

Avtomobilizacija srednjeevropskih držav in usmeritve

Automobilization of Central European Countries and Trends

Ján Lešinský

Avtomobilska industrija je letos dopolnila prvo stoletje. Do leta 2010 bo lahko število cestnih motornih vozil (CMV) naraslo za 50 odstotkov in poraba goriva za 45 odstotkov. V srednji in vzhodni Evropi se pričakuje precejšen razvoj avtomobilizma; do leta 2000 bo narasla proizvodnja za 75 odstotkov in do leta 2005 za 125 odstotkov (kar pomeni povečanje svetovnega deleža s 5 na 10 odstotkov). Države s tega področja bodo dosegle večje deleže pri proizvodnji osnovnih materialov in sistemov ter pri proizvodnji in uporabi avtomobilov ter njihovi reciklaži.

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(Ključne besede: avtomobilizem, srednja Evropa, CEFTA, dobavitelji)

The automobile industry has completed its first century. By the year 2010 the number of road motor vehicles (RMV) could increase by 50 % and fuel consumption by 45 %. In Central and Eastern Europe a substantial automobilization is expected; by the year 2000 production will increase by 75 % and by 2005 by 125 % (which will increase the regional contribution from 5 % to nearly 10 % of the world production). Therefore, the countries of this region will likely gain a larger share in the production of basic materials and systems, in the production and utilization of cars, and in their recycling.

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(Keywords: automobilization, Central Europe, CEFTA, suppliers)

0 UVOD

Če gledamo na avtomobilizacijo kot na pojav tega stoletja, so celine območja, na katerih prebivalci tradicionalno sodelujejo, vplivajo drug na drugega in tekmujejo. Razvoj pomorskega prometa je pospešil večje transporte izdelkov med celinami, zračni promet je olajšal gibanje ljudi in telekomunikacijska podpora omogoča stalno navzočnost informacij na kateremkoli kraju na zemlji. Avtomobilski promet je ohranil celinski značaj kar se tiče uporabe, vsekakor pa vpliva na medcelinsko preseljevanje. Dandanes je na svetovnih cestah okrog 680 milijonov osebnih avtomobilov (OA) in komercialnih vozil (KV), pri letni proizvodnji 55 milijonov avtomobilov letno (leta 2005 jih bo 802 milijona pri proizvodnji 70 milijonov letno in leta 2010 blizu 1 milijardo pri proizvodnji 80 milijonov letno). Navkljub različnim napovedim (in katastrofalnim scenarijem), bo avtomobilska industrija (AI) še vedno pomenila 10 odstotkov svetovne industrijske proizvodnje. V vsaki državi AI podpira tehnični razvoj, razvoj standardov in tržišča, svobodo v osebni gibljivosti, ponuja veliko delovnih mest in vpliva na modernizacijo metod vodenja, uvaja nove

0 INTRODUCTION

If we consider automobilization as a phenomenon of this century, then the continents are territories in which the inhabitants have traditionally cooperated, influenced each other and competed. It was the development of sea transport that facilitated large-scale movement of goods between continents, while air transport makes the physical exchange of people across continents easier. In addition, telecommunications supports the instant transfer of information all over the globe. Automobile transport retains its continental character as far as operational space, however, it has an influence on "intercontinental" mobility. Nowadays there are about 680 million passenger cars (PsC's) and commercial vehicles (CV's) on the roads of the world, at a production output rate of 55 million cars per year (in 2005 there will be 802 million at 70 million units per year, and in 2010 nearly 1 billion cars at 80 million per year). In spite of various prognoses (and catastrophic scenarios), the automotive industry (AI) will still represent 10% of the world's industrial production. In each country concerned, AI supports technological development, development of standards in the market and freedom in personal mobility. In addition, AI offers a lot of jobs and influences modern management methods, new

metalurgije, materiale itn. Kljub povečanemu številu avtomobilov, zaradi strožjih standardov in zmanjšanja emisije pri posameznih vrstah motorjev, v Evropski zvezi pričakujemo zmanjšanje emisije za 40% (v severni Ameriki se bo emisija zvišala za 6%, drugje po svetu se bo zmanjšala za 33%). Spremenila pa se bo tudi sestava goriva (poraba bencina se bo zvečala za 33%, nafte za 65%), razvila se bodo nova goriva in novi pogoni.

1 TRENUTNO STANJE

Za sredino devetdesetih so značilne obsežne spremembe v svetu avtomobilizma ([5] in [6]). Označimo jih lahko s:

- počasnejšim povečevanjem letne proizvodnje (96/97 v svetu + 6%, v srednji in vzhodni Evropi + 15%) in
- počasnejšim povečevanjem voznega parka v industrijskih deželah (od ~ 7 do 2%)

vendar tudi z:

- večjim trdom proizvajalcev za učinkovitost,
- širjenjem koncentracije proizvodnje,
- globalizacijo vpliva, napredka in truda [10],
- stalnim zmanjševanjem števila neposrednih dobaviteljev [5],
- obsežnim premikom v proizvodnosti.

Velika avtomobilska industrija torej išče prostor za postavitev svoje proizvodnje, proizvajalci poskušajo najti večja področja.

Trenutna razdelitev avtomobilske industrije [7] glede na proizvodnjo:

- 80% v tako imenovanih tehnološko visoko razvitih državah (s poudarkom nastajanja in razvoja novih izdelkov) in
- 20% v novoprihajajočih državah (sestava, državni avtomobili, konstruiranje detajlov).

Trenutno stanje pri reševanju transportnih problemov z vidika individualnega avtomobilizma (pri povprečnem številu 100 osebnih avtomobilov na 1000 prebivalcev) prikazuje gostota avtomobilov v posameznih območjih, preglednica 1 [10].

Srednja in vzhodna Evropa skoraj v celoti izpolnjujeta zahteve avtomobilske industrije – trenutne kriterije – potrebno stanje tehnologije (za proizvodnjo), plačevanje končnih izdelkov (kupna moč prebivalcev), zviševanje ravni avtomobilske industrije (usposobljen kader) in naraščanje profita (poceni delovna sila) ([2], [5] in [6]).

1.1 Vzhodna in srednja Evropa

V nasprotju s stanjem pri naprednih narodih je v devetdesetih v srednji in vzhodni Evropi:

- bilo naftnih derivatov veliko in so bili poceni,
- vrednost izdelkov ni bila problematična,

metallurgies, technologies, materials, etc. In spite of the growing number of cars, we expect an emission reduction of in the EU 40%, due to stricter standards and emission reduction in individual types of engines (in North America the emission production will increase by 6 %, while in the rest of the world it will decrease by 33 %). There will also be changes in the fuel structure (consumption of petrol will go up by 33 % while that, of oil will increase by 65 %), as new fuels and new drives are developed.

1 THE PRESENT STATE

The mid 1990's characterized by extensive changes in the automobile world [5] and [6], such as:

- a slower increase in annual production (but 96/97 worldwide + 6%, Central and Eastern Europe + 15 %) and
- a slower increase in car fleet growth in industrial countries (from ~ 7 to 2 %)

but also:

- a bigger effort of manufacturers for efficiency,
- extensive production concentration,
- extensive globalization of influence, steps and efforts [10],
- a steady decrease in the number of direct suppliers [5],
- an extensive shift of production performance.

The large automobile industry is therefore "looking for" a territory to place its production, and manufacturers are trying to find bigger areas.

The present distribution of car industries [7] according to production is:

- 80% in so called "high-tech" countries (with stress on the creation and development of new products) and
- 20% in "newcomer" countries (assembly, national cars, detail design).

With an average number of 100 passenger cars per 1000 inhabitants in the world, the car density in individual zones is shown in Tab. 1, [10].

It is Central and Eastern Europe that satisfy, according to today's criteria, the demands of the automotive industry for development of technology (for production), pay for the final product (solvent population), development of the level of the car industry (qualified human resources) and increase of profit (low cost of labour), nearly in full scale ([2], [5] and [6]).

1.1 Eastern and Central Europe Region

In contradistinction to the situation in advanced nations, during the 90's in C. and E. Europe countries:

- oil products were plentiful and cheap,
- weight of products was not a real problem,

Preglednica 1. Parametri avtomobilizacije po posameznih področjih – stanje leta 1998
 Table 1. Automobileization parameters according to individual territories – the situation in 1998

Območje Territory	Število prebivalcev v milijonih Number of inhabitants in millions	Št. avtomobilov na 1000 prebivalcev Car density - CD PsC/1000 inh.
severna Amerika NAFTA	~ 380	400
Evropska zveza EU	~ 380	400
Japonska in Koreja Japan and Korea	~ 170	320
srednja in vzh. Evropa Central and E. Europe	~ 175	150
Rusija Russia	~ 148	80
srednja Evropa CEFTA	~ 89.0	219
Slovenija Slovenia	~ 2.0	383
Češka Czech Republic	~ 10.3	359
Poljska Poland	~ 38.6	230
Madžarska Hungary	~ 10.0	226
Slovaška Slovak Republic	~ 5.4	212
Romunija Romania	~ 22.7	121

- lahki materiali so bili dragi (plastika, aluminij, magnezij),
 - proizvajalci so imeli močno razvito strojniško kulturo,
 - varovanje okolja ni bilo prednostno, tako kakor je danes;
- Današji kriteriji za izbor materialov so strožji zaradi:
- zahteve uporabnikov (delovanje, varnost, udobje, cena) [7],
 - tehničnih omejitev (mehanski in toplotni dejavniki, izraba materiala) [1],
 - okoljskih omejitev (poraba goriva, onesnaženje, hrup, reciklaža) [3].

- lightweight materials were expensive (plastic, aluminium, magnesium),
- manufacturers had a strong “mechanical culture”,
- protecting the environment was not among priorities as it is today.

Today’s material choice criteria are more stringent, due to:

- consumer demands (performance, safety, comfort, price) [7],
- technical constraints (mechanical and thermal factors, material usage) [1],
- environmental constraints (consumption, pollution, noise, recycling) [3].

2 PROIZVODNJA

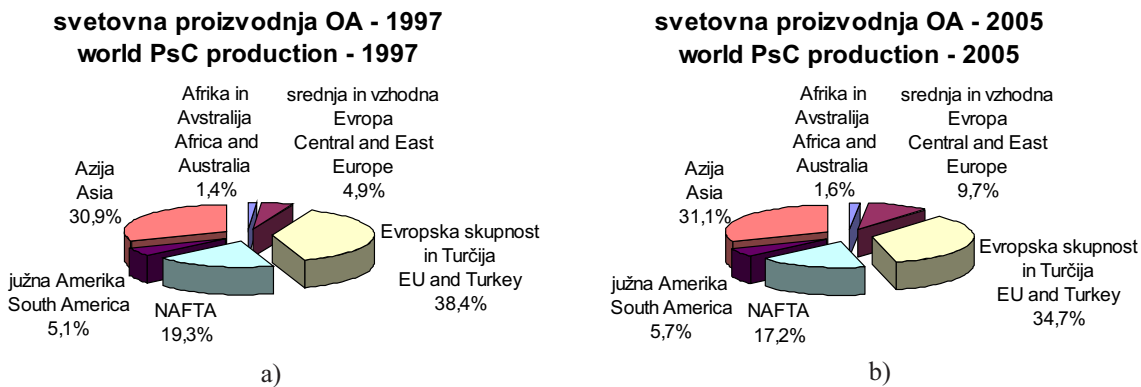
V naslednjih 10 do 20 letih bo na našem območju podobna proizvodnja avtomobilov kakršna je bila v zahodni Evropi v sedemdesetih ([5] in [6]). Močno se bo povečala proizvodnja avtomobilov (pri ne tako velikem povečanju zaposlenosti), močno se bo obnovila sedanja industrija, nastale bodo nove povezave med zahodno in srednjo Evropo, povečalo se bo število podizvajalnih podjetij [5], okrepila se bo gradnja infrastrukture, razvijala se bo dejanska ekonomska vzajemnost, povečala se bo kupna moč prebivalcev [2], povečale se bodo razlike med državami (in tudi v državah samih [2]).

2 PRODUCTION

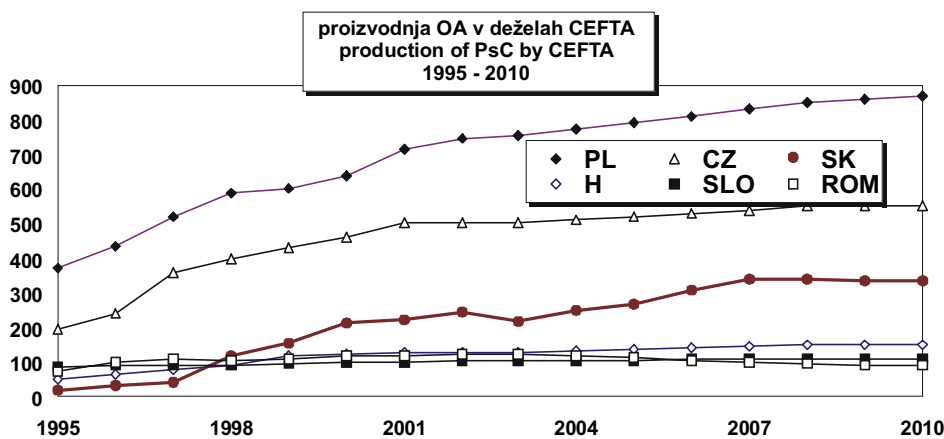
The next 10 to 20 years will be, in our area, similar in car production to Western Europe in the 1970’s ([5] and [6]). We will see a big increase in the production of cars (but not such a high increase in employment), a big revitalization of today’s industries, creation of new connections between Western and Central Europe, an increase in the number of sub-supplier companies [5], a building of infrastructure, an evolution of true economic reciprocity, an increase of inhabitant’s solvency [2], and an increase in differences between countries (but within countries, too [2]).

Do leta 2005 se bo svetovna proizvodnja avtomobilov povečala za 10%. Večanje ne bo enakomerno, v državah srednje in vzhodne Evrope bo skoraj 125%. Spremenila se bodo sedanja razmerja, ki bodo temeljila na ekonomskem razvoju območij. Sedanja nasičenost, potrebe po selitvi, prikazane na sliki 1a, se bodo gibale v smeri pričakovane prerazporeditve, prikazane na sliki 1b.

By 2005, global car production will increase by 10%. The growth will not be uniform. In the countries of Central and Eastern Europe, the increase will be nearly 125%. This will change present conditions according to the economic development in the zones. The current saturation and mobility needs as presented in Figure 1a, will shift toward the expected redistribution according to Figure 1b.



Sl.1. Proizvodnja avtomobilov glede na skupine držav: a) 1997, b) 2005
 Fig. 1. Car production according to country groups: a)1997, b) 2005



Sl. 2. Gibanje proizvodnje OA v državah CEFTA 1995 do 2010
 Fig. 2. The trend of PsC production by CEFTA countries 1995 to 2010

Predvideno proizvodno stanje v državah CEFTA je prikazano na sliki 2.

We can see the predicted situation of CEFTA - countries production in Figure 2.

3 KONČNI PROIZVAJALCI IN DOBAVITELJI

3 FINAL PRODUCER AND SUPPLIERS

Pri industrijski proizvodnji iščejo države srednje in vzhodne Evrope nove vsebine in tudi oživljanje predimenzioniranih proizvodnih vej (kar zadeva porabo energije in materiala ter tudi delovno silo). S prevzemom nekaterih delov avtomobilske proizvodnje bi radi uskladili zaželene in koristne vidike (zaposlenost, pogoji za vzajemnost, izrabo kapacitet itn.). Vendar pa je to zahtevno in za nekatere nerealno [9].

The Central and Eastern European countries are looking for “new” contents and revitalization of oversized production branches (regarding energy and material demands, as well as human resources). They want to combine the wished-for and useful aspects (employment, reciprocity, capacity utilization, etc.) by taking over some aspects of car industry production. However, this way is demanding and, for many, unrealistic [9].

Avtomobilska industrija sama po sebi je nenavadna in veličastna. Če so pred 30 leti, imela velika avtomobilska podjetja desetisoče dobaviteljev, pred 10 leti tisoče, jih imajo danes le nekaj sto [2]. Opazimo, da so uspešni evropski avtomobili sestavljeni iz delov 100 do 150 dobaviteljev iz 10 do 15 držav, od katerih 75 do 90% prihaja iz 5 držav. Vodilno vlogo v evropski avtomobilski industriji zasedajo ne samo glede na število končnih izdelkov, ampak tudi glede na število dobaviteljev. Končni proizvajalec ohranja le pomembne dejavnosti, povezane s konstruiranjem in proizvodnjo, medtem ko dobavitelji (natančno razdeljeni v skupine in podskupine) prevzemajo nove vloge. To je posledica zmožnosti izpolnjevanja novih nalog proizvajalcev delov in obvladovanje lastnega načrtovanja (raziskave in razvoje ter proizvodnja), sestavljanja, logistike in servisiranja.

V celoti gledano se število (pogodbenih) dobaviteljev bistveno zvečuje, po drugi strani pa so dobavitelji večja podjetja, bolj zanesljiva, z večjo odgovornostjo do končnega proizvajalca in spadajo med "najboljše od najboljših" ali z drugimi besedami v sam vrh. Za dobavitelje pomeni to nujno potreben razvoj, večje dobičke, vendar tudi večja tveganja.

4 UČINKI

Vozni park posameznih držav lahko ocenjujemo na več načinov, vendar večinoma z relativnim številom avtomobilov (na prebivalca, na km², na km ceste, na bencinsko črpalko), s tehničnega vidika - s povprečno starostjo ([2] in [6]), z vidika voznih enot - z odstotkom bencinskih, dizelskih in električnih motorjev, z vidika goriva - klasični, alternativni ali plinski. Skupaj z oceno letnih mezd v nekaterih državah (CEFTA, Rusija) so na slikah 3 in 4 prikazana gibanja za naslednje desetletje.

5 VIDIKI

Iz ekonomskega razvoja, v odvisnosti od demografskega razvoja, posameznih držav je mogoče napovedati nadaljnje usmeritve, kakor je prikazano na sliki 5. Očitno je, da ekonomski potencial posameznikov (prikazan je kot BDP/prebivalca) in število prebivalcev vplivata na gostoto avtomobilov v državah. Doseženi BDP omogoča ljudem v dani državi, da kupijo več avtomobilov, oz. da izboljšajo in povečajo sedanji vozniki park (skladno s hiperbolami), kar je razvidno (skladno s kubičnimi parabolami) iz gostote avtomobilov v dani državi. V diagramu lahko vidimo, da bo imelo na primer na Slovaškem 5,4 milijona prebivalcev 300 osebnih avtomobilov/1000 prebivalcev v letu, ko bo njen BDP/prebivalca dvakrat večji.

Na koncu lahko ugotovimo, kar vidimo sedaj pri luksuznih avtomobilih, bo kmalu čisto običajno pri

The automotive industry is itself an extraordinary and monumental creation. While 30 years ago the big car companies had tens of thousands of suppliers, 10 years ago there were a few thousands, and today there are only hundreds [2]. We have recognized that successful European cars are assembled from components delivered by 100 - 150 suppliers from 10 to 15 countries, and 75 - 90% of them come from 5 countries. The leading positions in the European car industry are occupied not only according to the number of final products but also according to the number of supplier companies. The final manufacturer retains only the essential activities related to car design and production, while the suppliers (precisely divided into individual groups and subgroups) take over new functions. This results in completing new tasks by system and component producers, mainly mastering their own designs (R&D + production), assembly, logistics and servicing.

In all, the number of (contracted) suppliers is substantially decreasing, but on the other hand the suppliers are bigger companies; they are more reliable, with greater responsibility towards the final manufacturer and they belong to "the best of the best", or in other words to the "global best". For suppliers it means a necessity of growth and higher profits, but also higher risks.

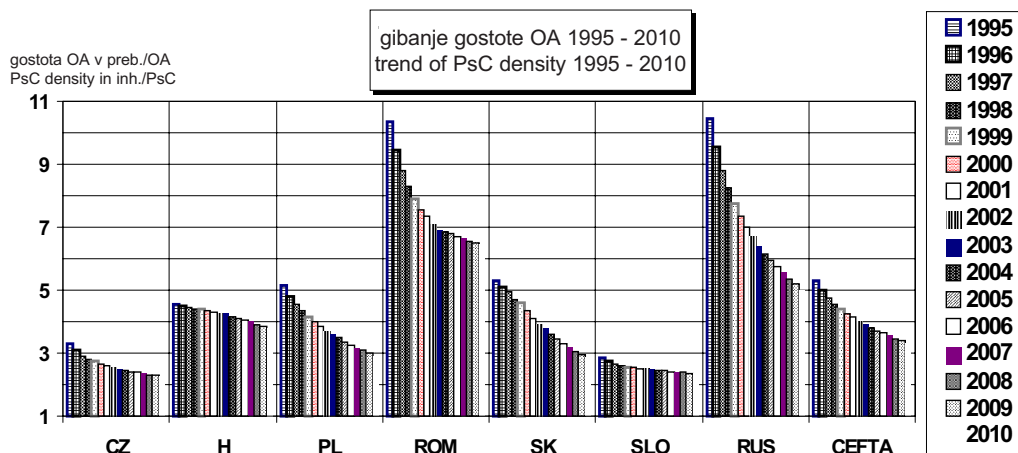
4 EFFECTS

The car fleet in any country can be evaluated from several points of view: from the relative numbers (per inhabitant, per sq. km, per road km, per filling station), from the standpoint of technical progress (average age [2], [6]), from the standpoint of driving unit (percentage of petrol engines, diesel engines and electric motors), and from the standpoint of fuel (classical, alternative or gas). Together with an evaluation of yearly wages in some countries (CEFTA, Russia), we can see trends for the next decade in Figure 3 and Figure 4.

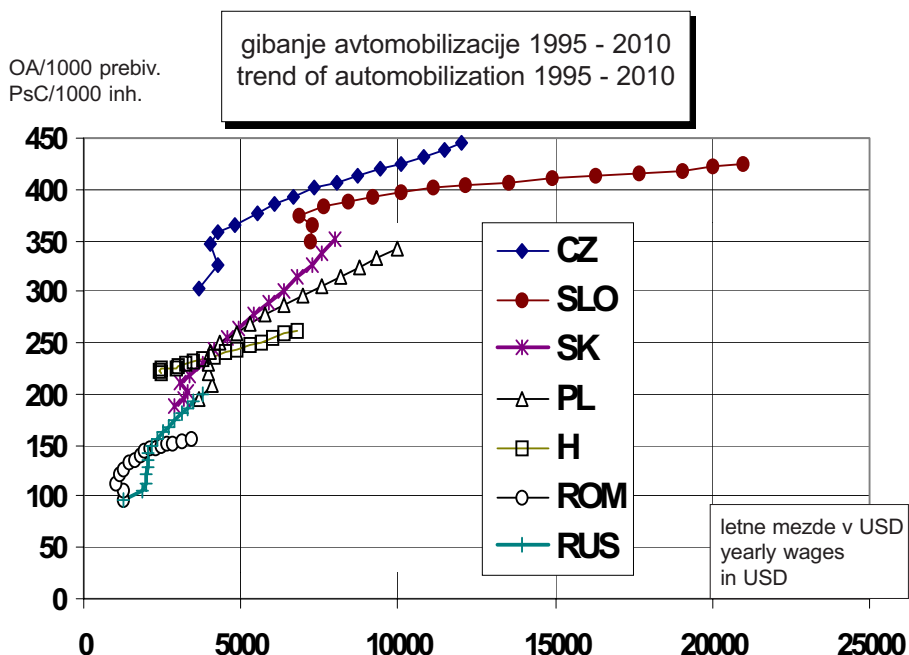
5 VISION

From the economic development standpoint, as well as with regard to the demographic development in individual countries, it is possible to anticipate further development trends as shows in Figure 7. It is obvious that the economic potential of individuals (here plotted as GDP / inhabitant) and the number of inhabitants influence the car density in the countries. The obtained GDP enables people in the given country to buy more cars, or to innovate and enlarge the existing fleet (according to hyperbolae), which is reflected (according to cubic parabolae) in the car density of a given country. For example in the diagram we can see that in Slovakia 5,4 million people will possess 300 passenger cars / 1000 inhabitants in the year while its GDP / capita will be two times higher.

Finally, what we see now in luxury cars will be soon quite commonly be called lower category



Sl. 3. Gibanje gostote OA v državah CEFTA in Rusiji 1995 do 2010
 Fig. 3. The trend of PsC's density by CEFTA countries and Russia 1995 to 2010



Sl. 4. Avtomobilizacija in mezde v državah CEFTA in Rusiji 1995 do 2010
 Fig. 4. Automobiliation and wages by CEFTA countries and Russia 1995 to 2010

vozilih sedanjega nižjega razreda. Varnost avtomobilov bo "inteligentna" (satelitska navigacija, opozarjanje na ovire, nočna vidljivost, inteligentne komunikacije). Zato se povprečna teža avtomobilov posameznega razreda ne more več veliko zmanjšati.

vehicles. The safety of automobiles will be "intelligent" (navigation via satellite, collision warning, night vision, intelligent communication). This is why the average weight cannot be reduced much in a car of the same class.

6 SKLEP

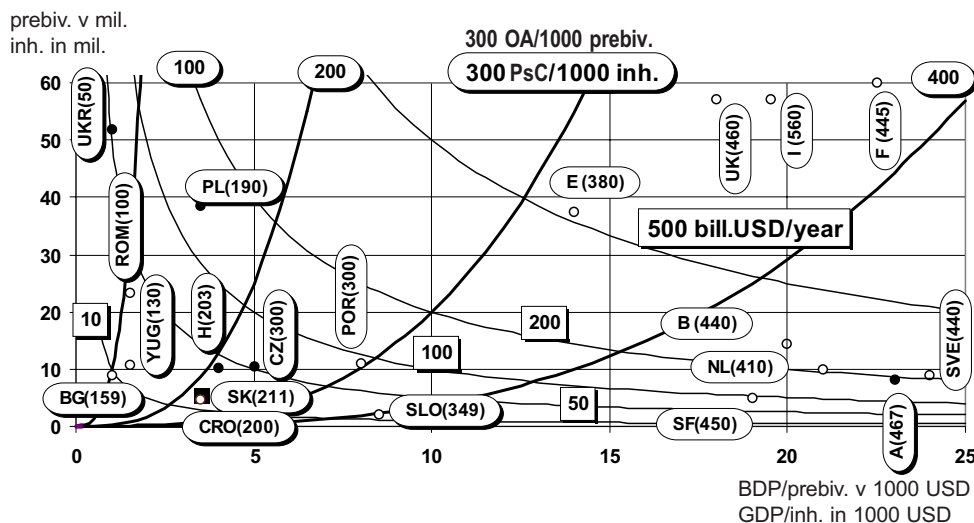
6 CONCLUSION

Na Slovaškem smo priča opaznemu razvoju proizvodnje osebnih avtomobilov. Povečanje sestavljenih avtomobilov na 240.000 letno (ali več) v VW Bratislava, rast proizvodnje sestavnih delov in priprave na masovno proizvodnjo delov za avtomobilsko industrijo, prav tako pa tudi velike spremembe v sosednjih državah (še posebno na Češkem in Poljskem) spodbujajo prenovo naše strojne industrije.

In Slovakia we have witnessed a substantial development of passenger car production. The rate of car assembly has grown to 240 000 per year (or more) in VW Bratislava, while an increase in components production and preparation of mass production of components for the automobile industry, as well as big changes in surrounding countries (mainly Czech Republic and Poland) stimulate revitalization of our machinery industry.

Vlade po vsem svetu si želijo avtomobilske industrije vsaj toliko, kolikor si njihovi državljani

Governments around the world want an automotive industry as much as their citizens want automo-



Sl. 5. Ekonomija in gostota avtomobilov – 1997 (• Slovaški sosednje države)

Fig. 5. Economy and car density - 1997 (• Slovak neighbour country)

želijo avtomobilov. Industrija je tako pomagala družbeno ekonomskemu razvoju. Avtomobil je izdelek današnje družbe, toda razvil in spremenil je socialno, ekonomsko in politično dinamiko družb moderne dobe. Države, ki več vlagajo v avtomobilsko industrijo, imajo sorazmerno večje število avtomobilov, ne samo za “prosto uporabo”.

biles. The industry has thus helped societies pursue economic development. The automobile is a product of today’s society; it has developed and changed the most important social, economic, and political dynamics of modern society. Those countries that participate more in car production have a proportionally higher number of cars, and not just for the sake of freedom.

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Avtorjev naslov: doc.dr.inž. Ján Lešinský
Fakulteta za strojništvo
Slovaške tehnične univerze
Nám. slobody 17
812 31 Bratislava, Slovaška

Author’s Address: Doc.Dr.Ing. Ján Lešinský
Faculty of Mechanical Engineering
Slovak University of Technology
Nám. slobody 17
812 31 Bratislava, Slovak Republic

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