CENTRAL EUROPE AUTOMOTIVE REPORT™

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July 1998

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Volume III, Issue 7 **ISSN 1088-1123**

Regional Market Highlights

Summary

- ***Hyundai Quits Poland***
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- ***CZ Builds 2 Millionth Gearbox for Skoda-Auto***
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- ***Daewoo Buys Romanian Vehicle Maker***

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Poland

SZC and Hyundai Terminate Agreement

On May 28, 1998, **Sobieslaw Zasada Centrum** terminated its controversial cooperation with **Hyundai Corp.** The two companies were planning to work together and assemble Hyundai's Atos and Accent models in Starachowice, Poland.

According to SZC's announcement, the reason for terminating negotiations was Hyundai's withdrawal from the project's co-financing arrangement, reportedly due to the crisis in Korea. SZC also failed to obtain permission from the Ministry of the Economy to extend the May 29 deadline for submitting required documents.

Visteon Buys Companies In Poland

On May 27, 1998, **Visteon Automotive Systems** announced that it purchased two automotive component companies in Poland.

The two companies — **Pol-Mot Praszka** in Praszka, Poland and **Pol-Mot ZEM** in Duszniki Zdroj, Poland — were acquired from **Pol-Mot Holding** in Warsaw and will be renamed **Visteon Poland SA** and **Visteon ZEM SA** respectively.

Visteon Poland SA has 1,620 employees and produces air brakes, coil springs, oil and water pumps, and aluminum castings. Visteon ZEM SA has 620 employees and manufactures wiper systems and cooling and blower system motors. Visteon plans substantial site, equipment, and training investments at the two facilities.

"These two companies offer Visteon an

Continued on Page 2

Profile

Suzuki Opens Throttle in Hungary: New Cooperation With GM & Sales Up 40%

*Suzuki is shifting into high gear in Hungary. In May, the company announced that it has agreed with **General Motors** to jointly develop a new model for the small car segment. Suzuki will manufacture the car at its plant in Esztergom Hungary, while GM will produce the car at its new factory in Gliwice, Poland. Suzuki plans to produce 50,000 of the new cars and will market them under its own name.*

Dr. Frigyes Banki

And on the sales front, business is booming for Suzuki as sales were up 40% during the first five months of 1998.

*To find our more about Suzuki's plans for Hungary, the CEAR spoke with Dr. Frigyes Banki, Deputy General Manager and Member of the Board of Suzuki's subsidiary in Hungary, **Magyar Suzuki**.*

CEAR: Can you give us an update on Suzuki's joint production agreement with GM?
Banki: This is a new challenge for Magyar

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Highlights *Continued from Page 1*

excellent base to grow its business in Central and Eastern Europe and create export opportunities into Western Europe," said Visteon's John Kill, European Operations Director.

"They will offer a local high quality supply base for the increasing number of Western automotive companies who are moving into Central and Eastern Europe. The two Polish plants will also provide a highly competitive production base ideally located for exports to Western Europe."

Visteon, an enterprise of Ford Motor Company, is targeting 20 percent of its growth from non-Ford business.

GM & Suzuki Will Cooperate on New Small Car Project

General Motors Europe and **Suzuki Motor Corp.** have agreed to jointly develop a new vehicle in the small car segment. The car will be built in GM's new plant in Gliwice, Poland and in Suzuki's factory in Esztergom, Hungary. Start of production is planned for the beginning of the year 2000. Each company will market the car under its own brand name in Europe.

When production of the new car begins at GM's Polish factory, annual capacity will be increased from 70,000 units to 150,000 units. Investments totaling DM 375 million ($200 million) will be made by GM to expand capacity. The workforce at the Gliwice plant will also be increased from 2,000 to 3,000 people.

GM/Opel's version of the small car will be available with two recently introduced ECOTEC engines — a 1.0 liter 12-valve three-cylinder engine and a 1.2 liter 16-valve four-cylinder engine.

Eaton Purchases Poland's Biggest Transmission Manufacturer

Eaton Corporation announced in June that it has signed a preliminary agreement to purchase **Fabryka Przekladni Samochodowych (FPS),** a truck transmission manufacturing company based in Gdansk, Poland. The transaction, which is for an undisclosed amount, is subject to governmental approval.

FPS is the largest manufacturer of truck, bus and van transmissions in Poland. The company also manufactures truck transfer boxes, power take-offs, splitter boxes, and gear shift mechanisms for domestic and export markets. FPS has annual sales of approximately $20 million and about 900 employees.

Bridgestone In Joint Venture With Polish Tiremaker

Bridgestone Corp. is establishing a tire manufacturing joint venture in Poland with the state-owned **Stomil Poznan SA**. The joint venture will be officially registered in July of this year, and production is expected to begin by July of 2000 with about 300 workers. Initial capacity will be 5,000 passenger car and commercial van tires a day.

Stomil is 100% owned by the **State Treasury**. In such cases, permission for a joint venture must be issued by both the **Ministry of the Treasury** and the **Ministry of Internal Affairs and Administration.**

Unofficially, it has been reported that Bridgestone will hold 71.2% of the shares in the joint venture. Company capital will total $63 million.

Stomil Poznan manufactures special-purpose tires for such sectors as aviation, the army, mining, and for industrial vehicles and trucks. It is among the special-importance plants mentioned in the Defense Act and the Official Secrets Act. According to the daily **Rzeczpospolita**, in 1997 Stomil Poznan recorded revenues of PZL 71 million and a profit of PZL 3.8 million.

"[The joint venture] proves that we are very much concerned about [the Polish] market," Bridgestone/ Firestone Polska sales and marketing manager Grzegorz Krzyzanowski told the CEAR. "It will be a big step forward for us."

The Bridgestone joint venture will compete for business with **Goodyear** and **Michelin** who already operate in Poland through their own joint ventures.

*More **Market Highlights** on Page 4*

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EDITORIAL CALENDAR 1999

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Issue	Feature	Automotive Reviews	Special Reports	Close Date
Jan 99	Poland	Body/Chassis	1998 Year in Review/ 1999 Forecast	Dec 10, 1998
Feb 99	Hungary	Central Europe's Executive of the Year	Vehicle Fleets	Jan 10, 1999
Mar 99	Czech Republic	Components & Systems	Auto Aftermarket	Feb 10, 1999
Apr 99	Slovak Republic	Marketing & Advertising	na	Mar 10, 1999
May 99	Romania/Bulgaria	Electronics	Auto Consultants	Apr 10, 1999
Jun 99	Poland/Slovenia	OEM Special: Who Supplies Who	na	May 10, 1999
Jul 98	Hungary	Powertrain	Exporting to Central Europe	Jun 10, 1998
Aug 98	Not Published			
Sep 98	Czech Republic	Plastics	Auto Engineering	Aug 10, 1998
Oct 98	Slovak Republic	Logistics	Human Resources	Sep 10, 1998
Nov 98	Romania/Bulgaria	Interiors	Real Estate	Oct 10, 1998
Dec 98	Poland/Slovenia	Financing	na	Nov 10, 1998

Regular Monthly Columns

Feature Country - featured country market overview and news, plus updates from around the region
Profile Interview - interviews with regional automotive executives
Product News - information on new products, components, and vehicles in the market
Opportunity Spotlight - regional companies offering investment, joint venture, or partnership opportunities
Quality Corner - information on improving supplier quality in the region
Legal Advisor - updates on legislation and legal matters pertaining to the automotive industry
Focus On Investment - investment analysis of regional automotive related companies
Accounting & Finance - updates on accounting, tax, and customs changes pertaining to the automotive industry

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***Highlights** Continued from Page 2*

Centra To Supply VW With Batteries

According to Krzysztof Paulus, director general of Polish battery producer **Centra SA** in Poznan, Centra will start to supply batteries to the **Volkswagen** factory in Wolfsburg at the end of this year.

"We need to obtain Volkswagen certificates for our products first," Paulus told the **CEAR**.

Centra has already received VDA6, which is required by Volkswagen, **Audi** and **Mercedes**. In mid July, according to Paulus, the company will undergo auditing for QS 9000 certification, which is necessary to enter the American market. The next step will be Volkswagen certificates, which Centra should obtain in October.

One out of every two storage batteries sold in Poland comes from Centra. The company plans to produce 2.6 million batteries this year, 30% of which will be exported mainly to Germany, France, Great Britain, Russia, and Belarus. **Exide** is the majority owner of Centra and some export is done within its distribution chain.

Daewoo FSO To Begin Pilot Production Of L-4 Engine

In December 1999, **Daewoo-FSO's** Zeran (Warsaw) factory will start pilot production of new L-4 engines, said Krystyna Danilczyk, press spokeswoman for Daewoo-FSO.

Planned production capacity is 200,000 units per year, of which 100,000 will be for the new Matiz model, 50,000 for the new F-100 van, and the rest will be exported. Total investment in the project should total $200 million. The L-4 engine offers multi-point fuel injection, 1.0 or 1.2 liter capacity, and 62hp or 71hp.

Gold Medals Awarded at Poznan International Motor Fair

Nine gold medals were presented at this year's International Motor Fair in Poznan, which took place in late May. Participating in the fair were 800 exhibitors, including 140 from abroad.

The awards went to:

- Mobil Delvac 1 SHC oil from **Mobil Oil Francaise** of France;
- an unleaded universal gasoline from **CPN SA** of Poland;
- Eagle tires from the **Goodyear Tire and Rubber Co**. of Luxembourg;
- the Frigo family of winter tires from the **Debica Tire Company** in Poland;
- an electronic fuel consumption measurement system from **Mannesman VDO AG** of Germany;
- the Niedzwiedz-Lock II blocking device for gear shifts from **Niedzwiedz-Lock SC** of Lubon, Poland;
- the Amsterdam car radio from **Blaupunkt GmbH Bosch Gruppe** of Germany;
- the H4 car light bulb from **Gluehlampenwerk Aachen** of Germany; and
- anti-dust filters from **WIX-Filtron Sp. z o.o.** of Gostynin, Poland.

Delphi May Build Technical Center

Delphi Automotive Systems is considering plans to build a Technical Center in Poland that would specialize in design engineering work for the car industry, according to reports by the **Polish Press Agency**.

Daewoo Teams Up With Akzo Nobel For Paint Supply

Akzo Nobel Car Refinishes Polska and **Centrum Daewoo** have signed an agreement for the use of Sikkens paints and renovation materials by authorized Daewoo service stations. The agreement is aimed at improving the quality of body and paint jobs offered by Daewoo.

Rumors About Japanese Investments Circulating Again

More rumors are circulating that **Toyota Motor Corp**. will build a passenger car transmission factory in Poland. The locations mentioned as possible sites include the special economic zones in Walbrzych and Legnica. The Japanese press is also speculating that **Calsonic Corp**. shortly intends to form a joint venture with **Polmo Kalisz** for the production of parts for air-conditioning systems.

Czech Republic

Lucas Establishing Fast-Fit Center Network

Lucas Autobrzdy, a joint venture between **Lucas Varity** and the Czech company **Ateso,** has started the roll out of its network of fast-fit centers in the Czech Republic. The first center was opened on May 15, 1998 in the city of Most and 2 or 3 additional centers will be opened in Brno in the near future.

By the end of 1998, Lucas expects to open 22 fast-fit centers in the Czech Republic. By the end of 1999, the company plans to have 40 centers. The centers will initially specialize in brakes and shock absorbers, with other products to be added in the future.

AMP Investing In New Plant

The US company **AMP Inc.** is investing $21 million into a new auto parts plant in Kurim, Czech Republic, according to the Czech daily **Mlada fronta Dnes**. The factory will produce connectors and bunched cables for cars, and will employ about 750 workers.

CZ Strakonice Produces 2 Million Gearboxes for Skoda-Auto

On June 2, 1998, the Czech company **CZ Strakonice** produced the two millionth gearbox for **Skoda-Auto** in Mlada Boleslav, Czech Republic. CZ produces gearboxes for Skoda's Felicia and Favorit models.

CZ Vice Chairman Lubos Kubista told the **CEAR** that the company is also currently involved in negotiations with **Volkswagen** regarding the production of turbochargers. CZ produces turbochargers primarily for trucks and agricultural tractors — **John Deere** is one of the company's key customers.

In addition to gearboxes and turbochargers, CZ produces vehicle chains, motorcycle components, aluminum castings, molds, and machine tools.

Skoda a.s. (Plzen) Selling Tatra

The Czech engineering group **Skoda a.s.** announced in early June that it plans to sell its heavily indebted truckmaker **Tatra a.s.** In addition to Tatra, whose debt currently runs at around CZK 3 billion ($90 million), Skoda also plans to sell its ailing press making unit

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Plenty of Power in Central Europe

Auto Powertrain Review

Engines, transmissions, shafts — all of these powertrain products are manufactured or assembled by companies throughout Central Europe. The sector has seen significant investment as manufacturers establish plants in the region to supply local customers and for export.

Major Engine & Transmission Production in Hungary

Hungary is home to two major powertrain manufacturers — **Audi** and **General Motors**. Not only are these companies currently producing in Hungary, but they are actively expanding their manufacturing footprints in the country.

GM has produced engines in Hungary since 1992. In 1997, the company completed a DM 50 million expansion of its plant in Szentgotthard which, at full capacity, will produce 460,000 engines per year. The plant currently builds 1.4 liter and 1.6 liter 16-valve Ecotec engines for export and the local market.

GM recently announced that it is expanding its presence in Hungary. The company is investing $128 million into a new transmission factory that will go on line in the year 2001.

Audi's engine plant in Hungary has grown to be the company's main engine production site. Since 1994, Audi has manufactured engines in Hungary, primarily for export to Germany (**Audi** & **VW**) and the Czech Republic (**Skoda**). Audi assembles four-cylinder, V6, and V8 engines. In April, the company started assembling vehicles in Hungary. (*for more on Audi Hungaria, see Company Spotlight on page 24)*

Poland Attracts Big Names

Poland's powertrain producers include some of the auto industry's biggest names, including **Fiat**, **Daewoo**, **Isuzu**, **Delphi**, **Eaton**, and **GKN**.

Isuzu is constructing a DM 300 million diesel engine factory in Poland to supply **GM** in Europe and Poland. Production will begin by mid-1999 and annual output will hit 300,000 units by the year 2000.

The **Daewoo**-owned **Andoria** engine plant produces diesel engines in Andrychow, Poland.

In December 1999, **Daewoo-FSO's** Warsaw factory will start pilot production of the new L-4 engines. Planned production capacity is 200,000 units per year, of which 100,000 will be for the new Matiz model, 50,000 for the new F-100 van, and the rest will be exported.

In September 1997, GKN started constructing its new $32 million facility in Olesnica, Poland. The new plant will manufacture driveline and power transmission products, including constant velocity joints and half shafts, for supply to customers within Poland, including **Fiat**, and for export.

Initial production at GKN's plant is planned at 300,000 vehicle sets, and increasing to 500,000 vehicle sets in the near future.

Below is a quick look at some of the key powertrain product producers in Central Europe

Poland

- **Isuzu Motors** — diesel engine factory under construction.
- **Fiat Auto Poland —** produces engines at its Bielsko Biala plant
- **Daewoo FSO —** starting pilot production of new L-4 engines
- **Andoria —** Diesel engine producer 40% owned by Daewoo supplies **Daewoo Motor Polska**
- **Eaton —** Has signed a preliminary agreement to purchase **Fabryka Przekladni Samochodowych,** the largest manufacturer of truck, bus, and van transmissions in Poland.
- **Delphi —** Building new greenfield factory in the Special Economic Zone in Tychy to produce driveline half shafts and steering components.
- **GKN Automotive Polska** — New factory will manufacture driveline and power transmission products, including constant velocity joints and half shafts.
- **FPS Tczew** — Gearbox producer is majority-owned by **Zasada**.
- **Polmo Szeczencin** — driveshaft producer owned by **PIAST** National Investment Fund

Czech Republic

- **Skoda Auto —** Produces two types of engines, a 1.3 MPI, 1289cc, 40 kW/54 BHP and 1.3 MPI, 1289cc, 50 kW/68 BHP.
- **Daewoo Avia —** Produces 3.6-liter, 4-cylinder diesel engines at plant outside of Prague.
- **Praga —** Produces mechanical gearboxes for trucks, buses, tractors, and special vehicles. **Daewoo Avia** is one of Praga's biggest customers for gearboxes.

Hungary

- **Opel —** Produces engines at plant in Szentgotthard. At full capacity, plant will produce 460,000 engines. Investing $128 million into new transmission production.
- **Audi Hungaria Motor** — Produces four-cylinder, V6, and V8 engines for export.
- **VAW —** Operates large cylinder head and engine block plant in Hungary.
- **RABA —** Diesel engine producer.
- **UKM Rekard** — Privatized company produces driveshafts and gearboxes.

Slovak Republic

- **VW Bratislava** — Produces gearboxes and gearbox components. In 1997, production capacity was 259,000 gearboxes — goal for 1998 is 322,000 units and 7 million components.
- **Sachs Trnava —** Produces passenger car and truck clutches. Supplies **Skoda** with 100% of its clutch needs. Expanding to produce torque converters for trucks and buses.

Romania

- **Daewoo Automobile Romania** — In 1997, invested $450 million into engine and transaxle shop. Engines and transaxles are shipped to

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Poland Plans Excise Tax on Import & Sale of Cars

Import/Export Help Desk

Mariusz Maciejewski, Price Waterhouse, Warsaw

The Polish government is planning to introduce a 2% excise tax on the importation and sale of cars. The project is very advanced and if successful might mean a significant reduction in the cost of importing luxury cars into Poland. On the other hand, it might lead to a significant increase of prices for cars in the medium and low price segment of the market.

Tax Accumulates Through Sales Chain

The new system would provide for a 2% excise tax levied upon each transaction in the sales chain until the car is first registered. Depending on the length of the chain of transactions, the tax could thus accumulate substantially on route to the consumer. No threshold is foreseen in the draft which means that even very cheap cars would be subject to the excise tax.

The current system in Poland provides for excise tax on sales of cars whose value exceeds 7,500 ECU. The tax rate is 10 % for cars sold domestically, levied on their sales value. For imported cars the excise is 15%, levied on the basis of customs value increased by customs duty (which currently amounts to a 35% full rate!).

Cars are further subject to a 22% import or domestic VAT. The system may be regarded as part of the broader strategy of the Polish government, aimed at encouraging big automotive producers to set up their plants in Poland rather than import cars produced elsewhere.

> "The introduction of the new excise tax system would be the first step by a Polish government to reduce the benefits of automotive producers who have invested in Poland."

Current System Tweaks Importers & Government

The current system is strongly criticized by importers. First of all, it has negative impact on the safety of cars on Polish roads as in practice it is mainly additional safety equipment — such as ABS, extra air-bag — which puts importers in an excise tax position. It is also questionable whether the difference in excise tax on Polish and foreign cars is in line with Polish obligations under GATT 1994.

The current system is also unpopular in governmental circles as it is easily avoidable. Foreign importers are able to diminish tax levies by importing into Poland poorly equipped cars and installing additional equipment after sale in Poland.

New Tax Would Hurt Local Producers

If the new system were introduced, it would primarily hit producers of cars priced below the 7,500 ECU threshold, especially those based in Poland who get the greatest benefit from the current system. In fact, the introduction of the new system would be the first step by a Polish government to reduce the benefits of automotive producers who have invested in Poland.

The financial manager of **Daewoo - FSO** Janusz Lach has given his negative evaluation of the government's proposal in the **Rzeczpospolita** newspaper saying that it is a manifestation of fiscalism. He said that the ministerial plans are seen as a bow towards western producers with total disregard for those who produce cars in Poland and create employment in the country.

It is still an open question as to whether the new system is in line with Polish obligations under free trade agreements that prohibit the introduction of new taxes. Specifically, Article 25 of the Europe Agreement establishing an association between Poland and the EC and its member states prohibits introduction of new, or increases of existing customs duties on imports or charges having equivalent effect.

The new rules might also prompt the automotive industry to soak in completely sales structures, leading to increased concentration of this business ■

Magyar Suzuki's Key Numbers

	1998 (forecast)	1997
Production (units)	70,000	63,500
Exports (units)	50,000	47,700
Turnover (forints)	85-86 billion	77 billion
Profit (forints)	1.6 billion	1.6 billion

$US = 212 forints (June 1998)

Source: Magyar Suzuki

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Polish Vehicle Market Segmentation (YTD April 1998)

Segment	YTD SALES (Units)		CHANGE (%)	MARKET SHARE (%)		SALES IN APRIL	
	1998	1997		1998	1997	1998	1997
1. Segment A	34,457	36,094	-4.54	25.06	27.63	13,794	12,010
2. Segment B	27,487	33,141	-17.06	19.99	25.37	11,276	11,035
3. Segment C	58,371	41,753	39.80	42.44	31.96	21,060	16,896
4. Segment C/D	14,290	17,458	-18.15	10.39	13.36	5,629	4,532
5. Segment D/E	1,733	635	172.91	1.26	0.49	806	262
6. Segment F	31	29	6.90	0.02	0.02	21	15
7. Segment S	298	586	0.00	0.00	0.00	142	195
8. Segment MPV	695	778	0.00	0.00	0.00	264	388
9. Segment 4WD	163	161	1.24	0.12	0.12	86	50
Total Passenger Cars	***137,525***	***130,635***	***5.27***	***99.28***	***98.96***	***53,078***	***45,383***
10. Light Comm. Segment	5,714	7,243	-21.11	46.21	55.07	2,261	2,671
11. Medium Comm. Segment	6,652	5,910	12.55	53.79	44.93	2,498	2,172
Total Commercial Vehicles	***12,366***	***13,153***	***-5.98***	***100.00***	***100.00***	***4,759***	***4,843***

Source: SAMAR s.c., Local Manufacturers and Official Importers, ACEA

Tips For Success In Central Europe

Overheard in Poznan

Jeff Jones

I recently attended a few auto shows in Central Europe, notably Poznan in Poland and Autotec in the Czech Republic. I spoke with scores of companies and learned a lot about what companies are doing and what people are thinking.

Although new cars sales growth rates are down in most Central European countries, the pace of activity in the auto sector is still intense. All companies — car makers, suppliers, distributors, and financing companies — are out hustling for business and devising new strategies to capture a bigger chunk of the market. Competition is vicious. It's not a market for the weak or undercapitalized.

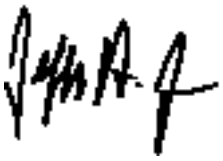
One of the biggest complaints I heard? "There just aren't enough hours in the week to do everything we need to do." People are overworked, staffs are lean, demands are high. The Eastern European sales manager for a major Western supplier covers the entire region with a staff of one. Himself. He works eight days a week.

Others were frustrated by the slow pace of infrastructure development in the region. In Poland, for instance, one truck maker noted that there is lots of talk about roads and highways, but few results. "For a transit country [like Poland], it's hard to understand."

I heard a lot about how Central European customers are demanding more from companies. Customers want faster service (such as for spare parts delivery), better availability of products, better aftersales service, and higher quality. Why is Lucas Autobrzdy rolling out a network of fast fit brake and shock absorber centers in the Czech Republic? It's what their customers are demanding.

Parts sellers told me that Polish customers are now shopping for quality. They have more income and are willing to pay for better built products. In the past, customers were willing to buy cheaper parts and frequently replace them. But today, with rising mechanic's rates (especially in Warsaw), this strategy is becoming cost prohibitive. Customers see the benefit of buying quality.

One common sentiment is that the Central European market is exciting. "You never know what will happen next," said one parts distributor. "Everything is changing so rapidly." Another Tier one supplier happily declared, "Our business is booming."



jones@cear.com

Fastest Sales Climbers in Poland (YTD April 1998)

Passenger Cars			Light Commercial Vehicles			Medium Commercial Vehicles		
Make	**Units**	**Change '98 v. '97 Units**	**Make**	**Units**	**Change '98 v. '97 Units**	**Make**	**Units**	**Change '98 v. '97 Units**
Daewoo Lanos	10,380	10380	Citroen Berlingo	417	414	Mercedes Vito	804	436
Fiat Siena	9,681	9681	Skoda Pick up	672	355	VW Transporter	559	299
Daewoo Tico	13,171	6216	Renault Kangoo Exp.	35	35	Iveco Daily	332	177
Daewoo Nubira	3,168	3168	Peugeot 306 XA	29	20	Peugeot Boxer	206	130
Toyota Corolla	2,643	2040	Peugeot 106XA	6	5	Mercedes Sprinter	207	104
Fiat Palio Wknd.	1,794	1794	Seat Inca	33	1	Kia Preggio	83	83
Opel Astra	6,198	1533	Piaggio Porter	8	1	Kia Ceres	163	79
Citroen Xsara	1,489	1489				Hyundai H100 P/V	96	42
Toyota Avensis	1,131	1131				Daewoo Lublin	2,675	28
Honda Civic	3,950	1115				Citroen Jumpy	28	28

Source: SAMAR, s.c.

Managing for Excellence

Facing the Intellectual Capital Challenge — Part II

Dr. Johan Roos, Professor of General Management and Strategy, International Institute for Management Development

Intellectual capital is one of the most important and sustainable sources of competitive advantage for today's modern companies — IC is simply the driver of future earnings. Most companies, however, don't even know how to measure their IC. Based on last month's discussion of the fundamentals of IC, this month Dr. Roos will explain and illustrate how car companies develop a simple, yet robust measurement system of IC

Today, an increasing number of companies rethink basic assumptions of how to point the way into the future. Most executives have already realized that profits, market share, and even customer satisfaction are all measures of the *current* position of the corporation. Current product-market combinations and satisfaction measures alone are simply bad predictors for where to make money tomorrow.

To find the best guidelines for future actions, corporations must examine the deeper and not so visible drivers of *future* earnings, IC. The absurdity is that while a company may just have gone into "intellectual bankruptcy", the short-term profits may very well rise since costs have been lowered!

To better manage – nurture and leverage — intellectual capital it is important to measure it. In turn, to be able to measure growth or decline in IC it is essential that the *nature* of IC itself is clear. This is why it is important to distinguish between different forms of intellectual capital, as well as the dynamics among these. Whereas many companies have so far only applied a 'balance sheet' approach to intellectual capital, a complementary 'profit and loss' approach is a natural extension.

A major challenge in companies of today is to have experts share their knowledge and skills with others in the organization, which is an example of a flow from human capital to structural capital. Thus, flows among the different forms of capital, intellectual and material, should be measured as much as the stocks. It is these flows that generate and alter the stocks, and it would thus be meaningless to manage one without the other.

Start with Your Mission

Regardless of whether a company or unit is in manufacturing or service, the purpose, business mission, vision, or goals are always the starting point for an IC-management system. This means that, in principle, each organizational unit would have *different* indicators of the different IC categories simply because each strategy will be different.

If the strategy is to compete on price, for instance, it is what makes the company have low delivered costs that must be captured by the indicators. Here, with a view of future earnings, indicators could include supplier delivery performance and cost management.

On the other hand, if the strategy is to compete on high perceived value, the indicators must capture what makes this happen, for example, superior innovations and quality image. Given that every business is unique in some aspect, each unit will separately have to develop their own indicators for common categories of IC, like customer capital, innovation capital, and flow from human capital to structural capital.

In **Mec-Track**, an Italian-based manufacturer of undercarriage components within the **Caterpillar Overseas Division** (COSA), management grounded their pilot IC-management system in the newly re-worked mission statement: "To strengthen our worldwide leadership position in the production of undercarriage components by offering to our customers differentiated products of recognized superior value." The idea was to try to measure growth and decline in only the IC that contributed to reaching this mission.

Measure Your Key Success Factors

The vehicle for measuring IC growth or decline is the set of indicators used for each category of IC, like customer capital or process capital. *It is these indicators that permit measurement, not the IC categories as such.* Because these measurements must make sense to those who measure and be understood by those being measured, the process of identifying indicators is a common sense and bottom-up process. The work involved often increases the awareness of what is really important in the *daily life* of people in a company.

This is why the next step is to translate the mission or strategic intent into "key success factors" (KSF). As their name implies, KSFs indicate what the particular mission or strategic intent must meet to succeed.

The strategy of ensuring low delivered costs throughout the business system, for instance, has a whole different set of success factors than the strategy of achieving high perceived value from the customer's perspective. The latter would allow a price premium whereas the former would mean competing on price.

The KSFs are once again a reminder for all strategy makers of what are the factors that need a constant monitoring. *Relevant* IC is just the IC that contributes to achieving your company mission. It is nice to have smart people and fancy equipment, but if this doesn't help you to win in line with your mission or intent, the IC they represent is not relevant!

The best way to demonstrate that KSFs are really *key* is to measure the company's success in each of the KSFs. A manager of COSA told me that this approach becomes obvious to people: "Y*ou just go to the people working in the business units and say: 'So, you say that this is important for your business? OK. Do you have a measurement for this?' 'Well, no' 'Do you think you need a measurement for this' 'Well, yes: I am the one who said it is important!'"* For each one of the KSFs, Meg-Trac management suggested a few measures that would capture its essence.

During the first attempt, most companies tend to use non-financial indicators that are already there in the existing

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Slovakia's Car Park

Big Variances; Western Region Owns Half of Cars

Dr. Jan Lesinsky, Slovak Technical University

By the year 2010, the number of road motor vehicles worldwide could increase by 60% and fuel consumption may increase by 50%. In Central and Eastern Europe, a substantial development of the region's auto sector is expected — by the year 2000 vehicle production will increase by 75% and by 2005 a 125% increase is expected. This will raise the region's share of world production from 4% to nearly 10%.

Central and Eastern European countries will become more involved in the production of basic materials and systems, as well as in the production, use, and recycling of cars. In these countries, the automotive industry has clearly arrived.

In Slovakia, we're witnessing substantial growth in passenger car production. VW Bratislava's increase in the number of assembled cars to 150,000 per year, its increase in components production, as well as the big changes in surrounding countries (mainly the Czech Republic and Poland), are revitalizing our machinery industry.

AUTO SECTOR DEVELOPMENT IN THE SLOVAK REPUBLIC

The car fleet in any country can be evaluated from several points of view, but most commonly from the relative numbers (e.g. per inhabitant, per square km, per road km, per filling station), technical progress (e.g. average age), driving unit (e.g. percentage of petrol and diesel engines and electric motors) and fuel (e.g. classical, alternative, or gas). *(see charts)*

On January 1, 1998, the breakdown of motor vehicles operating on Slovak roads was:

83% - passenger cars & vans
10% - trucks, special automobiles, and tractors
6% - motorcycles over 50cc
1% - buses

The number of vehicles in the Slovak Republic does not grow dramatically — in each category there are fewer vehicles than in the more industrially developed countries. In Slovakia, the solvency of inhabitants and the economic activities in industrial and agricultural production are not intensive enough to sustain higher growth levels.

TERRITORIAL DISTRIBUTION OF MOTOR VEHICLES

In Slovakia, large differences exist in the distribution of cars. In and around Bratislava, there are 330 passenger cars per 1,000 inhabitants (in the city this figure rises to 340), whereas in the districts of Trencin, Zilina, and Presov the figure is about 170. In the region of West Slovakia, the inhabitants own more than one half of all passenger cars in the whole country. Differences in employment rate, economic situation, location, and entrepreneurial activity increase the distribution gap.

SLOVAKIA COMPARED TO NEIGHBORING COUNTRIES

In the neighbouring states to the west of Slovakia, the average number of cars per 1,000 inhabitants is 400, to the North and South the figures are about the same as in Slovakia, (Poland -190, Hungary - 203), while to the East it is much less (50 - 80 per 1,000 people). Those countries that participate more in car production, have proportionally a higher number of cars ■

Regional Distribution of Cars in Slovakia

	Density p/1,000 pop.	Density p/sq. km	% of Pass. Cars	% of Pop.
Western Slovakia	239	35	52.5%	46.7%
Central Slovakia	185	15.36	22%	24.7%
Eastern Slovakia	189	18.43	25.5%	28.5%

Comparative World Car Density Figures (1998)

Territory	Number of Inhabitants (mil.)	Car density*
NAFTA	~ 380	400
EU	~ 380	400
JAP+KOR	~ 170	320
C. and E. Europe	~ 175	150
Russia	~ 148	80
Slovak Republic	**~ 5.3**	**211**

*Passenger Cars per 1000 inhabitants

Car Density by District in Slovakia

District	Car Density per 1,000 Pop.
Bratislava	330
Trnava	250
Trencin	175
Nitra	206
Zilina	166
Banska Bystrica	203
Poprad	165
Kosice	215

Slovakia's Car Density (1997)

Car Density p/1,000 pop.	Car Density p/sq. km	Car Park
211	23.17	1,135,914 units

Quality Expectations of the Global Automotive Industry Part II

Building Supplier Quality: Lesson 4

With Ray Barker, Group Director, Business Excellence Strategy, Avon Rubber

Last month's column reviewed QS-9000 quality system requirements, including Quality Planning, Design Skills, Preliminary Process Capability Requirements, On-going Process Performance Requirements, Measurement System Analysis, and Corrective & Preventive Action.

This month's column continues the review of requirements, and also covers Quality Operating System and Materials Management System requirements.

QS-9000 Quality System Requirements (continued)

Training — As a Strategic Issue

Training should be viewed as a strategic issue affecting all of the supplier's personnel and training effectiveness shall be periodically evaluated. Training must develop competencies such that the benefits may be fully realized to meet customer expectations.

Servicing — Feedback of Information From Service

A procedure for communication of information on service concerns to manufacturing, engineering, and design activities shall be established and maintained.

Quality and Productivity Improvements; Techniques for Continuous Improvement

The supplier shall identify opportunities for quality and productivity and implement appropriate improvement projects. The supplier shall demonstrate knowledge of the following measures and methodologies and shall use those that are appropriate:

- Capability Indices
- Control Charts (variables, attributes)
- Cumulative Sum Charting
- Design of Experiments
- Theory of Experiments
- Theory of Constraints
- Overall Equipment Effectiveness
- Cost of Quality
- Parts per Million Analysis
- Value Analysis
- Problem Solving
- Benchmarking
- Analysis of Motion/Ergonomics
- Mistake Proofing

Manufacturing Capabilities

Suppliers shall use a cross functional team approach for developing facilities, processes, and equipment plans in conjunction with the advanced quality planning process. Methods shall be developed for evaluating the effectiveness of existing operations and processes.

Mistake proofing is the use of process or design features to prevent the manufacture of non-conforming product.

Suppliers shall establish and implement a system for tooling management, including:

- Maintenance and repair facilities and personnel
- Storage and Recovery
- Set-up
- Tool change programs for perishable tools

If any of this work is sub-contracted, a tracking and follow-up system is required.

Quality Operating System Requirements

Quality Operating System (QOS) requirements define the mechanism for continual improvement. In automotive language it is a way of doing business, as expected by the global automotive customer base.

The **Ford Motor Company** definition of QOS is: "A systematic, disciplined approach that uses standardized tools and practices to manage business and achieve ever increasing levels of customer satisfaction through continual improvement."

It is interesting and informative to read the definition backwards:

Through continual improvement, we can achieve ever increasing levels of customer satisfaction and manage the business, using standardized tools and practices with a systematic, disciplined approach.

This methodology requires a clear statement of strategic imperatives and Key Results Measurables. Subsequently the identification of key processes to deliver the results and the quantification of process measurables needs to be linked to the development of Improvement Action Plans and a Management Review Process.

Materials Management System Requirements

Materials Management System Requirements as encapsulated by the Ford Motor Company Standard MS-9000, define the management responsibilities and structure to ensure an effective and efficient Material Planning and Logistics function, covering in-bound, internal and out-bound elements of the "total supplier to manufacturer to customer" chain of events.

The basic elements covered are:

- Management Responsibility
- Materials Management System
- Contract Review/Customer Interface
- Scheduling System
- Document Control

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Quality in Action

According to one aftermarket distributor in Poland, Polish customers can now afford to pay for higher quality automotive parts. Since last year, customers have started looking for better quality in the parts they buy.

***Profile** Continued from Page 1*

Suzuki. It will be a step-by-step development. We will gradually reach the 50,000 [target] capacity. In the beginning, we'll produce the current Swift model together with the new car. Eventually, production of the new car will take the place of the Swift production.

Production is targeted to begin [in Hungary] early in the year 2000, and production at GM's plant in Gliwice will begin at the same time.

CEAR: How much will Suzuki invest in the new production program?
Banki: Around 15-20 billion yen ($110 -$145 million), but no final decision has been made yet.

CEAR: Will Suzuki's and GM's versions of the new car be similar?
Banki: The plan is that the vehicles for the respective brands will be distinctly different. We will produce a car with a Suzuki 1.3 liter engine and Opel will produce its car with an Opel engine. The interior and certain technical aspects will be different, as well.

CEAR: What kind of facility expansion will be required for Suzuki?
Banki: This year we'll [start] building a stamping plant for the [new project]. The investment will be around 3.5 billion forints ($16.5 million). We're going [to stamp] medium-sized body parts, not the bigger parts like doors.

CEAR: By how much will Magyar Suzuki expand its workforce to accommodate the new production?

If we reach the target capacity, which means the existing 70,000 capacity [plus the 50,000 units planned for the new car], we would need an additional 600 workers.

CEAR: Why did Suzuki decide to build the new small car with GM?
Banki: To decrease production costs. The two companies will jointly produce stamped parts, [which] reduces tooling costs. Tooling and machinery are expensive. When we introduced the Swift face-lift in October 1996, just the tooling cost around 2 billion forints ($9.5 million).

CEAR: How will Magyar Suzuki's parts purchasing program be changed by the agreement with GM?
Banki: We're inviting even more European suppliers [to establish operations in Central Europe] and we are in discussions with new Hungarian suppliers. Our intention is to localize as much as possible. This is very important for the new model.

> "Magyar Suzuki is the center of Suzuki's future plans in Europe."

CEAR: What percentage of your parts purchases are made locally?
Banki: As for European local content, we are at 70%. [For Central Europe], the figure is very modest, but we are starting cooperation with some suppliers in CEFTA countries, like the Czech Republic, Poland, and Slovenia.

For instance, from the Czech Republic last year we imported [parts valued at] around 30 million forints ($141,000). This year, it will be more than 1 billion forints ($4.72 million). This is a very strong development.

The total Central and Eastern European content of the car is marginal, but we have rapidly growing contacts with suppliers [in those countries].

CEAR: What markets are you targeting for the new car?
Banki: First of all, Europe, but also outside of Europe. This [cooperation agreement] is one part of Suzuki Motor Corp.'s so-called "Global 5" initiative. Suzuki is trying to achieve a 5% market share out of the total world car market, including Japan.

Thus, Magyar Suzuki plays a very important role in Suzuki's near term strategy, both as a production base and as a sales outlet. Magyar Suzuki is the center of Suzuki's future plans in Europe.

CEAR: How are Suzuki's sales in Hungary for 1998?
Banki: This year we have seen very rapid growth in the domestic market. [During the first five months], we've sold 8,300 cars and we expect to sell 20,000 units for the whole year. And this looks like a very feasible goal. [Sales are up] about 40% [compared to] last year.

CEAR: Why have sales increased so dramatically?
Banki: I think the better economic conditions are one of the factors, the increasing purchasing power [of Hungarian consumers]. And, of course, the better image of [Suzuki], our quality, services, and the relatively low cost of our cars.

We have the best and largest sales network in the country. We have 120 dealerships, which makes a sizeable contribution to our success. These, I think, are the main factors.

The fast development of car [sales] this year has been a surprise for everybody. At this moment, we are reluctant to [expect] the 40% [sales growth rate to continue for the whole year], but we expect to increase our sales for the whole year by 25-30%. For next year, we'll be very happy with a 10-15% growth rate.

CEAR: Will the new Hungarian government affect you plans in Hungary?
Banki: I don't think so. The basic economic goals of the new government are just the same — to encourage investment and to maintain a predictable economic climate. Suzuki asked the previous government and will ask the new government to support and promote small and medium sized companies (SMEs).

We'd like to see strong SMEs who can supply Magyar Suzuki. We [will] not ease our requirements — price, service, quality — just because a [supplier] candidate is Hungarian. We are responsible for the final product ■

Polish Fund Reorganizes Auto Holdings to Take on Aftermarket

*Change is afoot at the Polish National Investment Fund **PIAST.** The fund's automotive holdings are being reorganized to capitalize on their natural synergy and to enter new markets.*

*The fund owns six companies active in the automotive sector: battery maker "**ZAP" PIASTOW** (batteries); **FMS "POLMO" S.A.** (steering gears, drive shafts, and steering shafts); **FOS "POLMO" LODZ S.A.** (pneumatic braking system compressor, fuel pumps, carburetors); **KAPENA S.A.** (buses); **WSK "KRAKOW" S.A.** (water pumps, water & oil coolers, oil separators); **"FAMAROL" S.A.** (agricultural equipment).*

*Charles Highett is Vice President, Business Development with **Eurofund Management Polska**, the managers of **PIAST**. Mr. Highett has specific responsibility for the Automotive Group within the fund. The **CEAR** spoke with Mr. Highett about the changes taking place at the fund and where the future is for the automotive group.*

How is the fund reorganizing its automotive group?

We're going to establish a holding company and that's on target for the third quarter of this year. [But] we're putting together something more than just a legal framework. We want to make sure [the companies all] work together properly.

We're [focused] on trying to make sure that all the systems are right, all the management methodologies are right, and the right culture is in place. We're cross relating all sorts of contacts and technologies. There's a huge amount of good will if you actually put it all together and leverage it. The sum of the whole is much greater than the sum of the individual parts.

Were any of the companies working together before the fund brought them together?

No, they were brought together under the fund. Some had a clear direction, others didn't. We pretty much know where we're going with each company.

Some of the companies have a number of product groups, sometimes in disparate markets. Having a management trying to manage different markets, it becomes rather difficult. So what we had to do is ensure that management groups clearly focused on one business area. We then started splitting the company into two or three strategic business units or profit centers, or as appropriate for the company.

"There's a huge amount of good will if you actually put it all together and leverage it. The sum of the whole is much greater than the sum of the individual parts."

That's now taking place and it's created an energy all by itself. It's very interesting to observe how people who now run the SBUs are demanding leaner processes and better service. This creates some tension — but mostly it is healthy.

Do you plan to sell off any of the companies in the Fund or keep everything together as one entity?

Anything that is non-core, we'll spin off. Anything that is core to our strategy, we'll keep in the fund. If the business and technology is global, we will probably be going down the route of finding a strategic investor, but we want to keep a significant stake for ourselves.

Investors in the holding company would probably not be focused on individual product groupings. They would almost certainly be either financial investors who are interested in the sector or a strategic investor who has a wider interest in the automotive aftermarket.

What automotive customers are you targeting for the companies?

In Poland, the key customers are very clear. **Daewoo** and **Fiat** are valued customers. We've had detailed discussions with **GM** and we're hopeful in a number of areas. With **Isuzu,** it will be interesting to see how they're going to sort out their supply base because they're very specific. We'd like to think we're going to be able to supply Isuzu in a number of areas but they set extremely tough criteria and have already established firm links with existing suppliers.

Of course, we're interested in supplying **Andoria** who has the new **Renault** engines — and we must not forget the local truck, bus, and tractor manufacturers, with whom we enjoy excellent relations.

We are realistic. If we can't do it directly with our own technology, we'll either buy licenses or bring in someone to do it with us. Some of these matters are under discussion now, but I can't be more specific.

What are you doing to improve the different companies' product quality levels?

ZAP, FMS Polmo, FOS Polmo Lodz, and **WSK Krakow** all got ISO 9000 last year. FMS Polmo is going for QS 9000 this year. The rest will be going for QS 9000 as well. And we'll be looking at ISO 14000. We have to be there and we will be there.

Will you focus on the OE market or aftermarket?

What we're aiming at is to principally develop in the aftermarket, but not losing sight of the OE market. We recognize the aftermarket is in the long run more likely to give us a stable business and is not a globally controlled business. The OE business, when you get into subassemblies, for example, is for the most part globally controlled. It's difficult to see how small companies can compete in that market.

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Russia's Auto Sector Investment Incentive Decree Explained

Sarah Carey, Partner, Steptoe & Johnson LLP

Certain large-scale investments in automobile and automotive parts production are eligible for exemptions from import customs duties and taxes for a period of up to 7 years pursuant to Russian Presidential Decree No. 135 of February 5, 1998 ("Decree No. 135").

In general, to qualify for the customs benefits envisioned by Decree No. 135, an investment project must: (1) involve total investments of at least 1.5 billion rubles ($250 million) over a five year period; (2) for projects with foreign investment, the foreign investor must invest 150 million rubles ($25 million) in the charter capital of the Russian investment vehicle; and (3) by the end of a five year period, at least 50% of the total production costs must be incurred in Russia.

> "The customs benefits are granted by declaring the manufacturing facility a 'free warehouse', allowing components, raw materials and other inputs to be imported duty free."

On April 23, 1998, the Russian Government enacted a series of regulations spelling out the requirements of Decree No. 135 in greater detail.

In order to secure the benefits of Decree No. 135, a Russian entity owning a manufacturing facility must execute an investment agreement with the Ministry of the Economy and obtain approval from the Russian Government (Cabinet of Ministers). Prior to these steps, the Russian company is first required to develop a feasibility study and a business plan for the investment project.

The feasibility study must be reviewed by examination boards of the Ministry of the Economy, the Ministry of Finance, the State Construction and Housing Policy Committee, the State Environmental Protection Committee and the Fire Prevention Service of the Ministry of Internal Affairs and approved by the Expert Council of the Russian Government.

Duty Free Imports

The customs benefits under Decree No. 135 are granted by declaring the manufacturing facility a "free warehouse", a customs regime under which components, raw materials and other inputs may be imported duty free to the manufacturing facility and used to manufacture a final product which may be sold elsewhere in Russia.

Based on the approval of the Russian Government, the State Customs Committee grants the manufacturing facility a license for the operation of a "free warehouse", which may not be revoked without the prior consent of the Russian Government. No production at the manufacturing facility other than as authorized by the Russian Government decision to designate the facility a free warehouse is permitted.

Vehicles and automotive parts manufactured at an eligible facility within the annual quotas established by the Russian government are deemed to originate in Russia provided the local cost sourcing rules established by Decree No. 135 are complied with. Such vehicles and automotive parts are not subject to import customs duties and taxes when shipped from the manufacturing facility to the rest of Russia (such items will, however, be subject to domestic VAT and other taxes on the sales of vehicles within Russia).

Vehicles and automotive parts shipped from the manufacturing facility that comply with local cost sourcing rules, but exceed the annual quotas, are subject to the normally applicable customs duties (at the rates in effect as of the time the components or raw materials were brought to the facility).

For vehicles and parts shipped from a manufacturing facility that do not comply with the local cost sourcing rules, the foreign components, raw materials and other inputs in the final product are subject to import customs duties (at rates in effect as of the time the inputs are shipped from the facility).

Local Cost Sourcing Rules for Vehicles & Parts

Vehicles are deemed to meet the local cost sourcing rules if (1) they are manufactured from separate components per a list approved by the Russian government[1] and (2) the share of costs incurred in Russia that are included in the cost of production is 10% for the first year of the investment project, 20% for the second year, 30% for the third year, 40% for the fourth year and 50% for the fifth year and each year thereafter.

While the first part of the test may be intended to ensure that vehicles are actually produced at the manufacturing facility, rather than merely assembled from kits, the regulations are somewhat ambiguous and we are seeking further clarification from the Russian government.

For parts, the local costs sourcing rules are met if the annual local cost ratio requirements (i.e., 10% for the first year, 20% for the second year, etc.) are complied with. Costs incurred in Russia are calculated as a ratio of the difference between overall production costs and the cost of imported raw materials, components and services to overall production costs (Overall Production Costs - Cost of imported inputs/Overall Production Costs). Production costs are determined in accordance with Russian cost accounting rules, which are fairly restrictive and limit the inclusion of certain costs, including interest on loans used to acquire fixed assets.

Yearly Reports to Russian Government

Each year an eligible facility must submit to the Ministry of Economy, the Ministry of Finance and the State Customs Committee the following: a report on the share of expenses incurred in Russia, certified by the Russian tax authorities; a

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Tax, Customs, and Finance Review

Ildiko Hadas, Senior Manager, Ernst & Young, Budapest Office

At the end of 1997, the Hungarian Parliament passed a new **Companies Act**. This Act will come into force on June 16, 1998 and it made the modification of some other related acts necessary as well, including several tax and accounting acts.

Dividend advance

From June 16, 1998, a dividend advance can be paid only if the interim balance sheet of the company meets the following provisions regarding payment of dividend:

Having paid the dividend advance, the equity of the company, computed by a special method, cannot be lower than its registered share capital.

Thus, equity minus 1) tied-up capital or profit reserve (retained earnings); 2) valuation reserve; 3) difference between the deferred loss on foreign currency investment credit and the provisions set up for it; and 4) dividend advance must be higher or equal to the registered capital.

Companies already existing on June 16, 1998 have to apply the provisions in the year 2000 for the first time.

Allowance received from a person not qualified as taxpayer, debts forgiven or assumed by him

From June 16, 1998, the allowance rendered by a resident/non-resident who does not qualify in Hungary as a taxpayer, as well as the debt forgiven by him will not be handled for CIT purposes as *dividend received,* thus the tax base cannot be decreased by this sum.

Registration with the tax authority

From June 16, 1998, newly founded companies will have to register only with the court of registration. They will receive the tax number, the statistical number, and social security number (TB-number) through the court of registration.

Individual entrepreneurs will receive the tax number and social security number through the economic chambers.

It is a significant change that from June 16, 1998 business activity cannot be started in Hungary without a tax number ■

"It is a significant change that from June 16, 1998 business activity cannot be started in Hungary without a tax number."

Top Selling Passenger Car Brands in Romania (1st Q) (units sold)

Company	1998 1st Q	1997 1st Q	% Change
Dacia	21,794	19,824	9.94%
Daewoo	3,546	3,037	16.75%
ARO	476	317	50.15%
Volkswagen	307	281	9.25%
Skoda	186	65	186.15%
Ford	151	198	-23.73%
Renault	136	34	300.00%
Fiat	72	46	56.52%
Kia	67	16	318.75%
Nissan	56	23	143.47%
Mercedes Benz	36	43	-16.27%
Peugeot	36	7	414.28%
Hyundai	32	10	220.00%
Opel	30	24	25.00%

Source: APIA

Romanian Car Exports (1st Q)

Romanian Car Exports (in units)

Company	Model	1998 1st Q	1997 1st Q	% Change
ARO	10 (1.4 liter)	27	54	-50.00%
	10 (1.9 liter diesel)	107	133	-19.54%
	24 (2.5 liter)	-	2	-
	24 (2.5-3.2 liter diesel)	2	19	-89.47%
Dacia	Berlina 1.4 liter	-	410	-
	Break 1.4 liter	13	5	160.00%
	Nova 1.6 liter	241	29	731.03%
Daewoo	Cielo 1.5 liter	1,282	344	272.67%
	Espero 1.8 liter	-	-	-
TOTAL		1,672	996	67.87%

Source: APIA

***Excellence** Continued from Page 9*

measurement system: customer satisfaction, market share, defect rate, etc. This is absolutely normal, and indeed commendable.

The KSF "new products," for instance, may be measured by "number of new products/number of total products." An IC-management system project, however, often gives rise to new insights regarding both what will make or break the strategy, and how to measure this in new ways.

Put Indicators Back into Your IC Language

Indicators derived from one KSF do not necessarily end up in the same IC form. On the contrary, often a single KSF includes aspects of people's skills, money, customer or partner relationships, and innovations. The next step is to develop an appropriate IC-management "model," one that allow you to put the various indicators into the few IC categories you have already decided make most sense in your situation (see the first article in this series).

The Management Challenge Revisited

Regardless of whether a company or unit is in manufacturing or service, the purpose, business mission, vision, or goals are always the starting point for what indicators to use.

The creation of an IC management system is both a top-down and a bottom-up process. The initial start of the idea, as well as the initial framework, must come from the topmost layers of the organization. The COSA team had the support of Vito Baumgartner, its chairman, and even Don Fites, CEO and Chairman of **Caterpillar Inc.** in the global headquarters in Peoria, Illinois, was informed.

Yet, top management can only supply the language and the framework — the IC-categories. The filling in of the framework, the articulation of KSF and how to come up with adequate measures can only be done at a local level, by the people that know the day-to-day realities of the business.

The management challenge from this perspective is to nurture and leverage growth in your company's *relevant* IC – the one that helps you reach your mission — and pick up on early warning signs of declining IC.

This article helps you to begin developing a tool to manage IC after you measure its growth or decline. The topic of next month's article is how to simplify management by consolidating the many indicators into a few indices, and a single IC-index. Such an index will enable you to benchmark IC growth or decline among units and companies.

Next Month: Developing an IC-Index

Romanian Car Production & Assembly (1st Q)

Romanian Car Production & Assembly (in units)

Company	Model	1998 1st Q	1997 1st Q	% Change
ARO	10 (1.4 liter)	69	230	-70.00%
	10 (1.9 liter diesel)	80	243	-67.07%
	24 (2.5 liter)	75	69	8.69%
	24 (2.5-3.2 liter diesel)	167	426	-60.79%
Dacia	Berlina 1.4 liter	14,601	14,143	3.23%
	Break 1.4 liter	4,657	4,797	-2.91%
	Nova 1.6 liter	2,945	2,372	24.15%
Daewoo	Cielo 1.5 liter	240	6,526	-96.32%
	Espero 1.5 liter	-	-	-
	Espero 1.8 liter	578	780	-25.89%
TOTAL		**23,412**	**29,536**	**-20.73%**

Source: APIA

***Russia** Continued from Page 14*

report on actual investments to date; information on production volumes, confirmed by an agency designed by the State Customs Committee; and a report on the extent to which the facility's quotas have been reached or exceeded and amount of customs duties saved by the manufacturer as a result of the customs benefits.

Based upon an analysis of these reports, the Ministry of Economy and the State Customs Committee recommend to the Russian Government the level of quotas for finished products eligible for import customs duties exemptions for the following year. Quotas for each manufacturer are established both in terms of number of units and overall value.

[1] The list contains a minimum description of components that must be used in manufacturing automobiles at an eligible facility (including body assembly, engine, radiator, wheel assembly, front and rear wheel suspension, battery, shock absorbers, exhaust system and repair kit) and may be revised for a particular investment project by decision of the Russian Government ■

Classifieds & Investment Opportunities

Manufacturer of driving shafts, steering shafts, steering gears, and spare parts seeks foreign investor
Wieslaw Kosieradzki
PIAST
tel: 48-22-827-8700
fax: 48-22-826-7341
Poland

Manufacturer of centrifugal oil separators, heaters, water and oil coolers for cars & trucks, water pumps for vans, trucks, and ships seeks foreign investor
Wieslaw Kosieradzki
PIAST
tel: 48-22-827-8700
fax: 48-22-826-7341
Poland

Manufacturer of fuel supply systems for car & van engines, compressors for pneumatic braking systems for cars, buses, & farm tractors, compressor units & pneumatic fittings, & spare parts for compressors seeks foreign investor
Wieslaw Kosieradzki
PIAST
tel: 48-22-827-8700
fax: 48-22-826-7341
Poland

Manufacturer of hydraulic cylinders, up to 32 bars pressure, 25-160 piston diameter, up to 4,000 mm length, seeks Slovak Republic commercial cooperation, offers production to order
Jorgen Varkonda
SNAZIR
re:Rerosa s.r.o.
tel: 421-7-5335-175
fax: 421-7-5335-022
Slovak Republic

Manufacturer of exhaust flanges, light welded steel constructions, agricultural machines, and hydraulic components under Sauer Co. license seeks joint venture partner
Jorgen Varkonda
SNAZIR
re: Topolcianske Strojarne a.s.
tel: 421-7-5335-175
fax: 421-7-5335-022
Slovak Republic

Manufacturer of car & truck air and oil filters seeks joint venture partner for production, financial, and distribution cooperation. Monthly air filter capacity for cars of 60,000, and 6,000 for trucks
Jorgen Varkonda
SNAZIR
re: Sandrik a.s.
tel: 421-7-5335-175
fax: 421-7-5335-022
Slovak Republic

Manufacturer of pressed parts for cars, press units, electric carriages, and machine tools seeks commercial or production cooperation
Jorgen Varkonda
SNAZIR
re: BAZ a.s.
tel: 421-7-5335-175
fax: 421-7-5335-022
Slovak Republic

U.S. partner sought for Czech producer of crankshafts (various sizes up to 2500 mm lengths) for purpose of contract manufacturing. Company is supplier to producers of engines for trucks, tractors, ships, & stationary aggregates. 1996 turnover expected to be $20 million.
Jan Vesely
IESC
tel: 420-2-2499-3170
fax: 420-2-2499-3176
Czech Republic

Partner sought for producer of diesel injection equipment for development, production, & sale of single and multi-cylinder in-line injection pumps for all types of diesel engines, as well as for injection systems, testing, measuring, & adjustment equipment. 1995 turnover was $40 million.
Jan Vesely
IESC
tel: 420-2-2499-3170
fax: 420-2-2499-3176
Czech Republic

Manufacturer of plastic parts for Opel, Mercedes, VW, & Suzuki seeks equity partner who is engaged in plastic processing business $5 million
Csaba Kilian
re: Pemu
ITDH
tel: 36-1-118-0051
fax: 36-1-118-3732
Hungary

Supplier of seats for Suzuki cars & Spare parts for Ikarus seeks purchaser. Company undergoing privatization process.
Csaba Kilian
re: 02/Aut/96
ITDH
tel: 36-1-118-0051
fax: 36-1-118-3732
Hungary

Battery manufacturer seeks joint venture partner for processing used vehicle starter batteries
$2.1 million
Csaba Kilian
re: Perion
ITDH
tel: 36-1-118-0051
fax: 36-1-118-3732
Hungary

Russian bus company seeks American joint venture partner to manufacture new bus models. Business plan available in English
Victor Sergeyevich
Kostromin General Director
Pavlovo Bus Co.
tel: 7-83171-6-81-14
fax: 7-83171-6-03-18
Russia

Russian company seeks a joint venture partner to re-build car and truck tires and recycle tires and other rubber products into pellets.
Alexander Nikolayevich
Kalin General Director
Kstovo Tire Repair & Recyling Plant
Tel: 7-8312-38-12-75
Fax: 7-8312-38-12-75

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Make sure the auto industry hears about your company's activities in Central Europe. Send the CEAR™ your news about:

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***Highlights** Continued from Page 4*

Umformtechnik Erfurt.

Skoda (unrelated to the **Volkswagen**-owned **Skoda-Auto**) produces a wide range of equipment and machinery for the transportation, nuclear power, and other industries. According to preliminary figures, the company suffered a CZK 1.78 billion ($54 million) loss in 1997.

Hungary

Suzuki & GM Cooperate on Small Car

General Motors Europe and **Suzuki Motor Corp.** have agreed to jointly develop a new vehicle in the small car segment. "We plan to produce 50,000 units of the new car," said Tamas Tihanyi, the PR & Marketing Manager for Suzuki's subsidiary in Hungary, **Magyar Suzuki**. (*for more on Magyar Suzuki, see Profile on page 1)*

RABA Engine Fitted With New Natural Gas Vehicle System

Transcom International's affiliated company, **Transcom Engine Corporation** has developed an electronic fuel injection and engine control system for heavy duty vehicles. In May at the NGV'98 natural gas vehicles conference and exposition held in Cologne, Germany, Transcom featured an advanced turbocharged **Renault** MGDR:06.20.45 natural gas engine and a **RABA** G10-TE190 natural gas engine fitted with the Transcom Natural Gas Vehicle System (NGVS). Both engines, one from **Renault Vehicle Industries** of France, the other from **RABA Motor Company** of Hungary, achieve the EURO III draft exhaust emission standard.

Transcom has invested over AUS $40 million (US $26 million) into its NGVS and has tested the system in several countries. Transcom's computer controlled fuel injection and engine management system is currently in service in city buses in Perth and Canberra, Australia, and Szeged, Hungary.

Slovak Republic

VW Bratislava Hints At Expansion

Volkswagen Bratislava is undergoing massive change, with plans to triple its output of Golf models in 1998 up to 120,000 units. But even greater expansion may lie ahead.

VW Bratislava's personnel director, Jaroslav Holecek, who is responsible for finding all of the new workers for VW's expansion plans, hinted at much bigger things to come during a May speech in Bratislava. After recounting VW's turnover, investment, and employee figures for 1998, he added that "the figures for 1999 are several multiples of the figures for 1998."

Turnover for 1998 is expected to be SK 53,980 million ($1.6 billion), up from SK 21,916 million ($660 million) in 1997. Investment for 1998 is set at DM 173.6 million ($100 million), and by the end of the year the company plans to have 4,650 workers, an increase of over 1,000 from last year.

CV Maker TAZ Sipox Looks to Germany for Business

TAZ Sipox, Ltd., Trnava is looking to export its light commercial vehicle to Germany. TAZ took part in the Amitec '98 exhibition in Leipzig, Germany in April to introduce the different versions of its van, which include an ambulance and hearse.

Final prices for the German market are not yet set. Current prices begin at $12,600. According to TAZ's marketing manager Jaroslav Jurci, "the prices will be very attractive to the customer."

Last year, TAZ manufactured 831 vehicles in various versions. Some 48% were exported, including exports to the Czech Republic. The TAZ vehicles are the former Skoda 1203 model, production of which was moved from Mlada Boleslav, Czech Republic to Slovakia prior to 1989. The version of the van produced in Slovakia has a **Volkswagen**-made 1.9 liter diesel engine. TAZ intends to manufacture the van, at the latest, until the year 2000.

Romania

Daewoo Sending Engines & Transaxles to Poland

On June 3, 1998, the first batch of engines and transaxles left **Daewoo Automobile Romania's** plant for Poland. Three trucks were loaded with 360 sets of 1500cc SOHC engines and medium-type transaxles that will equip Lanos models produced by Daewoo in Poland.

Another 3,800 sets will leave for Poland later in June. Final homologation has been obtained for Daewoo's SOHC engines (single camshaft) and for the medium-type transaxles.

Daewoo Heavy Industries Buying Vehicle Manufacturer

Daewoo announced that it is acquiring a 51% stake in the company **Mecatim**. Mecatim is a manufacturer of small cars, tractors, and automotive components based in Timisoara, Romania. Mecatim will reportedly supply parts to Daewoo's assembly plant in Romania, as well as to other Daewoo plants.

Slovenia

New Cars Sales Drop In Slovenia

At the end of April, new cars sales in Slovenia totaled 23,302 units, down 2.6% from 23,927 units sold during the same period last year. Market leader Renault saw its market share drop to 18.83% from over 20% a year earlier. Renault's sales totaled 4,387 vehicles.

Second ranked Volkswagen's sales were off 2.5% at 2,887 units. VW controls 12.39% of the market. Third ranked Daewoo saw its sales jump over 140% to 2,032 units. The Korean company's market share shot up from 3.51% to 8.72%.

The 5 best selling models in Slovenia during the first four months of 1998 were the Renault Megane, Volkswagen Polo, Renault Clio, Fiat Punto, and Opel Corsa.

South Central Europe

Opel Top Seller In Croatia

During the first four months of 1998, Opel was the top selling brand in Croatia. Sales of 2,693 cars gave the company a 13.8% market share. The Opel Corsa captured a 7% market share, and the Vectra also turned in strong sales. Sales of the new Astra in Croatia begin on May 22, 1998 ■

5 Questions With Detlef Wittig, Vice Chairman & Chief Financial Officer of Skoda Auto

Can you give us an update on Skoda's supplier localization program? Are local suppliers able to meet the quality requirements for Skoda's new models, or will more supply contracts be shifted to Western companies?

"For Skoda-Auto it was always abundantly clear that the only way to prosper was to continue to be able to manufacture vehicles at favorable cost levels and therefore with its local suppliers, but only then when Skoda was able to do this to the high Western quality and technical standards. Today, our customers expect the highest quality and service at a Skoda price.

Out of 767 Skoda suppliers, 279 are Czech and Slovak. Skoda currently sources nearly 75% by value of its purchasing volume from these suppliers, and a further 25% from suppliers abroad. A major reason for this success was the work of Skoda's supplier development task force, as well as Skoda's role as facilitator for partnerships with Western suppliers. Skoda has been instrumental in the creation of 90 joint venture and greenfield agreements between Western and Czech/Slovak companies.

By now, our suppliers use the latest technology and deliver world class quality components not only to Skoda, but to other vehicle manufacturers within and outside the **Volkswagen Group**. For 1997, they were awarded contracts from **VW**, **Audi**, and **Seat** of a value of more than DM 483 million ($268 million) per year. As more and more Skoda suppliers achieve the higher quality ratings, so too, will their chances of being able to supply into the VW Group increase."

What's the biggest problem faced by local suppliers?

"After the fall of Communism, most suppliers obviously lacked Western know-how and technology. Therefore, a fast knowledge transfer and strong Western partners were of critical importance. Skoda's fast growth in output helped the suppliers to quickly recover their high initial investment outlays and to strengthen their position in the European supply industry."

How are the on-site suppliers at the new Octavia plant working out? Any unseen difficulties with this type of a supply arrangement?

"We regard the integration of major systems (e.g. seats, doors, etc.) suppliers as an important strength of our production system because it has clear logistical advantages and allows the fastest possible flow of information between car manufacturer and supplier to instantly solve any problems. So far, the system is very successful and we have not faced any major difficulties."

What's an important marketing trend in the Central European auto industry and how is Skoda-Auto contending with it?

"Central Europe is a reemerging market in the world. Clearly, the levels of income in Central Europe are still far behind Western standards. Therefore, car buyers are looking for high quality and reliable products, as well as low prices and low service/maintenance costs. Skoda provides that."

Last time we spoke, you mentioned that Skoda-Auto makes heavy use of the press to promote its vehicles. Is this still your primary source of marketing or have you adopted any new strategies?

"We have placed a strong focus on exposure marketing and have added TV spots to our media unit. But still we have a major focus on PR activities to support our marketing unit."

Submit Your Nominations for the 1998 CEAR™ Central European Automotive Excellence Award

The CENTRAL EUROPE AUTOMOTIVE REPORT™ is accepting nominations for the 1998 CEAR™ Central European Automotive Excellence Award. This award will be presented to the Central European automotive manufacturer or supplier that has best demonstrated market leadership through its use of innovative manufacturing and marketing systems. The award is given to recognize the positive influence such exemplary leadership has on the development of the Central European automotive sector. We would greatly appreciate your input in nominating candidates for this award.
You may nominate your own company or others. The deadline for nominations is August 15, 1998.

1st Nominee Reasons

2nd Nominee Reasons

Fax to: +1-206-374-5282 Email to: info@cear.com

***Powertrain** Continued from Page 5*

Poland.

- **Dacia —** produces powertrain components for its Berlina, Break, and Nova models
- **Hyundai —** Signed agreement with **Dacia** to produce 50,000 Hyundai Accent models and 100,000 engines starting in 1999. Accents will be sold in Romania and engines will be used in Dacia models later in 1998.
- **Roman —** truckmaker produces crankshafts and camshafts ■

***Quality** Continued from Page 11*

- Purchasing/Subcontractor Management
- Product Identification & Traceability
- Shipping
- Manufacturing Flexibility/Inventory Management
- Inspection, Measuring, & Testing
- Corrective & Preventive Action
- Handling, Storage, Packaging, Preservation, & Delivery
- Control of Material Records
- Internal Material Audits
- Training
- Statistical Techniques

Team-Oriented Problem Solving using a disciplined approach to ensure the effective resolution of internal and external supply problems by the determination of root cause and prevention of recurrence is clearly demanded by QS-9000 and the Material Management System requirements. The steps in the disciplined approach are recommended as follows:

- Management decision to use Team-Oriented Problem Solving approach
- Form a team and use team approach
- Define the problem and plan to take action
- Implement and verify interim containment action(s)
- Find, define, and verify root cause(s)
- Select and verify solution(s) to ensure permanent corrective actions
- Implement permanent corrective actions
- Prevent recurrence of this and similar failures, also identify any company improvement opportunities.
- Recognize individual contributions and congratulate the team

Next Month: What the Sub-contractor Supply Base Expects of Their Customers

***Fund** Continued from Page 13*

So we've got to move into the aftermarket. And we're doing that by a coordinated strategy of developing a distribution structure and converting the product alignments. You can't do this overnight. It takes time. But the product lines must move into the aftermarket. That's really where we want to be.

There are loads of things we've got up our sleeve that we can't discuss at the moment. It's all very exciting. It's commercially sensitive information and if we let out too soon, we may lose some of our initiative ■

Exhibitions, Conferences, and Shows in 1998 & 1999

1998	
August 26-30	**Moscow, Russia** Moscow Int'l Motor Show
Sept. 3-10	**Hanover, Germany** Auto Show
Sept. 14-16	**Nagaya, Japan** Int'l Symposium on Advanced Vehicle Controls
Sept. 15-20	**Nitra, Slovakia** Autosalon Nitra
Sept. 15-20	**Frankfurt, Germany** Automechanika
Sept. 18-27	**Bucharest, Romania** Bucharest Motor Show
Sept. 27-Oct. 1	**Paris, France** FISITA World Congress
Sept. 29-Oct. 1	**Detroit, MI** Int'l Body Engineering Conference
Sept. 29-Oct. 4	**Budapest, Hungary** Autotechnika
Oct. 1-3	**Brussels, Belgium** Int'l Electric Vehicle Symposium
Oct. 1-11	**Paris, France** Int'l Road Transport Exhibition
Oct. 1-11	**Paris, France** Int'l Paris Motor Show
Oct. 6-8	**Detroit, MI** Global Powertrain Congress
Oct. 8-12	**Ho Chi Minh City, Vietnam** Auto Vietnam 98
Oct. 12-13	**Warsaw, Poland** IBC UK Automobiles in Eastern Europe Conference
Oct. 13-15	**Amsterdam, The Netherlands** InterAuto '98
Oct. 16-25	**Sydney, Australia** Int'l Motor Show
Oct. 16-25	**Panama City, Panama** Panama Auto Expo
Oct. 23-Nov. 1	**Birmingham, UK** British Int'l Motor Show
Oct. 29-Nov. 1	**Istanbul, Turkey** Commercial Vehicles '98
Oct. 29-Nov. 8	**Sao Paulo, Brazil** Brazil Int'l Automobile Trade Show
Nov. 4-7	**Bangkok, Thailand** Asia Automotive '98
Nov. 4-8	**St. Petersburg, Russia** St. Petersburg Auto & Service Show
Nov. 5-8	**Istanbul, Turkey** Auto Show
Nov. 12-15	**Cairo, Egypt**, Cairo Motor Show
Nov. 14-22	**Suntec City, Singapore** Singapore Motor Show
Nov. 17-21	**Sofia, Bulgaria** Bulgaria Int'l Specialized Trade Show
Nov. 26-Dec. 6	**Montevideo, Uruguay** Montevideo Motor Show
Nov. 27-Dec. 6	**Essen, Germany** Essen Motor Show
Nov. 30-Dec. 2	**Graz, Austria** SAE Total Life Cycle Conference & Exposition
Dec. 2-5	**Jakarta, Indonesia** Indonesia Auto Show
Dec.	**Detroit, MI** SAE Global Vehicle Development Conference
1999	
Jan. 16-24	**Brussels, Belgium** Brussels Int'l Motor Show
Feb. 4-14	**Amsterdam, The Netherlands** Int'l Motor Show
March 11-21	**Geneva, Switzerland** Geneva Int'l Motor Show
March 26-Apr. 4	**Belgrade, Yugoslavia** Belgrade Motor Show
April 8-16	**Stockholm, Sweden** Stockholm Int'l Motor Show
April 11-17	**Zagreb, Croatia** Zagreb Motor Show
April 13-18	**Riga, Latvia** Riga Motor Show
May 22-30	**Barcelona, Spain** Barcelona Int'l Motor Show
May 27-June 1	**Poznan, Poland** Int'l Automotive Show
June 5-10	**Brno, Czech Republic** Brno Motor Show
June 18-26	**Sofia, Bulgaria** Sofia Motor Show
August 24-29	**Moscow, Russia** Moscow Motor Show
Sept. 30-Oct. 10	**Bucharest, Romania** Bucharest Motor Show
Nov. 9-11	**Birmingham, UK** Autotech '99
Nov. 13-21	**Athens, Greece** Athens Int'l Motor Show

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Fax: [40] 1-3128623

Automobile Bavaria
BMW cars
Michael Schmidt
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Anca Brebeanu
Managing Director
Tel: [40] 1-6506180
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Horatiu Ionescu
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Car & Truck
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Petru Croitoru
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Carpati Motor
Honda cars
Dan Guta
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Fax: [40] 1-3124674

Civati Trading Industries
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M. Ionescu Muscel
Managing Director
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Compexit Trading
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Managing Director
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Daperom Grup Auto
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Fouad Karam
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HCS Romtrade
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Mihai Parascan
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Fax: [40] 1-3128558

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Franz Fruhwirth
Managing Director
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Fax: [40] 1-2314293

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Ford cars and LCVs
Viorel Niculescu
Managing Director
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Fax: [40] 1-2123665

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Dan Iordache
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Tadaharu Miyakoshi
Managing Director
Tel: [40] 1-3112539
Fax: [40] 1-3124794

Chrysler Saves $20 Million Per Assembly Plant With Virtual Manufacturing System

New Product Review

Builders and operators of assembly plants in Central Europe take note. **Chrysler Corporation** appears to have found a better way to build a car assembly plant.

Chrysler, in partnership with **Rockwell Automation**, **Dassault Systemes**, **Deneb**, and **Progressive Tool & Industries**, announced in May 1998 that they have jointly developed a next-generation digital manufacturing system that will save millions of dollars and shave months in the development time of passenger vehicles.

Chrysler's system, Control Program Generation and Analysis (C.P.G.A.), replaces the lengthy programming of control code to operate each workcell on the plant floor, thus shortening the launch time of manufacturing facilities.

"The C.P.G.A. technology will reduce the time it takes to program a typical workcell by thousands of hours, shave two to four months off the development time of passenger vehicles, and save upwards of $20 million per assembly plant," said Chrysler's Frank Ewasyshyn, vice president of Advance Manufacturing Engineering.

"The system will also more readily identify and eliminate process variation in the build process for better vehicle quality, and improve communication among manufacturing, engineering, and supplier personnel."

The new system provides an integrated environment for tool process, vehicle design, and the automated generation of plant equipment diagnostics and control code. In addition, the system allows the sharing of process information for the generation and validation of control programs prior to tooling construction in a vehicle program.

C.P.G.A. builds upon the Digital Manufacturing Process System (DMAPS), which Chrysler introduced with Dassault Systemes in 1995. DMAPS is now a fully computerized end-to-end product and process management system which enables Chrysler to design, construct, and run a "virtual manufacturing process."

C.P.G.A. further develops machine logic digitally within the system — thereby eliminating the end-line programming needs — so workcell control logic is defined much earlier and automatically. Controls engineers can then concentrate on other value-added areas of the manufacturing process rather than manual programming tasks.

In addition, C.P.G.A. is an integral part of the CATIA computer aided design system which Chrysler first used in 1984. CATIA 3D models have replaced engineering drawings and allows for an integrated design. This allows designers from different disciplines to better understand how their parts relate to other parts during the design of the vehicle.

"The generation of control code is the last step in integrating all the virtual manufacturing advances we've made into one system and allows for seamless communication to workcells on the plant floor," said Ewasyshyn. "It also provides for the automatic generation of diagnostics and the verification of control code prior to the construction of any tooling. By stretching the imagination, we've taken the virtual world almost to its limits."

C.P.G.A. captures product, process, and resource models in a common CAD environment, which allows the data to be shared among all stages of vehicle development. Control code and diagnostics are then generated from the given sequence of operations defined in the particular process model along with the tooling elements in the design model.

An important element is that the system enables Chrysler engineers to program its manufacturing processes consistently, thereby reducing and even eliminating programming errors. This allows all manufacturing facilities across the organization to operate on standardized and optimized control code.

"A key feature is the creation of a centralized and consistent database of process knowledge that our engineers will tap into," said Dan Vandenbossche, manager of Chrysler's Manufacturing Technical Support.

"This capture of best practices across all of our manufacturing facilities will improve the knowledge base of plant personnel and process and tool design engineers, and benefit future product launches."

The validation of control code in a virtual world rather than on the plant floor will greatly reduce workcell verification, thus shortening the launch time of manufacturing facilities. The generated diagnostic rules and graphical representation of fault locations will also improve machine operating cycles once a plant is launched.

The effort to develop computer generated programmable codes began between Chrysler and Dassault Systemes, Deneb, Rockwell Automation, and PICO in mid-1996. C.P.G.A. will be moving from the development stages into production applications over the next 12 to 24 months ■

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- Auto Plastics Review
- Interview With Dana's Perfect Circle
- More Supplier Lists
- Czech Republic Tax & Customs Update
- Poland Sales and Production Statistics
- Quality Improvement Lesson 5
- Bulgarian Sales & Production Review
- Lucas Takes On The Czech Republic
- Measure Your Company's Intellectual Capital

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Audi Assembling Engines & Autos in Hungary

Company Spotlight

Company: Audi Hungaria Motor Kft
Location: Gyor, Hungary
Contact: Peter Lore, Public Relations
Business: Engines, Car Assembly

Audi is obviously pleased with its decision to build engines in northwestern Hungary. The engine plant, producing since August 1994, is now the company's most important engine building facility. By the year 2000, Audi expects to produce 4,000 engines a day. And in April 1998, Audi expanded its operations in Hungary with the start of assembly of the TT Coupe model.

Audi's car and engine factory is located in the city of Gyor, halfway between Budapest and Vienna. When searching for a suitable site for its new plant, Audi looked at 180 locations throughout Europe and chose Gyor. **Audi Hungaria Motor Kft.** was founded in February of 1993 as a fully-owned subsidiary of **Audi AG**.

The Plant

The plant is located in a customs free zone on a 480,000 sq. meters site. The engine building takes up 110,000 sq. meters of this area, and within the engine building, car assembly operations cover 35,000 sq. meters of space.

According to Peter Lore, Audi Hungaria's spokesman, there are "no concrete plans" for the remaining unused space at the facility in Gyor.

Back in 1994, some 200 workers helped produce 750 four-cylinder, five-valve engines a day. Today, 2,600 unionized employees churn out 2,500 4-cylinder, 1,000 V6, and 100 V8 engines a day. The engine plant runs 3 shifts a day, 7 days a week.

Since April, TT Coupes have been added to the factory's menu, and production of TT Roadsters will soon follow. Total car assembly capacity is 30,000 units — 10,000 TT Roadsters and 20,000 Coupes. "This year we are planning to produce about 10,000 units, just Coupes," said Mr. Lore.

The car assembly plant currently operates with one shift and employs 360 workers. "By November, we will have 3 shifts," said Mr. Lore.

By the year 2000, employment in Gyor will hit 3,000 workers, with Audi's total investment topping DM 841 million ($480 million).

Logistics

In 1996, shipments of materials and engines between Hungary and Ingolstadt, Germany were switched from road to rail. Components and blanks destined for the Gyor engine plant are batched in Ingolstadt and transferred to Gyor overnight by rail.

Thus, components leaving Ingolstadt in the evening can be processed and used the next morning in Gyor. After the components are machined and assembled, the completed engines are shipped back to Ingolstadt by rail.

"We have two trains for the engine plant and we will have 2 trains for the car assembly operation by the end of this year," said Mr. Lore.

Engines built in Gyor are used in Audi, **Volkswagen**, **Skoda**, and **Seat** cars.

The Workers

As in most of today's lean manufacturing operations, the hierarchical structure at the Audi engine plant is flat and decision making is decentralized. Workers are organized into teams and are empowered to make their own decisions. Performance targets and procedures are set jointly by the workers and management. Inside the factory, target and current production levels are displayed on panels where all workers can see them.

There are two reporting levels at the factory between the plant management and production teams — the Product Manager and Area Manager. There is only one reporting level in administration.

Worker pay at the engine factory is based on a standardized, performance-based remuneration system which includes a basic wage and a variable component tied to individual performance ■

Sales of New Cars and Commercial Vehicles in Poland

	Sales (Units)							YTD April
	1992	1993	1994	1995	1996	1997	1998	% Change vs '97
Passenger Cars								
Local Production	144,748	170,549	199,724	206,284	260,265	337,467	100,229	24.62%
Import	54,531	71,059	50,558	58,754	114,347	140,493	37,296	-25.72%
Total	199,279	241,608	250,282	265,038	374,612	477,960	137,525	5.27%
Commercial Vehicles								
Local Production	19,665	18,475	21,413	28,076	43,207	43,086	9,988	-11.23%
Import	3,250	5,497	2,542	3,870	7,586	12,217	2,378	25.09%
Total	22,915	23,972	23,955	31,946	50,793	55,303	12,366	-5.98%

Source: SAMAR, s.c.

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Best Selling Brands in Poland (YTD April 1998)
Ranking By Retail Volume

Passenger Cars

Make	Volume	Market Share
FIAT	44,223	32.16%
DAEWOO	38,126	27.72%
GM - OPEL	10,558	7.68%
SKODA	6,658	4.84%
RENAULT	5,344	3.89%
FORD	5,134	3.73%
VW	4,339	3.16%
TOYOTA	4,308	3.13%
HONDA	4,284	3.12%
SEAT	3,394	2.47%

Commercial Vehicles

Make	Volume	Market Share
DAEWOO MTR.	3,121	25.24%
DAEWOO	2,662	21.53%
CITROEN	1,252	10.12%
MERCEDES	1,011	8.18%
VW	807	6.53%
FIAT	696	5.63%
SKODA	672	5.43%
FORD	448	3.62%
PEUGEOT	428	3.46%
IVECO	332	2.68%

Source: SAMAR, s.c.

Romanian New Vehicle Sales (1st Q)

Romanian New Vehicle Sales (in units)

	1998 1st Q	1997 1st Q	% Change
Passenger Cars	27,083	23,991	12.88%
Light Commercial Vehicles	6,106	4,043	51.02%
Commercial Vehicles (3.5-7 ton)	251	141	78.01%
Commercial Vehicles (over 7 ton)	403	216	86.57%
Buses	143	201	-28.85%
Up to 15 places	54	58	-6.89%
Over 15 places	89	143	-37.76%
TOTAL	**33,986**	**28,726**	**18.31%**

Source: APIA

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New Car Registrations Growth in Europe (YTD April)

	Country	1998	1997	% Change
1	Germany**	971,900	869,320	11.8
2	Italy**	716,500	617,672	16.0
3	U.K.	622,600	550,486	13.1
4	France	460,200	406,897	13.1
5	Spain**	272,000	239,016	13.8
6	Netherlands**	167,800	159,052	5.5
7	Poland*	137,525	130,635	5.3
8	Belgium	136,500	122,862	11.1
9	Austria**	80,000	75,472	6.0
10	Switzerland**	69,100	68,688	0.6
11	Portugal**	58,800	55,577	5.8
12	Sweden	58,300	51,411	13.4
13	Ireland**	56,400	51,180	10.2
14	Greece**	44,900	41,005	9.5
15	Denmark**	40,400	39,300	2.8
16	Finland	34,200	30,292	12.9
17	Norway	27,000	29,703	-9.1
18	Luxembourg	9,900	9,602	3.1

*Grey import not included
** Provisional figures

Source: SAMAR, s.c.

Best Selling Models in Poland (YTD April 1998)

Passenger Cars

Make	Units	% Change '98 v '97
Daewoo Tico	13,171	89.37
PF 126	11,136	-19.09
Daewoo Lanos	10,380	-
Fiat Cinquecento	9,902	-35.22
Fiat Siena	9,681	-
Opel Astra	6,198	32.86
FSO - Polonez	5,938	-51.40
Skoda Felicia	5,723	21.15
Fiat Punto	4,638	0.41
Fiat Uno	4,474	-32.16

Light Commercial Vehicles

Make	Units	% Change '98 v '97
FSO Polonez Truck	2,585	-18.69
Citroen C15	712	-23.61
Skoda Pick up	672	111.99
Citroen Berlingo	417	13800.00
Fiat Uno Van	414	-18.34
GM - Opel Combo	220	-19.12
Peugeot Partner	166	-25.23
Fiat Cinquecento Van	125	-89.80
VW Caddy	83	-44.83
FSO Polonez Cargo	77	-25.96

Medium Commercial Vehicles

Make	Units	% Change '98 v '97
Daewoo Lublin	2,675	1.06
Mercedes Vito	804	118.48
VW Transporter	559	115.00
FSC - Zuk	446	-49.38
Ford Transit	370	-35.76
Iveco Daily	332	114.19
Mercedes Sprinter	207	100.97
Peugeot Boxer	206	171.05
Kia Ceres	163	94.05
Fiat Ducato	157	-48.86

Source: SAMAR, s.c.