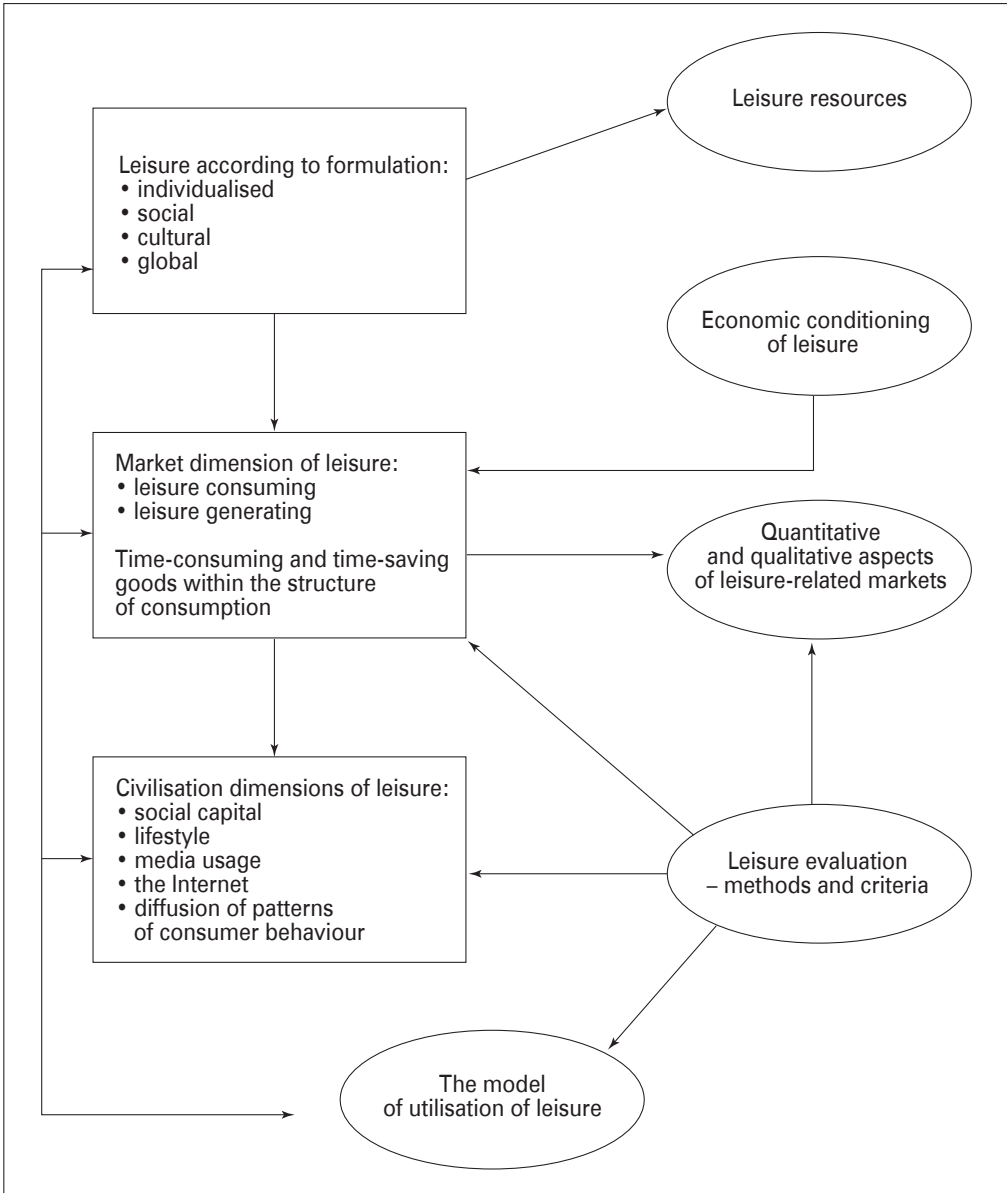
The civilisation and technological conditions produce particular leisure resources. Their amount is determined not only by legal regulations concerning work-time limits, but by availability of time-saving products and services as well. Leisure is influenced by modern technologies. The issue needs to be analysed within the framework of such phenomena, as time of transfer of information, on-line trade and services, and technological advancement of various consumer goods. Without a doubt, a modern human is used to prompt transfer of information. It does play a time-saving function, and facilitates usage of on-line services or on-line trading. There is a time-consuming aspect of the Internet as well, as far as individuals are concerned. This aspect is represented by participation in mailing lists, or by using the Internet resources for entertainment and relaxation. Another aspect of using the modern technology is people’s possessing ever increasing numbers of products of growing complexity and technological advancement, i.e. requiring more and more time to service them and fully utilise their potential. On

<sup>4</sup> J. P. Robinson, G. Godbey, *Time for Life. The Surprising Ways American Use Their Time*, Penn State University Press, PA 1997, p. 12.

<sup>5</sup> R. F. Hamilton, *Work and Leisure. On the Reporting of Poll Results*, *Public Opinion Quarterly*, No. 3 (55)1991.

the other hand, devices create new opportunities as far as using time is concerned – e.g. programmable household equipment, multi-functional mobile phones etc.

**Figure 1. Diverse dimensions of research approaches towards leisure**



Source: original research.



Another way to view leisure is, that it constitutes a necessary component of social capital. It is worth noticing, that the modern economic literature presents several definitions of social capital. It can be considered as a set of values facilitating co-operation between members of a society, as well as a network of relationships and connections between individual members of a community. Furthermore, it can be defined as resources or advantages possessed by individuals due to their social position. Social capital is not only treated as public good (according to F. Fukuyama's conception)<sup>6</sup>, but as private good as well, expressed by individual investments within the network of social relationships. It serves towards integration and social solidarity, supplementing, or even substituting the activity of social institutions, building of local structures etc.

Leisure is necessary for building individual elements of social capital. Three main areas of leisure participating in its creation can be identified: the private, the public and the commercialised one. Individuals fill the private sphere of leisure with fulfilment of certain obligations (such as membership of charity organisations), working for others (e.g. voluntary work), co-operation in small groups (e.g. parents' committees or sharing one's knowledge with others). The public sphere of leisure is translated into activism for political organisations and local government etc. It is very time-consuming, which indicates the necessity to possess and devote a lot of free time. Furthermore, it is this dimension of leisure, which indicates unification of local community members. The last dimension – the commercialised one – relates to events engaging individuals in their free time into public relations events or actions – e.g. sporting or education events sponsored by companies.

A typical characteristic of leisure in modern societies is its economic dimension. Generating leisure requires financial expenses – such as, for example, purchasing time-saving products. Also, the chosen manners of spending free time (active recreation, tourism, participation in culture etc.) constitute an increasingly significant item in household expenses. In the present socio-economic conditions, the leisure generating market and the leisure spending market co-exist and develop dynamically.

The economic dimension of leisure can be understood as attempts to estimate the value of leisure at an individual and social scale. It can be identified via analysis of structure of consumer expenses, or of the way households are equipped with time-consuming and time-saving goods and services. Furthermore, it may involve analysing patterns of behaviour (including consumer behaviour) implemented in free time. Particularly the last approach requires broad empirical research.

<sup>6</sup> B. Fine, *Social Capital versus Social Theory. Political economy and social science at the turn of millennium*, Routledge, London, New York 1002, p. 293.

### 3. Leisure Research

Modern research of leisure is dominated by quantitative approach. Individual time budgets allow for obtaining exact information about the number of minutes devoted to various kinds of activity. The method provides not only extensive empirical material, but it uses the physical properties of time to register behaviour of individuals, and of entire social groups as well. Usually, a time budget research concentrates on measuring periods of time devoted by individuals to activity within particular areas of life. Those include:

- professional and paid work,
- housework,
- family life,
- social contacts,
- relaxation and regeneration,
- empty time (travelling, waiting, etc.)<sup>7</sup>.

In practice, each of those areas can be researched in more detail, in order to obtain data concerning average duration of activities (per respondent, as well as per person conducting a particular activity).

Thus created profile of empirical research allows for rather precise estimation of leisure resources, and determination of directions of their utilisation. Nevertheless, such approach, although very useful and providing a good basis for comparisons (e.g. within socio-professional groups, or between countries), does not provide information about individual opinions concerning leisure.

Therefore, an important aspect of leisure research is the qualitative approach, which allows for a more exploratory diagnosis. A focus group interview is a part of this approach, analysing the non-quantifiable characteristics, in order to establish and analyse needs and motivations, i.e. the research areas, for which quantitative methods do not suffice. Focus group interviews are useful in obtaining information about opinions and consumer behaviour, along with its determining factors.

The Department of Consumption and Living Standard of Warsaw School of Economics undertook a project<sup>8</sup> involving a diagnosis of individual perception of leisure, its evaluation, and determining models of consumer behaviour in free time. In order to do this, a scenario and a mode of conducting a focus group interview were prepared. It was carried out in three homogenous groups, composed

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<sup>7</sup> L. Adamczuk, Budżet czasu ludności Polski, in: Jakość życia i warunki bytu, Biblioteka Wiadomości Statystycznych, GUS, Vol. 40, Warszawa 1991, p. 165.

<sup>8</sup> T. Słaby, M. Bombol, R. Kasprzak, Modele zachowań konsumpcyjnych w czasie wolnym, Statutory research No. 226/05 implemented by the Institute of Management and Finance of Warsaw School of Economics, Warszawa 2005.

according to the phase of family life cycle. The first group consisted of childless people, the second – of people with children under 10 years of age, and the third one of parents of children older than 10. In addition, the criteria included elements such as net per capita household income above the national average, residence in Warsaw, a hobby (defined passions and interests), and physical activity undertaken at least once a week. The moderated discussions were supported by purpose-made questionnaires to be filled individually by the participants. They contained a choice of typical sets (patterns) of behaviour, open-end questions, and questions concerning personal attitudes of respondents towards chosen aspects of their leisure. The research was carried out in September 2005.

The qualitative research provided a range of information, which can constitute a basis for certain general conclusions. The respondents considered leisure to be a complex and complicated category. They defined it as “the time after work”, “all the time spent with one’s family”, “relaxing time actively spent with the family”, “leave”, “time for oneself only”. It is significant, that all the respondents considered their leisure resources as too small and insufficient.

The research indicates, that people without children have more free time during the week and on weekends, than parents do. This means, that models of leisure activities change according to the phase of life cycle. Possessing children, and their age, are significant variables influencing time-spending patterns. The younger the children, the more everyday life and free time are subjected to their influence. This includes the adults’ personal hobbies – the respondents emphasised marginalizing their own leisure needs.

Empirical verification of the model of homogenous leisure consumer behaviour patterns was carried out as a part of the research<sup>9</sup>. Based on the list of favourite leisure activities, five main blocks of activities were determined: media, recreation, social, passive and self-fulfilment. Table 1 presents detailed lists of activities within each block.

The choice of activities within blocks was certainly subjective, since several activities could easily be qualified into more than one block. For example, using the Internet can be classified as self-fulfilment, using the media, or maintaining social contacts. Dancing can be treated as recreation or as a social activity. Going to the movies, or to the theatre, can qualify as using the media infrastructure, or as a manner of self-fulfilment as well.

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<sup>9</sup> M. Bombol, *Ekonomiczny wymiar czasu wolnego, Monografie i Opracowania No. 537, SGH, Warszawa 2005.*

**Table 1. Components of leisure activities according to activity blocks**

Passive	Media	Self-fulfilment	Social	Recreation
Inactivity	Reading	Church going	Going to a disco	Allotment
Cooking	magazines	Cosmetics	Card-playing	Ball-playing
Reposing	Reading	Guitar playing	Chess-playing	Fungi-picking
Drinking	newspapers	Playing	Social events	Driving a car
alcohol/beer	Playing	instruments	Spending time	Gardening
Housework	computer	The Internet	with one's	Swimming
Staying	games	Collections	partner	Contact with
at home	Cinema	DIY	Spending time	nature
	Concerts	Praying	with one's family	Outdoor
	Watching TV	Learning	Pub/restaurant	activities
	Listening to	Learning foreign	Talking on the	Biking
	radio	languages	phone	Fishing
	Listening to	Looking after	Meeting	Dancing
	music	pets	acquaintances	Sports
	Theatre	Needlework/ knitting	Playing with	Climbing
		Crossword	children	Travelling
		solving		

Source: original research.

It is particularly important to determine the importance and the role of individual blocks, according to the level of cultural and economic development of a specific, socially expected manner of spending leisure. Undoubtedly, the “social” block results from the essence of activity of an individual as a member of a community, and of particular social groups. The “recreational” block is identified with the necessity to look after one’s well-being, fitness and longevity, of which people are increasingly aware. It is also desirable due to health reasons. Modern humans, living in a world dominated by information, are dependent upon, or perhaps condemned to using the media, hence the occurrence of the block connected with usage of media during leisure.

The remaining two blocks deserve a deeper reflection. The first one – “self-fulfilment” – could be expanded indefinitely, since, of all the blocks presented, it is the most subjective one. It reflects the most popular, i.e. rather standard forms of behaviour indicating the realisation of supreme individual needs. On the other hand, the block described as “passive” indicates lack of a particular activity during free time, or undertaking activities, which do not require financial involvement.

The respondents represented two types of behaviour, according to their favourite leisure activities: recreational and social. The latter was typical for childless people. It is apparent, that those respondents had a more extensive

social life. Describing the directions of evolution of their leisure behaviour, the respondents emphasised active recreation. It could result from developing healthy habits (e.g. sport), pressure from reference groups, or from friends and family (maintaining the existing attachments by similarity of leisure behaviour).

Childless persons try to live their life to the full – their leisure is limited by nothing but work. They spend their money predominantly on their own pleasure, and their own leisure (sports, entertainment, eating- and drinking-out).

Leisure of respondents with children was limited by insufficient financial resources, children, lack of sporting and cultural infrastructure, or lack of knowledge about it. It is interesting, that childless people tend to value their leisure more.

The respondents reckoned, that leisure during the week was spent actively, on sports (biking, swimming, playing team sports, walking), particularly during the spring and summer seasons. There was less activity in autumn and winter, and people tended to spend more time in front of a TV-set or a computer, or with a book. Culture occupied a small proportion of free time. The usual cultural activity was cinema going, or, much less often, frequenting a theatre or a concert, even though the respondents were all Warsaw residents, and had access to a broad range of cultural activities. The participants emphasised the role of television in their leisure. It does not constitute a separate activity, but accompanies other activities.

The respondents found it difficult to clearly evaluate their leisure. They usually calculated the value of their free time by referring to their hourly pay – especially as far as Saturday leisure was concerned. They declared, that free weekends were very important to them, and they would not exchange their free time for work, even if it were to be very profitable. The evaluation of leave was carried out by multiplication (two- or threefold) of a value of organised trips or vacations.

#### **4. Recapitulating**

It is worth noticing, that although the described type of research concerning leisure is pioneering work, it has been met by interest from research companies, as well as from businesses. An in-depth and detailed study of leisure-related desires, needs and aspirations of consumers is necessary in order to design a successful offer of leisure activities.

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