



SZENT ISTVÁN  
EGYETEM



GAZDASÁG- ÉS TÁRSADALOMTUDOMÁNYI KAR,  
GÖDÖLLŐ

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# Studia Mundi - Economica

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## AZ INFORMÁCIÓS RENDSZEREK SZEREPE ÉS ÉRTÉKELÉSE A VÁLLALKOZÁSOKBAN

### INFORMATION SYSTEMS: FUNCTION OF AND EVALUATION IN BUSINESS

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#### Összefoglalás

A vállalat belső és a környezetével lebonyolított információkat tároló, feldolgozó és a megfelelő döntéshozónak rendelkezésére bocsájto vállalati információs rendszer alkalmazása és az informatikai beruházások az adott általánosságban a cég fejlettségét, piaci versenyképességét is jelzik. A magyar vállalkozások körében azonban a bevezetett ERP rendszerek száma alacsonyabb, mint az Európai Unió tagállamaiban átlagosan, melynek egyik oka a bevezetés költségeitől való félelem. Bemutatjuk, hogy milyen módszertanok mentén vizsgálható az infokommunikációs technológiákba történő beruházások értékelése.

#### Abstract

The Enterprise Information System in storage, processing, disposal of the relevant information to the decision makers and IT investments in generally shows the level of development of the entire company and also indicate market competitiveness. Among Hungarian enterprises, the number of introduced ERP systems is lower than the average of EU member states, which is caused by among other reasons the fear of the costs of implementation. We present some rating methodologies, with those information- and communication technologies investments can be examined with.

**Kulcsszavak:** integrált informatikai rendszerek, IT beruházások értékelése

**JEL besorolás:** O32, O33

„Az információ drága:  
csak a hiánya kerül többbe.”  
(Lord Raleigh)

#### Az információ, információs társadalom

Az információ nem más, mint adat vagy adatok, mely(ek) adott időpillanatban valaki (vagy valami: pl. cégek, intézmények stb.) számára (fontos, értékes, új – vessző helyett tehetünk vagy és és jeleket is) jelentéstartalommal bírnak.

A wikipedia (Internet1) szerint általánosságban: az információ számunkra eddig ismeretlen, új adatot, ismeretet jelent. Az, hogy valamit adatnak nevezzünk, nem szükséges hogy számunkra új legyen.

Ezzel a wikipedia-s alapvetéssel szemben, mely szerint az információt az különbözteti meg az adattól, hogy az új adat az információ, míg a régi nem, talán maradjunk annyiban, hogy az információt befogadó számára új-e, fontos-e, illetve értékes-e az új adat vagy ismeret. Amennyiben nem az, azzal még nem zárja ki magát ezen „elavult adat” az információk lehetséges köréből, hiszen valaki más számára még lehet az.

A Drótos (2005) és Koltay (2007) gyűjtése szerint az információ fogalmát a különféle tudományágak eltérően definiálják:

- köznyelvi értelemben: tájékoztatás, felvilágosítás, értesítés stb. jelentésű;
- a kommunikációelmélet szerint: az információ kölcsönösen egymásra ható objektumok kommunikációjának objektív tartalma, amely ezen objektumok állapotának megváltozásában nyilvánul meg;
- a hírközlés tudománya szerint: az információ valamilyen sajátos statisztikai szerkezettel rendelkező jelkészletből összeállított, időben és/vagy térben elrendezett jelek sorozata, amellyel az adó egy dolog állapotáról, vagy egy jelenség lefolyásáról közöl adatokat, melyeket egy vevő felfog és értelmez. Az információ mindaz, ami kódolható és egy megfelelő csatornán továbbítható;
- a matematikai információelmélet szerint: az információ számmal mérhető, mégpedig első közelítésben az információ mennyisége azoknak a barkochba kérdéseknek a számával egyenlő, amennyi az optimális kérdés mellett elégséges a dolog kitalálásához (más szóval a minimális számú kérdés, ami szükséges);
- az ismeretelmélet szerint: az információ olyan ismeret, tapasztalat, amely valakinek a tudását, ismeretkészletét, ennek rendezettségét megváltoztatja, átalakítja, alapvetően befolyásolja, ami átmenetileg a tudásbeli bizonytalanság növekedésével is járhat;
- társadalomtudományi szempontból: az információ a társadalom szellemi kommunikációs rendszerében keletkezett és továbbított hasznos vagy annak minősülő ismeretközlés. Össztársadalmi jelenség, a világ globális problémáinak egyike, hasonlóan az energiához, a környezetvédelemhez;
- gazdasági megközelítésben: az információ egyrészt szolgáltatás, másrészt piaci termék, de az árucserével ellentétben az információcserénél mindkét félnek megmarad az információja. A termékekben egyre csökken az anyag, az energia és az élőmunka felhasználása, és ugyanolyan mértékben nő a bevitt információ mennyisége;
- biológiai szempontból: az önszabályozó automatákban (így az élőlényekben is) negatív visszacsatolás révén szerzett információk biztosítják a rendszer stabilitását. Információs gépekként működve képesek fenntartani egy termodinamikailag nagyon valószínűtlen, magas információtartalommal rendelkező rendszert. Az élőlényekben a DNS hordozta biológiai információ szolgálja a faj fennmaradását. Az ember személyiségét a külvilágból szerzett információk óvják meg a felbomlástól.
- az információs fizika definíciója: az információ és a rend szoros kapcsolatban vannak egymással. Minden rendezett szerkezet információt hordoz. A fizikában az energiát munkavégző képességként definiálják, az információ ennek megfelelően rendező-képesség. Hasznos munkát csak energia és információ együttes befektetésével lehet elérni. Az információ mérése a rend vagy a kaosz mérésén alapszik;
- a filozófia szerint: az információ éppen olyan főszerepet játszik a világban, mint az anyag és az energia. A világot alkotó rendszerek információs kapcsolatok (esetleg információs mezők?) révén szerveződnek egésszé. Alapvető különbség viszont, hogy az információra nem érvényesek a megmaradási törvények, megsemmisíthető és létrehozható.

A környezet, amiben az információ árát vizsgáljuk pedig nem más, mint az „Információs társadalom”, tehát a környezetünket is érdemes megvizsgálni.

Az információs társadalom (angolul information society) elmélete szerint a társadalomban az információ előállítása, elosztása, terjesztése, használata és kezelése jelentős gazdasági, politikai és kulturális tevékenység. Ennek közgazdasági társfogalma a tudás gazdaság, amely szerint az értelem gazdasági hasznosításán keresztül érték jön létre. (Nádasi, és mtsai. 2014)

Ennek a társadalomtípusnak a sajátossága az információ-technológia központi szerepe a termelésben, a gazdaságban és általában a társadalomban. Az információs társadalmat az ipari társadalom örökösének is tekintik. Szorosan kapcsolódik a posztindusztriális társadalom (Daniel Bell), a posztfordizmus, a posztmodern társadalom, a tudástársadalom és a hálózati társadalom (Manuel Castells) fogalmihoz. (Pintér, 2007)

### **Információ szerepe a vállalati gazdálkodásban**

Az információ, mint termelési tényező szerepe vitathatatlan a gazdálkodásban. Az információs technológia (IT) az információ feldolgozás révén javította költség/teljesítmény arányokat, a termelékenységet, növelte a rugalmasságot a termelésben (Csorba, 2004). Az IT elősegítette a természetes erőforrások felhasználását, ezáltal kitolta a növekedés határait. Az információs technológia robbanásszerű fejlődése az 1970-es évektől fogva egy új technikai forradalmat eredményezett, melyben a számítástechnikai berendezések hálózatokba rendeződve információáramlást hoztak létre.

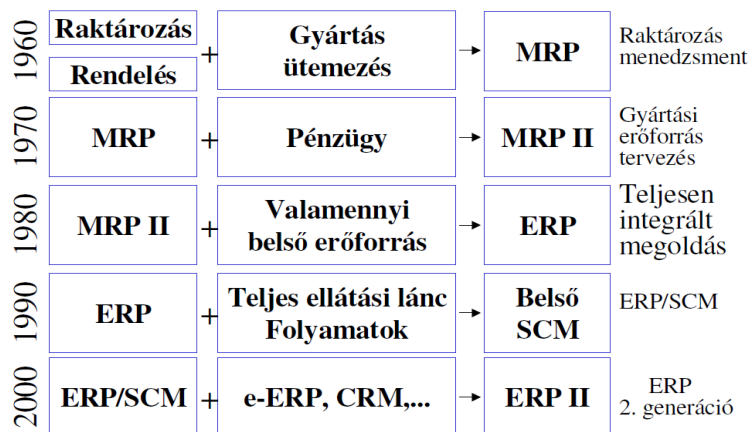
Az informatikai fejlesztésben vezető szerepet játszó Egyesült Államokban az 1970-es és 80-as éveket, mint a gazdasági racionalitást nélkülöző IT „fegyverkezési versenyt” írja le Strassmann (2002). A gazdálkodó vállalatok minden területen a számítógépesítésre törekedtek, az informatikai eszközök beszerzése stratégiai kényszerré vált. A 2000-es évek elején a recesszió azonban kikényszerítette a gazdaságossági számítások előtérbe kerülését (Bögel, és mtsai. 2003).

Az információs rendszerek technikai fejlődésének első lépcsőjeként szigetszerűen működő számítógépes programok kerültek a vállalatokhoz, klasszikusan a számviteli és raktározási folyamatok könnyítése céljából. A szoftverek közötti adatcsere és a menedzsment felé történő információszolgáltatás azonban a rendszerek integrációjához és evolúciójához vezetett (1. ábra).

### **Információs rendszerek és döntési folyamatok**

Információs rendszernek ma már azt a rendszer nevezzük „amely figyeli egy vállalat környezetére vonatkozó adatokat, begyűjti azokat, valamint ezzel egyidejűleg kezeli a vállalaton belül zajló tevékenységeket és a környezettel folytatott adatcserét is” (Chikán, 2008).



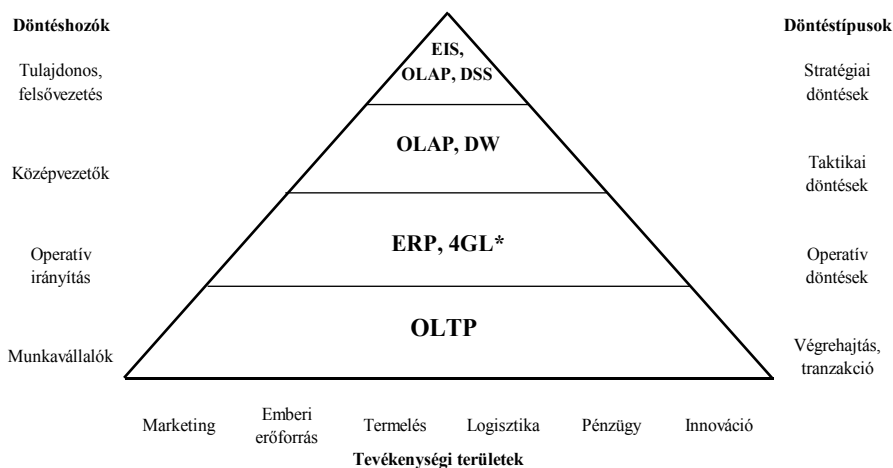


**1. ábra Az integrált rendszerek evolúciója**

*Forrás: Turban, 2002, magyarul idézi: Ternai, 2008*

Az integrált informatikai rendszerek lefedik a teljes Chikán (2008) által leírt vezetői döntéshozatali szinteket (2. ábra):

- munkavállalói szinten az online tranzakció feldolgozás (On Line Transaction Processing - OLTP) zajlik, melynek célja az üzleti, működési folyamatok elemeinek, eseményeinek „azonnali” feldolgozása (adatbevitel, -feldolgozás, -tárolás, -megjelenítés, esetleg lekérdezések);
- operatív irányítói szinten az erőforrás tervező (Enterprise Resource Planning System – ERP I.) programok segítenek, melyek feldolgozzák és nyomon követik az üzleti folyamatok eseményeit, rögzítik a különböző funkcionális szervezeti egységektől és vállalati folyamatokból származó adatokat, kielégítik a különböző szintű vezetői információigényeket;
- a középszintű vezetés döntéseinek támogatását az adattárházak (Data Warehouse – DW) és az azokban tárolt adatokat akár több irányból megjelenítő on-line elemző rendszer (On-line Analytical Processing - OLAP) biztosítja, az által, hogy az alaprendszerekből kinyert és tisztított adatokat az ERP kötöttségeitől mentesen a vezetői szempontok szerint feldolgozva és tetszőleges mélységben jeleníti meg;
- a felsővezetők szintjén a vezetői információs rendszerek (Executive Information System – EIS), illetve más elnevezéssel üzleti intelligencia szoftverek (Business Intelligence – BI) találhatóak, melyek interaktív jelentésekkel, grafikonokkal és összefoglalókkal támogatják döntési folyamatot (ERP II).



**2. ábra Vezetői döntéshozatal informatikai támogatása**

*Forrás: Michelberger*

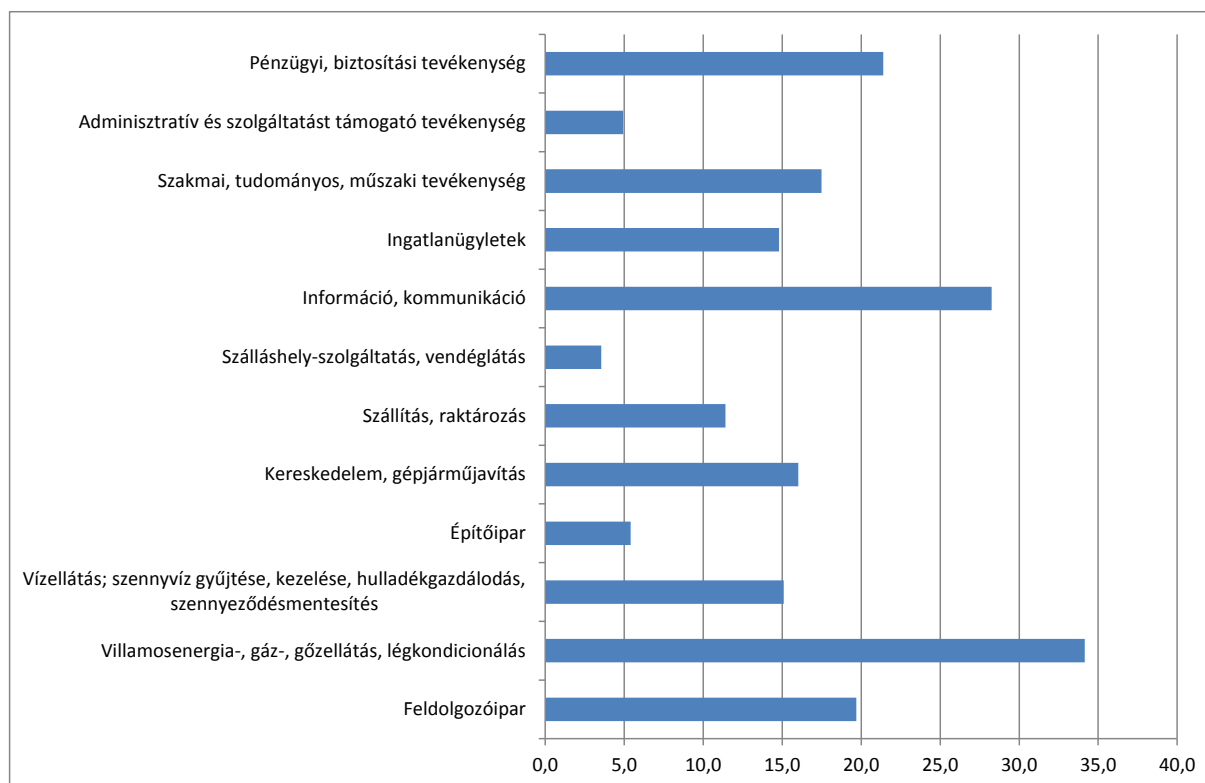
A vállalati információs rendszerek előnyei (Shang, és mtsai. 2002) a nemzetközi irodalomban jól körülírtak:

- operatív előnyök: költségcsökkentés, ciklusidő csökkentése, termelékenység javítása, minőség javítása, fogyasztói szolgáltatások javítása;
- vezetői előnyök: jobb forrásmenedzsmen, döntéshozatal és tervezés javítása; teljesítmény javítása;
- stratégiai előnyök: üzleti növekedés és szövetségek támogatása; innováció építése, termékdifferenciálás elősegítése, külkapcsolatok építése;
- IT infrastrukturális: változásokra való felkészülés, költségcsökkentés, infrastruktúra teljesítőképességének növelése;
- vállalati: változások támogatása, tanulás elősegítése, közös nézőpontok kiépítése.

Ezen öt fő és 25 aldimenzió által leírt előnyök természetesen nem mind, nem azonnal és nem problémák nélkül jelentkeznek.

### **ERP használata a magyar KV szektorban**

A magyar helyzetet tekintve Központi Statisztikai Hivatal (KSH, 2014) friss adatközlése szerint a vállalkozások nagy része (~90%) használ tevékenysége során számítógépet és rendelkezik internet eléréssel, de a vállalkozáson belüli automatizált információcsere alkalmazása rendkívül alacsony. A statisztikai adatok szerint évről-évre nő mind az erőforrás tervező (ERP), mind az ügyfélkapcsolat kezelő (CRM) rendszerek alkalmazása, azonban az ERP elterjedtsége kevés ágazatban éri el az EU-s átlagot jelentő 27%-ot (3. ábra.)



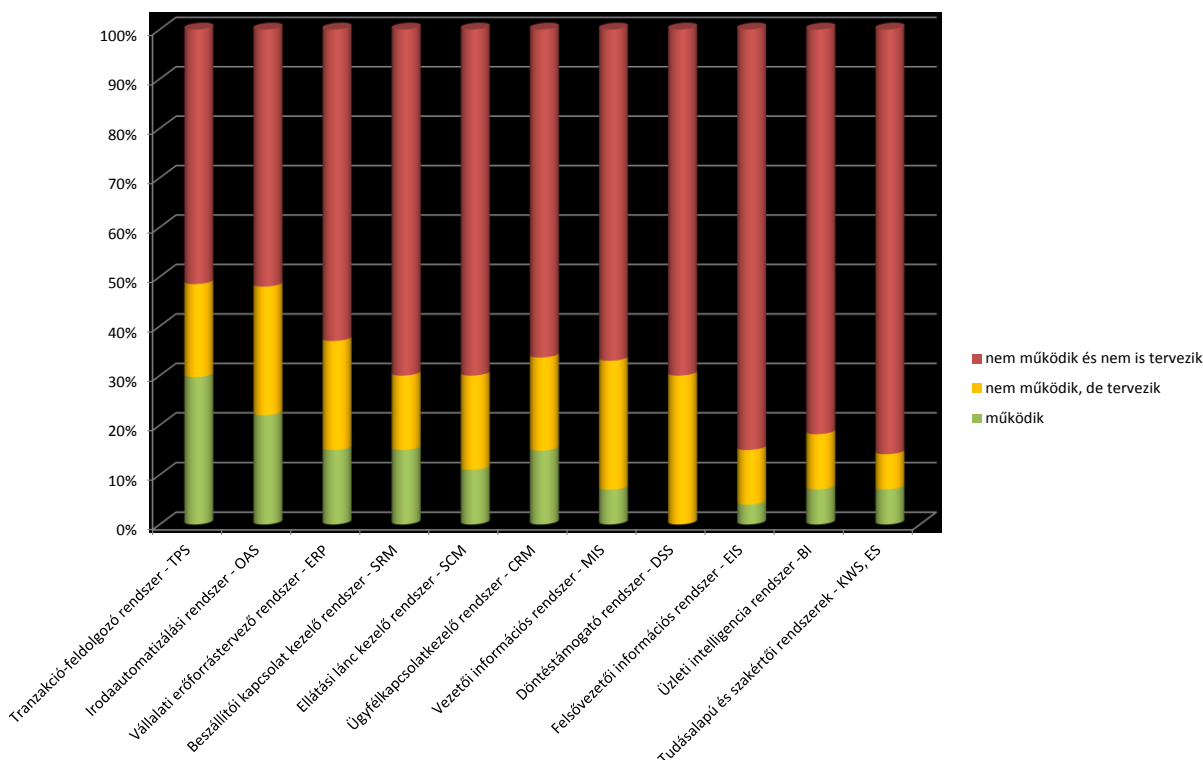
**3. ábra ERP használati aránya nemzetgazdasági áganként, 2013**

*Forrás: KSH adatok alapján saját szerkesztés*

A vállalkozások méretét tekintve megállapítható, hogy minél több munkavállalót foglalkoztatnak, annál nagyobb arányban használnak ERP rendszert, a 250 főnél több alkalmazottal rendelkezők kétharmadánál van erőforrás tervező rendszer, ami azt is tükrözi,

hogy főként a hazai viszonylatban nagyszámú kis- és középvállalkozás (kkv) nem rendelkezik fejlett vállalatirányítási rendszerrel.

Sasvári 2013-ban 94 magyar mikro- és kisvállalkozás vizsgálata során arra az eredményre jutott, hogy az érintett vállalkozások nagy része nem csak nem rendelkezik információs rendszerrel, de a jövőben sem szándékozik azt bevezetni. A kisvállalkozások esetén az információs rendszer komplexitásával egyenes arányosságban csökken az információs rendszerek használata és bevezetésükre való hajlandóság (4. ábra).



#### 4. ábra Magyar kisvállalkozások információs rendszer használata, 2012

*Forrás: Sasvári, 2013 alapján saját szerkesztés*

A magyar vállalkozások tartózkodását az integrált irányítási rendszerek bevezetésével kapcsolatban Zörög (2013) az alábbiakban látja:

- nehezen kimutatható gazdasági haszon,
- átszervezéstől, folyamatok átalakításától való félelem,
- szervezet életébe való beavatkozás;
- vezetők és foglalkoztatottak IT hiányosságai.

A kis- és középvállalkozások esetében szubjektív tényezők is árnyalják az ERP rendszerek iránti ellenérzés okairól alkotott képet (Csapó, és mtsai. 2013):

- az integrált rendszerek nagyvállalatok számára készülnek, a kisvállalkozásoknál felesleges a bevezetésük;
- a kkv-k adatkezelése és folyamatirányítása nem kíván összetett rendszert, akár manuálisan, minimális informatikai támogatással megoldható;
- magas bekerülési költségek a szükséges (vagy annak vélt) hardver és szoftver tekintetében.

A vállalatirányítási rendszerek azonban nem csak irányító, szervező és döntéstámogató eszközt jelentenek a menedzsment kezében, egyre inkább a cégérték növelésének, a vállalat fejlettségének fokmérőjévé vált alkalmazásuk. A fejlesztő cégek, a kutatók és az állam eltérő problémamegoldó és ösztönző rendszert javasolnak:

- a fejlesztő és forgalmazó cégek igyekeznek lebontani a paradigmát, mely szerint az ERP csak a nagyvállalatok számára elérhető, akik rendelkeznek elég megtakarítással, szabad tőkeállománnyal, vagy a kutatásra és fejlesztésre elkülönített pénzeszközöikből képesek áldozni fejlődésre (Kárpáti-Sárkány, 2009), a kisvállalkozásokat moduláris és könnyen paraméterezhető szoftverekkel célozzák meg (Nagy, 2013);
- szoftverfejlesztési oldalról közelíti meg a kérdést Ternai (2008) is, a vállalkozásnál rendelkezésre álló szoftverek összehangolását, kiegészítését és ezzel új szintre emelését javasolja, a szolgáltatás-orientált architektúra (SOA) által, vagyis egy olyan megközelítéssel, melyben lazán összekapcsolt szoftveres szolgáltatások szolgálják ki az üzleti folyamatok és a felhasználók szükségleteit (Bieberstein, és mtsai. 2006);
- a szakképzett és felkészült munkavállaló oldaláról közelíti meg a kérdést Zörög (2013), így az oktatás megfelelő színvonala megteremtheti azt a vezetői és munkavállalói kört, mely számára magától értetődő az integrált vállalatirányítási rendszerek használata, és az alkalmazás iránt támasztott igény;
- az állam, felismerve, hogy „a mikro-, kis- és középvállalkozások jövedelemtermelő képességének erősítése az IKT megoldások hatékony alkalmazása révén a versenyképesség növekedését segíthetik elő” (GOP-2011-2.2.1 Pályázati felhívás) több, európai uniós alapról finanszírozott pályázatot írt ki, legutóbb 2011-ben (Vállalati folyamatmenedzsment és elektronikus kereskedelem támogatása), a pályázat eredményeképpen 24.500 cég kapott támogatást, az elemzések alapján viszont a támogatás hatására „foglalkoztatottak szignifikáns növekedése mellett a tőkeállomány kis mértékben, az árbevétel és az üzleti eredmény pedig egyáltalán nem javult” (Budapest Szakpolitikai Elemző Intézet, 2013).

### **Az IT-beruházások értékelése**

Az előzőekből kiderült, hogy az informatikai már hosszú ideje jelentős és egyre jelentősebb szerepet játszik a vállalkozások életben. Ebből kiindulva nagy jelentőséggel bír, hogy információs és kommunikációs technológiáknak a vállalat teljesítményéhez hozzáadott értékét illetve vizsgáljuk. Ennek részét képezi az aktuálisan használt informatikai megoldások, valamint a megvalósítani tervezett IT-beruházások értékelése is. A következőkben az erre vonatkozó elméleti modelleket, eljárásokat tekintjük át röviden.

### ***Az információs technológia hatása az üzleti eredményességre***

Az IT hatását az üzleti eredményre sokan és sokféleképpen vizsgálták, értékelték. (Stewart, és mtsai. 2007) Annak ellenére, hogy tényként kezelik, hogy az informatika fontos fegyver a versenyképesség megőrzése, növelése terén, a vállalati teljesítményben betöltött pontos szerepe folyamatos vita tárgyát képezi már évtizedek óta.

Számos szerző (Westerlind, 2004) (Lin, és mtsai. 2005) (Silvius, 2006) hivatkozik azokra a vizsgálatokra, melyek alapján nem jelenthető ki egyértelműen, hogy önállóan az informatikának milyen és mekkora hatása van a termelékenységre. Ezt a jelenséget közkeletűen IT-termelékenységi paradoxonként szokták említeni. Ez a területet jelenleg is sokan, sokféle szempontból vizsgálják – pl. az IT szerepe a fejlődő és fejlett országok hatékonyságában (Dedrick, és mtsai. 2010), vizsgálatok a török bankszektorban (Günsel, és mtsai., 2011) vagy

az infómunkások körében (Pashkevich, és mtsai., 2013). És bár az IT szerepe összességében nyilván pozitív, de nem minden vonatkozásban mutatható ki ez a hatás.

Több szerző megállapításait összegezve az IT-termelékenységi paradoxon okai a következőkben összegezhetők (Westerlind, 2004) (Lin, és mtsai. 2005):

- az inputok (az IT könnyen és nehezen megfogható hozadékai) és outputok (a két mérés között pl. árváltozás figyelmen kívül hagyása vagy új termékkör bevezetése) éves mérése;
- az IT értékének meghatározásában mutatkozó nehézségek;
- nem megfelelő mérési módszer alkalmazása;
- túl korai (pl. a teljes bevezetés előtti) értékelés;
- az egyes vállalatoknál mutatkozó pozitív hatások nem jelentkezik az iparág egészében;
- rossz irányítás (nem kellően elkötelezett, képzett stb. döntéshozók).

Az IT üzleti értékének leképezésére Silvius egy ettől eltérő koncepciót alakított ki Soh és Markus 1995-ös folyamat-szemléletű modellje alapján. (Silvius, 2006) Ez a keretrendszer három fő komponensből áll:

IT-hatékonyság: E területen az IT-költségek és az ebből létrejött IT-eszközállomány viszonyát vizsgáljuk. Lényeges az idődimenziója – az elérhető technológiát optimálisan kell felhasználni, a megfelelő pillanatban kell áttérni az új technológiákra. A vállalati informatikai vezetők ide kapcsolódó fő kérdése: Hogyan minimalizáljuk az aktuális IT-menedzsment, -karbantartás költségeit úgy, hogy a vállalt szolgáltatási minőséget fenn tudjuk tartani?

IT-hatásosság: Az informatikai vezetők másik gyakori dilemmája: Hogyan maximalizáljuk az IT-beruházások üzleti értékét? Ez a kérdés nem a hatékonyságot, hanem a hatásosságot érinti, vagyis: Hogyan vesz részt az informatika az üzleti stratégiákban és célokban?

Silvius más szerzők munkája alapján azonosít négy forrást, amelyekből az IT üzleti értékteremtése származik. Tehát az informatika a vállalati tevékenységet hatékonyabbá (pl. gyorsabb, pontosabb adminisztráció) hatásosabbá (részletesebb információszolgáltatás a döntéshozóknak), rugalmasabbá (pl. szervezeti struktúra országon túli kiterjesztése a fejlett kommunikáció támogatásával) és innovatívabbá (pl. új piacok megszerzése az eBusiness segítségével) teheti.

Ezt a négy forrást kombinálhatjuk a marketing-mix 4P modelljének (termékpolitika, árpolitika, értékesítés-politika, reklámpolitika), valamint az üzleti folyamatok általános modelljének komponenseivel (erőforrás-kezelés, érték-előállítás, innováció, irányítás). Így létrejön egy olyan jól használható mátrix, amelyben elhelyezhetők, és így értékelhetők, kommunikálhatók egy IT-beruházás (pl. egy vezetői információs rendszer) hatásai.

A harmadik fő komponens az üzleti stratégia és az IT összhangja: Egy vállalat alapvetően háromféle üzleti stratégiát folytathat: Versenyezhet az árak segítségével, a termék minőségével valamint a vevői igények mind teljesebb kiszolgálásával. Ezekhez – nem kizárólagos, de jellemző erőként – párosítható egy-egy támogató IT-értékforrás: az árversenyhez a hatékonyság, a termékversenyhez a hatásosság és a vevőkért folytatott versenyhez az innovativitás.

### ***Beruházás-értékelési módszerek kategorizálása***

Akármilyen modellen keresztül is vizsgáljuk a vállalatnál használt (vagy megvalósítani tervezett) informatikai megoldások üzleti folyamatokra gyakorolt hatását, következő lépésként elkerülhetetlen, hogy valamilyen módszertan segítségével értékeljük is ezeket az IT-megoldásokat.

Az elmúlt évtizedek során nagyszámú értékelési eljárás alkalmazását dokumentálták az informatika területén, ezek egy részét a klasszikus beruházás-gazdaságossági számítások közül vették át, másokat informatikai projektekhez alakítottak ki. A módszerek köre folyamatosan bővül, egyesek részét képezik más, összetett rendszereknek, így teljes képet nem tudunk adni róluk. A következőkben néhány, a témával foglalkozó szerző megállapításait foglaljuk össze.

Renkema és Berghout (Renkema, és mtsai. 1997) összesen mintegy 50 értékelési módszert vizsgáltak meg és kategorizáltak, a következő szempontokat felhasználva:

- a módszer célja (projekt- vagy vállalati szintű),
- a módszerben használt értékelési kritériumok (pénzügyi, nem pénzügyi, kockázatok bevonása),
- a módszernek az értékeléshez nyújtott támogatása (pl. jelzi, milyen módon kellene azonosítani a hasznokat),
- a módszer milyen eredményt hoz létre (nominális, ordinális, intervallum-, arányskála),
- a módszer által összességben képviselt minőség (egyszerű használhatóság, teljes körű eredmény stb.).

Ezek alapján az alábbi, gyakran hivatkozott módszer-kategóriákat hozták létre:

- Pénzügyi módszerek: A vállalati beruházások értékelésénél hagyományosan használt módszerek kerültek ebbe a csoportba, így jellemzően a beruházás finanszírozására koncentrálnak.
- Többtényezős módszerek: Ezek az eljárások nem csak a beruházás pénzügyi hatásait vizsgálják, hanem olyan tényezőket is figyelembe vesznek, mint a stratégiának való megfelelés
- Arány-típusú módszerek: Ezek a módszerek jellemzően arányokat használnak a szervezeti hatékonyság kifejezésére (pl. az összes IT-kiadás/az összes árbevétel) – de nem kizárólag pénzügyi mutatókat felhasználva ehhez.
- Portfólió-módszerek: Az informatikai beruházásokat a modern portfólió elmélet keretei között vizsgáló módszerek. Ennek értelmében egy vállalat IT-ráfordításait (mint projekteket) nem költségként, hanem a pénzügyi befektetésekhez hasonlóan kell értékelni.

Andersen összesen 82 elemzési módszert és számos kategorizálási koncepciót vizsgált meg. (Andresen, 2001) Ezek alapján ő a következő tényezőket veszi figyelembe a módszerek értékelésénél: a bevontak köre; az IT-beruházás vizsgált fázisa; a módszer által vizsgált hatás típusa; a módszer költségessége; a módszerben alkalmazott értékelési kritériumok; az IT-beruházás típusa; az értékelési módszer hatóköre és az értékelési módszer bonyolultsága.

Ezeket felhasználva három kategóriába sorolta a módszereket:

- Pénzügyi módszerek: Azok az eljárások kerültek ide, melyek kimenete jellemzően pénzügyi vagy pénzügyi körülményeket írnak le.
- Kvantitatív módszerek: Ezek a módszerek számszerű végeredményt (egy vagy több mutató) hoznak létre, de nem kizárólag pénzügyi jellemzőket használnak fel.

- Kvalitatív módszerek: Ide sorolta azokat az eljárásokat, melyek nem számszerű eredményeket produkálnak (pl. portfólió-diagram vagy valamilyen szubjektív állítás).

Lech három tényezőt vett figyelembe a módszerek kategorizálásánál (Lech, 2005):

- A módszer IT-orientációja: Mennyire veszi figyelembe a vállalati informatikában jelentkező speciális költségeket és hasznokat.
- A módszer értékelési hatóköre: Teljes projektet vizsgál-e vagy bizonyos részleteire fókuszál.
- A megfigyelés szintje: A módszer egyedi projektek értékelésére, projektek összehasonlítására vagy az IT hatásának teljes körű vállalati értékelésére készült.

A szakirodalomban fellelt kategóriák és a fenti tényezők alapján ő a következő csoportokat alkotta:

- Pénzügyi módszerek: Az IT-projektek közvetlen pénzügyi hatását vizsgálják
- Kvalitatív módszerek: Nem kizárólag pénzügyi, de mindenképpen számszerűsíthető tényezőket is figyelembe vesz. Ezen belül megkülönböztet:
  - Többtényezős módszerek: Pénzügyi és nem pénzügyi mutatókat használnak, rendszerint rangsorolásra alapozva.
  - Stratégiai elemző módszerek: A stratégiai menedzsmentből átvett olyan módszertanok, mint pl. Balanced Scorecard vagy a portfólió-elemzés.
- Valószínűségi módszerek: Kvantitatív elemzési eljárásokat és döntési elméleteket vesznek figyelembe az értékelésnél.

Silvius (2008) Renkema és Berghout fent említett munkáját néhány ponton kiegészített: a pénzügyi mutatók (pl. nettó jelenérték, NPV) továbbfejlesztése egyrészt bevonja a mutatóba a rugalmasság (pl. a beruházás ütemezésének, kimenetének módosulása) számszerűsítését. Ehhez a reálopciók megközelítés alkalmazza, amelyet több szerző is előkerül (Erdős, 2009). Másrészt bevonja a játékelméleti megoldásokat a stratégiai érték számszerűsítéséhez. Így pl. a kibővített NPV elvi képlete a következő módon alakul: kibővített NPV = NPV + rugalmassági érték + stratégiai érték.

Emellett javaslatot tesz arra, hogy az IT projekt kiválasztási folyamata során a különféle értékelési módszereket kombináltan használjuk, így kiküszöbölve azok egyedi hátrányait. Ez összefoglalható a következő ábrában:



**5. ábra** Értékelési módszerek kombinációja a projektkiválasztás folyamatában

Forrás: Silvius, 2008

Erdős (2009) a kis- és közepes vállalatok igényei alapján vizsgálta a kérdést a következő szempontok segítségével:

- Vállalati paraméterek: a vállalat mérete, iparága, a meglévő vállalati folyamatok, vállalati stratégia stb.
- Az értékelést érintő paraméterek: döntési szituáció, az értékelési folyamat bonyolultsága, az értékeléshez rendelkezésre álló erőforrások stb.
- Az IT-beruházást érintő paraméterek: a beruházás típusa, mérete, fontossága stb.

Ez alapján a következő módszer-csoportokat mutatta be:

- Költségelemzések: A beruházás (látható és rejtett) költségeit számszerűsítő módszerek
- Haszonelemzések: Az IT-beruházás által előidézett hasznosságokat számszerűsítik, egyes esetekben monetarizálják.
- Beruházás-gazdaságossági mutatók: A közgazdaságtanban alkalmazott klasszikus mutatókat említi meg ebben a kategóriában, amelyek itt is sikerrel használhatók, ha a kiadásokat és a bevételeket megfelelően meg tudjuk határozni.
- Kockázatok kezelésére alkalmas megoldások: Mivel munkájában az IT-beruházások előzetes értékelésével foglalkozik, nagy teret szentel a bizonytalansági tényezők (előre nem ismert külső környezeti hatások, ezek beruházásra gyakorolt hatása) kezelési lehetőségeinek.
- Komplex értékelési módszertanok: Valamilyen többdimenziós szempontrendszer alapján vizsgálják a beruházást, figyelembe véve többek között a szervezet stratégiáját, üzleti folyamatait.

### ***Értékelési módszerek rövid ismertetése***

Az előzőekben bemutatott kategorizálást (Lech, 2005) alapul véve ismertetünk röviden néhányat a gyakrabban használt eljárások közül.

#### *Pénzügyi módszerek*

Nettó jelenérték (Net Present Value, NPV): A gazdaságossági számítások során képzett egyik alapvető mutató, sok komplex módszertanban is szerepet kap. Megmutatja a beruházás várható élettartam alatt realizálódó bevételek és felmerülő kiadások jelenre diszkontált különbségét. (Erdős, 2009)

Megtérülési ráta (Return on Investment, ROI): A beruházás-értékelés egyik leggyakrabban használt mutatója, számos más módszer részét is képezi. Megmutatja, hogy a beruházott tőke hány százalékát lehet profitként realizálni. A beruházás hozadékát „kemény” (becsült vagy számított megtakarítások, ill. megkeresett bevételek) és „puha” (indirekt kifejezhető hasznosság – pl. növekvő munkatársi, vevői elégedettség, a cég belső arculatának javulása) kategóriákba szokták sorolni. Előbbit viszonylag könnyű, utóbbit nehéz mérni, noha az IT-fejlesztések haszna jelentős részben a puha tényezőkből származik. (Westerlind, 2004) (Szalay, 2009)

TSTS-eljárás (Time-Savings Time-Salary): Nagyon egyszerű mutató az IT-projekt hasznának számszerűsítéséhez: a beruházás eredményeként megtakarított munkaidő értékével kalkulál. (Erdős, 2009)

Gazdasági hozzáadott érték (Economic Value Added, EVA): A mutató a cég (vagy ez esetben egy beruházás) által megtermelt adózás utáni működési eredmény és az ennek érdekében



lekötött tőke elvart hozama közötti különbséget takarja. (Fónagy-Árva, 2006) A mutató a vállalat valódi gazdasági profitját fejezi ki, így általa maximalizálható a részvényesi érték is. Az IT-befektetések esetében (mivel projekt szinten nem beszélhetünk adózás utáni eredményről), ez esetben is megoldást kell találni az IT által létrehozott hasznok (és költségek) mérésének régi problémájára. Tehát valamilyen kiegészítő módszerrel (pl. költség-haszon elemzés) szükséges meghatározni a projekt nettó hasznát. (Berry, 2003)

Birtoklás teljes költsége (Total Cost of Ownership, TCO): Összetettebb módszer, segítségével számszerűsíthető egy informatikai beruházás megvalósításának összes költségét a teljes élettartam alatt. Megkülönböztet direkt (hardver és szoftver, működtetési, támogatási) és indirekt (végfelhasználói, rendszerkiesésre vonatkozó) költségeket. (Erdős, 2009)

#### *Kvalitatív módszerek*

Kiegyensúlyozott mutatószámrendszer (Balanced Scorecard, BSC): A Robert S. Kaplan és David Norton által 1992-ben publikált koncepció célja, hogy segítségével a vállalat stratégiáját sikerrel ültessék át az üzleti gyakorlatba. A mutatószámrendszer azért „kiegyensúlyozott”, mert ötvözi a pénzügyi és nem pénzügyi elemeket, egyensúlyt teremt a rövid- és hosszú távú szemlélet között, tartalmaz objektív és szubjektív szempontokat is, így a stratégiai menedzsment kedvelt eszközévé vált. A mutatók alapvetően négy nézőpont köré csoportosulnak: pénzügy, vevők, működési folyamatok, tanulás és fejlődés. (Szörös, 2008) A modellt több szerző adaptálta a saját szakterületéhez, pl. Silvius IT-beruházási scorecard-modellje (Silvius, 2006). Az IT speciális problémáihoz adaptálta a módszert Van Grembergen (Van Grembergen, 2000), melyben a fenti dimenziók átalakultak: vállalati hozzájárulás, felhasználó-orientáltság, működési kiválóság, jövő-orientáltság.

Portfólió-elemzés (Portfolio Analysis): A Harry Markowitz nevéhez fűződő, 1952-ben megszülető modern portfólió-elmélet alap gondolata, hogy a beruházási portfólió eszközeit nem egymástól függetlenül kell kiválasztani, hanem figyelembe kell venni, hogy az egyes elemek árváltozása hogyan hat másokéra. A különféle portfóliós eljárások jól ismert döntéstámogató eszközök a menedzsment területén (pl. BCG-mátrix). Így az IT-beruházások portfólióként való kezeléséhez is számos eljárást hasznosítanak (pl. Bedell-modell, beruházási portfólió, beruházási térkép). (Renkema, és mtsai. 1997) (Schuurman, és mtsai., 2008)

Information economics, IE: Egyedi projektek és projekt-portfóliók minősítésére egyaránt alkalmas módszer. Három nagy területet (gazdasági/pénzügyi terület – egyfajta kibővített ROI, üzleti terület, technológiai) és ezeken belül tényezőket vizsgál (melyek pozitív vagy negatív módon járulnak hozzá az IT-beruházás értékéhez. Ezekon keresztül veszik számításba a költségeket, hasznokat, kockázatokat jelentő tényezőket. Az értékelést végzők mindegyik tényezőt súlyozzák, melyeket figyelembe véve és a három terület pontjait összegezve kapjuk meg az IT-befektetés értékét. (Parker, és mtsai. 1988) (Andresen, 2001)

#### *Valószínűségi módszerek*

Reálopciók módszerek (Real Options Valuation, ROV): Lehetőséget biztosít arra, hogy az időközben bekövetkezett változásokat (átütemezés, projektméret skálázása, válasz a piaci környezet változásaira) figyelembe vegye az IT-beruházás értékelésében. A számszerűsítés hasonlóan történik a pénzügyi területen alkalmazott opcióárazáshoz, megemlítendő a Black-Scholes és a binomiális modellek. (Silvius, 2006) (Erdős, 2009)

## Összegzés

Az információs társadalom korában meglepően alacsony a magyar kis- és középvállalkozások beruházási hajlandósága az információtechnológiai rendszerek és fejlett vállalatvezetési megoldások területén. Az okok és magyarázó tényezők sokaságából a beruházás-gazdaságossági szempontokat részleteztük, bemutatva azon módszerek széles skáláját, melyek az adott IT beszerzés értékelését támogatják. Ezen módszerek ismerete elősegítheti a fejlett vállalatirányítási rendszerek bevezetésének kvantitatív előnyeit felismerni, a megfelelő ár-értékarány beállításával a rendszerek bevezetését elősegíteni.

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**IS THE WTO OVER? MEGA-REGIONAL/PLURILATERAL FREE TRADE NEGOTIATIONS: PERSPECTIVES OF MULTILATERALISM IN TRADE****A WTO VÉGE? MEGA-REGIONÁLIS/PLURILATERÁLIS SZABADKERESKEDELMI TÁRGYALÁSOK A MULTILATERÁLIS KERESKEDELMI SZABÁLYOZÁS PERSPEKTÍVÁI****György Csáki****Abstract**

A II. világháború óta a világkereskedelem folyamatosan és igen dinamikusan bővül – különösen igaz ez az 1980-as évek óta eltelt időszakra. Sokan mondják azt is, hogy a világkereskedelem soha nem volt olyan szabad, mint manapság, s tény, hogy ma már 161 ország vesz részt a WTO égisze alatt folyó sokoldalú kereskedelempolitikai tárgyalásokon. Ennek ellenére, a WTO elmúlt két évtizedes története egyáltalán nem sikertörténet – a WTO egyetlen kereskedelmi fordulót sem zárt le sikeresen: a Millenniumi Forduló 1999-ben el sem indult, a 2001-ben elindított Doha Fordulót pedig 2006-ban hivatalosan felfüggesztették. Ilyen körülmények között nem meglepő, hogy az elmúlt években sorra indulnak a mega-regionális/plurilaterális kereskedelmi tárgyalások – s a legjelentősebb, a Transzatlanti Kereskedelmi és Befektetési Partnerség nevű, az USA és az EU közötti tárgyalások megindítása nagyban közrejátszott a WTO 9. Miniszteri értekezletének (Bali, 2013. december) viszonylag sikeres lezárásához. Most az a nagy kérdés, melyik mega-regionális zárul le sikeresen, illetve milyen sorrendben zárulnak le, s ez nem jelenti-e a WTO végét, nem szorítja-e vissza a WTO egy nemzetközi kereskedelmi vitarendezési fórummá?

Since WWII a very dynamic expansion of international trade has taken place – it is especially true for the period since the early 1980s. Many says that world trade has never been so free as nowadays, and 161 countries are taking place in multilateral trade talks under the umbrella of WTO. Nonetheless, recent two decades of WTO is far from being a success story – none of the WTO trade Rounds have been completed successfully: the Millennium Round had not even started in 1999, and the Doha Round (launched in November 2001) was officially suspended in the year 2006. Under such conditions, it is not surprising at all that multi-regional/plurilateral trade negotiations were launched – and the most important of those, the Transatlantic Trade and Investment Partnership, that is the US – EU free trade negotiations contributed a lot to the relatively successful conclusion of the 9th WTO Ministerial Conference (Bali, December 2013). Now, the great question is, whether which mega-regional free trade negotiations will be concludes and if more, in what order? Will these mega-regional trade deals mean the end of WTO? Will the WTO driven back to become a multilateral dispute settlement forum?

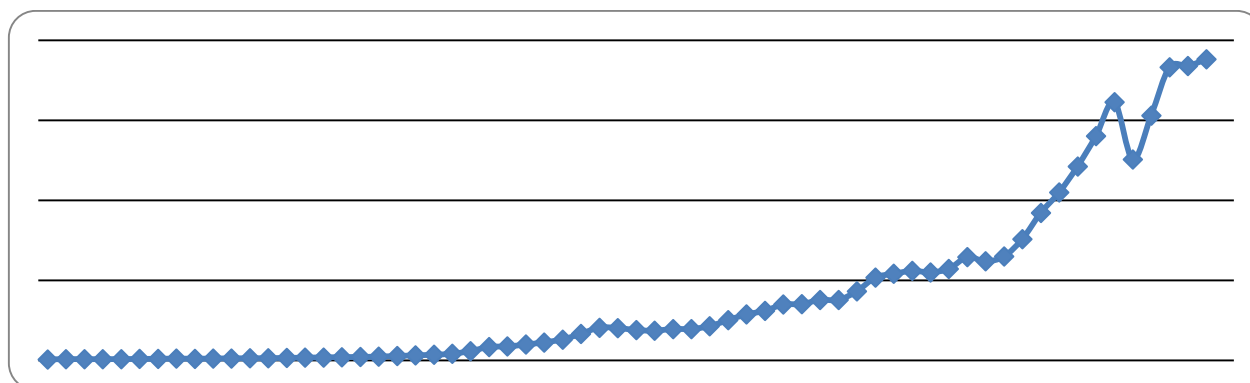
**Keywords:** *international trade, free trade agreements, WTO*

**JEL classification:** *F00, F13*

**Introduction**

Two key developments are the most frequently recurring conjectures of the analyses that accompany the annual editions of both WTO's and UNCTAD's trade statistics. First, the

dynamic expansion of international trade<sup>1</sup> (figures 1, 2), second, the increasing share of developing and emerging economies within total world trade. The main explanatory factor of the above developments is the ongoing trade liberalization that has facilitated the expansion of developing countries' export.



**Figure 1 World trade in merchandise, exports, 1950-2013, million US dollar, current prices & current exchange rates**

Source: UNCTAD:

<http://unctadstat.unctad.org/wds/TableViewer/tableView.aspx?ReportId=101>.

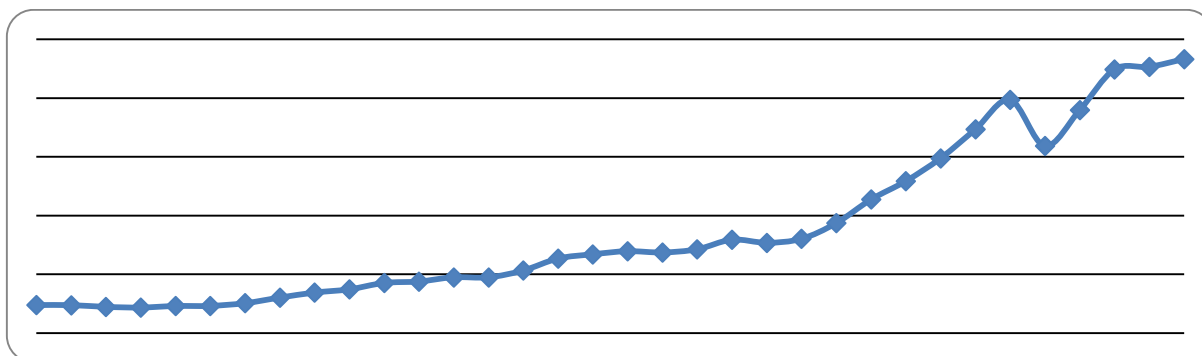
After WWII one of the main tendencies of the world economy has been the extraordinarily dynamic expansion of international trade. While in 1948, the value of world trade in manufacturing equalled to bn 58 USD and in 1970 it was equal to bn 318 USD, in 1980 this value achieved bn 2049. Since then the increase of world trade in manufacturing became “exponential” with it’s value of bn 3495 in 1990 and had its peak in 2008 with bn 16147 USD (!). In 2009 a dramatic failure took place with bn 12554 USD but in 2011 a new peak was achieved with bn 18329 USD worth of global manufacturing exports. (UNCTAD, 2015/a)

Very similar general tendencies can be observed concerning world trade in services: literally exponential dynamism since 1980 was interrupted with an important decline in 2009, in the meantime, trade in services proved a much more dynamic recovery in 2010-2013. (UNCTAD, 2015/b) If we take a look at the trade of goods and services, we can realise that the dynamism of trade in services has always been higher than that of goods and its declines in 2001 and 2009 were more moderate and the overall recovery of world trade since 2010 has been less dynamic than its development between 2001-2008. (UNCTAD, 2015/c)

Further two empirical tendencies of world trade are worth to be highlighted:

1. The share of developing/emerging economies has permanently increased in recent decades: this share was 20,21 percent in the 1980s and 27,46 percent in the 1990s, but between 2001-2008 it increased to 34.34 percent and since the crisis it achieved 40 percent;
2. The share of trade in services has also permanently increase since the 1980s: while trade in manufacturing increased eight times between 1980 and 2008, the increase of trade in services increased about twelve times and the recovery after the recent crisis has also been much more dynamic in trade in services. (UNCTAD, 2015/b)

<sup>1</sup> Not only world merchandise export and imports show a non-abating dynamics: the share of traded services also keeps growing. Over the period between 2010 and 2013, trade in services increased at an even more rapid pace than the volume of trade in merchandise goods.



**Figure 2. Exports and imports of goods and services, annual, 1980-2013, million US dollar, current prices & current exchange rates**

Source: UNCTAD:

<http://unctadstat.unctad.org/wds/TableViewer/tableView.aspx?ReportId=25116>

It can be maintained that world trade is more open than ever: the tariffs of merchandise goods have dropped to a negligible level, quotas have been gradually relaxed; and steel, textile and apparel are not sensitive products any more. World trade is governed by multilateral trade agreements and dominant part of trade is going on between the 161 members of WTO.

The establishment of the WTO signified a major improvement in multilateral trade negotiations: “The GATT was not a multilateral organisation and operated for almost 50 years under the Protocol of Provisional Application (...) the WTO is an international organisation with provision for an institution, a secretariat and a more complex set of rules regarding decision-making.” (Lloyd, 2001: 328) Under WTO rules the feasible goal to insure free trade is the achievement of non-discrimination in all goods and services<sup>2</sup> transactions. The principle of non-discrimination means that subsidies should be treated like tariff in the multilateral trade negotiations. Since tariffs and non-tariff barriers were significantly reduces under the GATT rounds, subsidies and discriminations related to public procurements have become more important as protection against foreign actors. There have been four “new issues” on the agenda of WTO since the beginning: the Marrakesh Agreement (that established WTO) decided to set up a WTO Committee on trade and environment, and the 1<sup>st</sup> WTO Ministerial Meeting in Singapore agreed to examine relationship between trade and investment, trade and competition policy and recognised that core labour standards belong to the competence of the International Labour Organisation. “There has been a tendency to put all new areas into the GATT/WTO, chiefly because it is there and it has a mechanism for enforcing its international law. It has been seen as an expeditious method of getting new rules where there is a perception they are needed.” (Lloyd, 2001: 345) But there is a substantial incoherence in the internal and external architecture of the WTO that has hampered to achieve these goals: the WTO was formed in an ad hoc fashion as new agreements were continuously added to the existing ones.

In the GATT/WTO member countries are obliged to abide by the rules – this is fairly unique among international economic organisations – and violation of those rules is sanctioned following the damaged country’s claim. Dispute settlement is regulated in details and contravention of GATT/WTO rules must be ceased and caused damages must be compensated in no more than 15 months. As of June the 1<sup>st</sup> 2015, 496 dispute settlement have started in the WTO<sup>3</sup> (that is in 20 and a half year time), out of which 94 cases have been settled or terminated,

<sup>2</sup> “The ultimate objective is that residents of different Member countries should be as free to transact business with each other as are residents of the same country.” (OECD, 1990: 13.)

<sup>3</sup> See: [https://www.wto.org/english/tratop\\_e/dispu\\_e/dispu\\_status\\_e.htm](https://www.wto.org/english/tratop_e/dispu_e/dispu_status_e.htm).

151 cases are in consultation, in 43 cases decision making panes have been established etcetera.<sup>4</sup> Dispute settlement is obviously the most successful activity of the WTO.

Irrespective of the achievements the two-decade history of WTO cannot be labelled a success story. Compared to GATT's eight successfully concluded rounds of multilateral trade negotiations which resulted in a spectacular reduction of tariff-based trade restrictions, no WTO rounds have been concluded with multilateral agreements: WTO's history is marked rather by failed ministerial meetings, deadlocks and the suspension of the Doha round.

2013 seemed a turn of the tide: the negotiations on the Transatlantic Trade and Investment Partnership (TTIP) and the Bali Ministerial Conference (the 9<sup>th</sup> WTO Ministerial Conference) of WTO bear the promise of opening a new chapter in the history of multilateral trade negotiations.

When it was realized that instead of a multilateral approach to governing world trade, plurilateral trade negotiations were gaining momentum (such as the Trans-Pacific Partnership and, especially, TTIP), these developments exerted non-negligible pressure on WTO stakeholders facing the deadlock of the Doha Development Agenda. TTP and TTIP have made it clear that the failure of a multilateral solution (failure to make a decision based on the consensus of the 161 WTO-members) will prompt powerful actors' shifting to bilateral and plurilateral trade governance.

This was the context of the WTO Ministerial Conference in Bali that resulted in a Ministerial Declaration agreed by consensus, marking the conclusion of the first universal agreement under WTO auspices since the launch of the Doha round.

The Bali package (the Ministerial Declaration and 17 decisions)<sup>5</sup> the most prominent of which is the Agreement on Trade Facilitation (addressed already by the Doha Development Agenda). The Declaration ends with a brief section on 'Post-Bali Work' that reaffirms the signatory parties' commitment to global trade negotiations and to the Doha Development Agenda. The Ministerial Conference called on the Trade Negotiations Committee "to prepare within the next 12 months a clearly defined work program on the remaining Doha Development Agenda issues". Though this concluding part of the Declaration reflected optimism and commitment,<sup>6</sup> its wording cannot conceal the parties' deep distrust in the future of multilateral/global trade negotiations. Hence, the post-Bali future of global trade negotiations and of WTO's competence, i.e. of its multilateral rule-making power are more ambiguous than ever.

The post-Bali agenda of multilateral trade negotiations has at least two pillars: "proper closure of the Doha Round is necessary before one can move onto a new round. Attaining this closure at the earliest should be the main item on the WTO's post-Bali agenda, to exploit the present negotiating momentum and hard-won zeal for cooperation and compromise. (...) The new trade liberalisation agenda should recognise the centrality of global value chain production and trade patterns when (re)designing global trade governance rules in order to reflect new business models and trade trends." (Karmakar, 2013:4 and 6)

Many expert say that WTO's major problem lies in its inability to reflect 21<sup>st</sup> century trade issues such as corporate restructuring (that is deindustrialisation in the developed world), the

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<sup>4</sup> [https://www.wto.org/english/tratop\\_e/dispu\\_e/dispu\\_current\\_status\\_e.htm](https://www.wto.org/english/tratop_e/dispu_e/dispu_current_status_e.htm).

<sup>5</sup> Decisions are listed at: [https://www.wto.org/english/thewto\\_e/minist\\_e/mc9\\_e/bali\\_texts\\_combined\\_e.pdf](https://www.wto.org/english/thewto_e/minist_e/mc9_e/bali_texts_combined_e.pdf)

<sup>6</sup> With the benefit of hindsight it is clear already that optimism was hurried and the instruction has not materialized.



existence of industrial supply chains as well as the emerging wave of protectionism following the crisis of 2007-2009 –although the above mentioned issues have changed the landscape of world trade. “But many export-oriented farmers still face foreign trade barriers and subsidised rivals. And plenty of manufacturers’ export plans are frustrated by tariff peaks and many more by a bewildering array of foreign regulations and procedures. Moreover, the distinction between 21st century and earlier forms of commerce can be somewhat misleading. While it is true, for example, that the existence of international supply chains alters the interpretation of trade data and potentially national commercial policy priorities, it is worth recalling that what is ‘supplied’ in supply chains are goods and services, for which longstanding multilateral trade disciplines exist. For these reasons, the reality is that what might be referred to as 21st century commerce matters, but so does the commerce of yesteryear.” (Evenett – Jara, 2013: 5)

If Bali really was an opening, this unique opportunity must be seized, but ‘liberalisation-lead negotiations’ will not guide to the end of the Doha Round and will not provide an effective future for the WTO. One of the major open questions is whether multilateral negotiations should provide the necessary framework for all that. The uprising of mega-regional trade negotiations should mean some question marks on that.

### **Mega-regional free trade agreements**

In addition to their WTO-membership countries tended to sign bilateral or regional trade agreements (RTAs) agreeing either on free trade or creating customs unions.<sup>7</sup> Above and beyond the proliferation of these agreements, recently countries initiated negotiations on the formation of larger-scale RTAs. Some of the recently formed comprehensive RTAs are bound to be of outstanding importance from the point of view of both size and impact on the world economy. They are referred to as *mega-regional trade agreements*. This section will analyse three of them.

#### ***Trans-Pacific Partnership (TPP)***

The origin of the negotiation series on the expansion of trade relations of countries in the Asia Pacific region was the Trans-Pacific Strategic Economic Partnership (TSEP), a free trade agreement signed by Brunei, Chile, New Zealand and Singapore in 2005. The TPP is a more comprehensive partnership agreement, including 12 countries. Its significance rose especially after the U.S.’ joining the negotiations in 2010.<sup>8</sup>

According to official U.S. documents the objective of the TPP is to enhance trade linkages among TPP partners, boost investment, intensify innovation and economic growth and facilitate job creation and retention.

Since the 19 rounds of TPP negotiations (between the U.S.’ joining the negotiations in 2010, and 2013) were all behind closed doors, little information is available about the agenda, the results and the controversies. The secrecy of the negotiations is internationally criticised for

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<sup>7</sup> Currently 174 RTAs are listed at WTO’s website (<http://rtais.wto.org/UI/PublicAllRTAList.aspx>). Preferential trade agreements (i.e. partial and unilateral preferential reductions of trade barriers under WTO auspices) constitute a different category.

<sup>8</sup> In addition to Australia, Brunei, Canada, Chile, Japan, Malaysia, Mexico, New Zealand, Peru, Singapore, the U.S. and Vietnam Korea and Taiwan have expressed interest in joining the negotiations. Furthermore, additional countries, including Bangladesh, the Philippines, Indonesia, Cambodia and Laos might attend as well. Even China and India have declared their interest in the TPP.

lack of transparency and accountability. According to some leaked information, the U.S. proposals on reinforcing intellectual property right protection encountered serious controversies among TPP negotiators.<sup>9</sup>

Observers/stakeholders (domestic NGOs, such as AFL-CIO, and Public Citizen) tend to oppose the TPP for a range of issues, the most prominent of which is TPP's investor–state dispute settlement mechanism.

According to critics, investment provisions cannot be reconciled with environmental, human right and public welfare regulations. Critics fear that the TPP will relax signatory states' labour protection regulations, and the privileges provided to foreign investors will threaten environmental obligations and work safety. Additionally, since the TPP simplifies outsourcing and foreign direct investment, NGOs expressed concern about jobs, and U.S. workers' wages.<sup>10</sup> Conversely, U.S. scholars (Moran-Oldenski, 2015. and Petri-Plummer, 2012.) argue that the TPP will boost inward investment in the U.S. by TPP country firms, and will thereby contribute to job creation, increased R&D and value added. U.S. firms' investment in TPP countries will increase these firms' competitiveness, which benefits consumers.

Since TPP negotiations have been going on in secrecy, their fate and impact are unpredictable. There are abundant open questions: whether the TPP will be concluded at all, or be transformed in a series of bilateral deals (e.g. between the U.S. and Japan); whether the U.S. will be able to implement its interests (pushed for already in the course of WTO negotiations); whether India or China will join – this would greatly alter both the configuration and the impact of the TPP.

### ***Regional Comprehensive Economic Partnership (RCEP)***

RCEP a negotiation on a free trade agreement and economic cooperation among 16 countries, gathering ASEAN member countries and the 6 countries (Australia, China, India, Japan, Korean Republic and New-Zeeland) having FTA with them. The sixteen negotiating countries have more than 3 billion inhabitants, USD 21 000 billion aggregated GDP and they represent 27 percent of world trade. According to estimation based upon general equilibrium model, RCEP would lead to about USD 260-640 billion income gains in the world economy. (Wignaraja, 2013) RCEP negotiations were launched in 2013 in Brunei and are to be completed till the end of 2015. 6 rounds of negotiations were taking place so far.

RCEP's "Guiding Principles" states as follows: "1. The RCEP will be consistent with the WTO, including GATT Article XXIV and GATS Article V. 2. The RCEP will have broader and deeper engagement with significant improvements over the existing ASEAN+1 FTAs, while recognizing the individual and diverse circumstances of the participating countries. 3. The RCEP will include provisions to facilitate trade and investment and to enhance transparency in trade and investment relations between the participating countries, as well as to facilitate the participating countries' engagement in global and regional supply chains." (RCEP, 2012)

RCEP negotiations cover six topics, such as trade of goods, trade in services, investment, economic and technical cooperation, competition rules and dispute settlement. In a very optimistic view, RCEP could lead even to the establishment of a "Free Trade Area of Asia-Pacific" (FTAAP), but for the time being negotiations are very difficult: participants are aware

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<sup>9</sup> There is substantial intra-TPP heterogeneity in the effective level of intellectual property right protection (e.g. with respect to patent rights or in the degree of copyright protection) and enforcement.

<sup>10</sup> <http://www.citizen.org/TPP>. <http://voxeu.org/article/tpp-fdi-and-good-jobs-us>.

of the advantages of free trade, but some of them are facing strong domestic pressure of market protection. In the case of India, Indonesia and Singapore difficulties will be faced even in the case of market access. It is a further difficulty that the establishment and operation of a common market type integration is particularly hard among countries of different level of development: such an integration can impose a heavy burden on the less developed participants. Beyond these difficulties, “ASEAN should remember that the RCEP agreement is not the only option available for Asia Pacific regionalism. The ongoing TPP negotiations can also serve as an FTAAP model, giving the US a lead role in setting the agenda for a future regional architecture.” (Das, 2014:2)

RCEP may help to regionalise global production networks what can create Asia even more the industrial workshop of the world, it can reduce overlaps among Asian free trade areas as well as chaotic multiplicity of trade rules. A comprehensive agreement could abolish Asian trade restriction – in accordance to the WTO rules. In the area of investment, where there is no WTO agreement, RCEP could facilitate FDI flows and technology transfer of transnational corporations. The outcome of RCEP negotiations is as uncertain as that of the other mega-regional trade negotiations – but it is obvious that WTO must enlarge its scope if it wants to preserve its global importance.

**Box 1.****RCEP and TPP – alliance or rivalry?**

Although RCEP and TPP have similar objectives in terms of trade liberalisation and economic integration, there are signs that the two RTAs are far from being complementary and synergistic.

The most conspicuous difference is in terms of leadership. ASEAN is the orchestrator of RCEP,<sup>11</sup> while the TPP is driven (and its agenda determined) by the U.S. The second difference is in terms of the presence of a key world trade actor: China. China is included in RCEP but not in the TPP. The third difference concerns the envisaged depth of the integration. Although RCEP is envisaged to be deeper and more comprehensive than the existing (overlapping) free trade agreements (FTAs) in the region, the commitments required from TPP-members are more comprehensive (WTO + issues) than those expected from RCEP participants.

The exclusion of China from the TPP means that the outcome of the U.S. – China rivalry is bound to influence the development of the two RTAs. At the same time TPP is bound to divide ASEAN since not all RCEP-members participate in TPP. Malaysia, Singapore and Vietnam are bound to support the TPP and other ASEAN members will probably focus rather on the development of RCEP (Pakpahan, 2012). This division and the U.S. – China rivalry may undermine ASEAN’s leadership in the regional trade architecture as well as in the regional political landscape. In order to preserve its central role as facilitator of economic and political arrangements in the region, ASEAN should play a proactive role in RCEP negotiations, and maintain its own unity and coherence (Fukunaga, 2015. and Hamanaka, 2014). These arguments make it clear that international trade negotiations are impregnated with geopolitical rivalry among major economic powers.

Another interesting feature shaping the rivalry between RCEP and the TPP is India’s increased interest in the mega-regional trade agreements (Singh, 2015). After decades of passivity, India has become increasingly active and communicates its determined position in international trade negotiations. India’s significant weight in global trade can be illustrated with the fact that the Bali Package at WTO Ministerial Conference was signed only after an agreement was reached between India and the U.S. (one day after the expected conclusion of the Conference in Bali) that took India's domestic concerns on food security into account (Lehman–Fernandes, 2014).

India’s interests and ambitions are not surprising if we take into account that it is member neither of the TPP, nor of TTIP or APEC. With the conclusion of the TPP India may face not only trade diversion effects but may at the same time become disadvantaged when trying to plug in multinational companies’ global value chains in manufacturing and in services. Several of TTIP’s provisions have a

<sup>11</sup> RCEP includes ASEAN and its FTA partners: China, Korea, India, Japan, Australia and New Zealand.

similar effect. For example, TTIP may trigger convergence in the regulatory environments of the U.S. and the EU, which increases pressure for conformity by third parties. The only way to proceed in the light of these developments is to adapt India's domestic regulation (e.g. its standard regime) to become consistent with both TPP and TTIP.

According to (Lehman–Fernandes, 2014), if the mega-regional agreements are concluded, given the US involvement in both, they will create common regulatory sets across the Atlantic and the Pacific. This will foster regulatory convergence and co-operation among member countries. If India remains excluded from the two mega-regionals its role will be confined to a rule taker rather than a rule maker (see also Singh, 2015).

Considering that both the U.S. and China are important trade partners for India it seems obvious that India should focus on reinforcing its position within RCEP

### ***Transatlantic Trade and Investment Partnership (TTIP)***

Exceeding 2 billion euros a day, the EU–U.S. trade relationship is the largest volume bilateral trade in the world. Although the two transatlantic actors are each other's key trading (and investment) partners, they are the ones that submit the most complaints to the WTO about each other's breach of obligations. The most contentious conflicts included the steel dispute (where WTO found that the U.S. imposed illegal safeguard measures in the form of temporary tariffs on steel in 2002)<sup>12</sup> and the Airbus-Boeing dispute where it was established that over the period between 1989 and 2006 the U.S. granted to Boeing WTO-incompatible subsidies worth USD 5.3 billion.

In the context of these developments, the initiation of EU–U.S. negotiation series in 2013 with the objective of concluding a comprehensive free trade agreement was a surprising development. The TTIP negotiations<sup>13</sup> aim to reduce the tariff- and non-tariff barriers to trade in goods and services, facilitate trade-related investment regulations, and promote regulatory cooperation. It is obvious since the launching of TTIP negotiations<sup>14</sup> that this agreement, in case of being successfully concluded, would provide a blueprint for global trade rules for the coming decades. Exactly how this would come about has not been expressed by governments of the two sides of the Atlantic, but it could involve TTIP's rules eventually being adopted in a new set of accords at a reinvigorated World Trade Organization (WTO). In such a long term outcome, much more is at stake than making free transatlantic trade and investment. „The motivations behind TTIP will shape the outcome. The EU negotiating mandate, which reflects in part objectives shared with the US, was released to the public by the Council of the European Union in June 2013.<sup>15</sup> In market access, the objectives are to remove import duties on goods and restrictions on services, open up government procurement, and facilitate investment. The mandate also calls for improved regulatory coherence and cooperation through dismantling unnecessary regulatory barriers. On rules, the parties seek to improve cooperation in setting standards. Taken at face value, this constitutes an “ambitious, comprehensive, and balanced”<sup>2</sup> enterprise aimed at raising income and creating jobs on both sides of the Atlantic. To date no provisions allowing third parties to join TTIP are envisaged, thereby limiting those parties’

<sup>12</sup> The EU estimated that it was entitled to around €2.4 billion per annum for the lost value of trade concessions resulting from the imposition of the U.S. steel safeguard.

<sup>13</sup> Parallely, a Canada – Europe Trade Agreement (CETA) has been concluded. See: Consolidated CETA Text. Published on 26 September 2014. Source: [http://trade.ec.europa.eu/doclib/docs/2014/september/tradoc\\_152806.pdf](http://trade.ec.europa.eu/doclib/docs/2014/september/tradoc_152806.pdf)

<sup>14</sup> Ten TTIP rounds have taken place so far – the recent one was concluded in Brussels, on the 17 July 2015.

<sup>15</sup> About the EU's negotiation mandate, see: *European council of the European Union, 2013, 11103/13 DCL 1*. Source: <http://data.consilium.europa.eu/doc/document/ST-11103-2013-DCL-1/en/pdf>

options and shifting the focus to TTIP's likely impact on outsiders." (Akman – Evenet – Low, 2015: 5.)

Negotiations cover the following chapters:<sup>16</sup>

- Market access: above and beyond cutting and harmonising customs duties, removing barriers that affect goods and services trade and simplifying rules of origin, TTIP aims to improve the parties' access to the bilateral public procurement market.
- Regulatory cooperation - including technical barriers to trade in a number of sectors. Regulatory cooperation proposes to review existing regulations that affect bilateral trade and investment, develop new regulations jointly; systematically exchange information on regulatory issues, and create relevant institutions responsible for the implementation of this objective.
- Rules, e.g. on energy and raw materials, sustainable development, SMEs, investor–state and government–government dispute settlement, competition, intellectual property & geographical indication.

According to an oft-cited study by Francois (2013) the dismantling of trade barriers will result in an annual gain of €119 billion for the EU, and €95 billion for the U.S. The potential annual gain for the rest of the world is estimated at around €100 billion. Given the low average level of customs duties in EU–U.S. trade (around 2%)<sup>17</sup> the greatest gains stem from the elimination of non-tariff barriers, for example regulations that involve unnecessary costs and duplications. The approval of drugs is a good example of the gains that can be derived from the harmonization of regulations. Previously pharmaceutical companies had to carry out, among others, clinical trials twice, if they wanted to have the product approved in both the U.S. and the EU. Here EU-US cooperation e.g. in terms of the harmonization of each other's approval procedures has reduced unnecessary duplication.

The proposed TTIP is bound to become the largest free trade area in the world dismantling the barriers to trade between markets of a population of 500 million and a 300 million respectively. This would be a great leap forward towards a free world trade: an objective that has been pursued for 70 years now. However, the consequences of TTIP conclusion for the rest of the world are ambiguous. For developing countries TTIP seems exclusionary: they might be excluded from this huge "unified" market. Will this bilateral treaty jeopardise multilateralism, i.e. the multilateral trading system the reinforcement of which has been on the agenda since the establishment of GATT in 1947?<sup>18</sup>

The EU's goals concerning trade in goods and customs duties (tariffs as it's best known) is very simple: although industrial tariffs are generally fairly low (less than 2 percent in average in the EU-US trade) and over half of the transatlantic trade is not subject of duties/tariffs, but the rest faces extremely different duties/tariffs, some other duties/tariffs are even prohibitive.<sup>19</sup> In some cases, EU and US duties/tariffs are largely different even on the same products/group of

<sup>16</sup> The three main chapters consist of 24 trade and investment issues. The European Commission "as part of its latest transparency initiative" has already published 27 fact sheets (2 page long each), 15 EU position papers ("these set out how we'd want a final deal to read, line by line") as well as 12 EU textual proposal ("what we want to achieve in a chapter". See: *European Commission, 2015*.

<sup>17</sup> Though some customs duties are much higher e.g. for clothes and shoes ~30%; for raw tobacco around 350%.

<sup>18</sup> Note that negotiation practices for tariff reduction under GATT were also mainly bilateral and commitments were based on reciprocity. (*Morin, J. F., Meunier, S., Novotna, T., Ponjaert, F., & Telo, M., 2015*)

<sup>19</sup> For example, the US duty on raw tobacco is 350% and over 130% for peanuts.

products.<sup>20</sup> “The EU wants to remove these duties and other barriers to trade, such as lengthy administrative checks, that increase the cost of trade in goods.” (Fact Sheet on Trade in Goods and Custom Duties) According to the EU’s intention concerning the 1<sup>st</sup> Chapter of the TTIP agreement “would remove nearly all customs duties on EU-US trade This would result in immediate savings for EU companies, create 'spill-over' effects – benefits not directly related to trade; for example: scrapping tariffs would lower the cost of the goods we export which would increase sales, which would mean more jobs to enable firms to produce more and would boost demand from people filling those new jobs for other goods we produce. Encourage trade in goods between the EU and the US.” (Ibid.)

### **Box 2.**

#### **A hot issue: the impact of shared standards on the rest of the world.**

TTIP does focus mostly on non-tariff barriers, since tariffs on goods are very low both in the US and the EU but important differences of trade regulatory measure, technical rules, fito-, animal and human sanitary regulations etc. hinder free trade. These differences hamper a lot market access for third parties, mostly for developing countries. There are three main types of agreement of technical barriers to trade: - mutual recognition of existing standards, when countries provide unrestricted access of their market to products that meet any participating country’s standards; - certain degree of harmonisation as a precondition for countries to allow products of other countries to access their markets; - mutual recognition of each other’s testing of each other’s standards - conformity assessment. (Matto, 2013) The US and the EU should make two important steps in order to avoid harmful impacts on third, mostly developing countries: first, mutual recognition would be preferred, which is a quite powerful form of liberalising and does not impose restrictive rules of origin. In that case, not only US and EU producers could supply both markets fulfilling either the European or the American standards, but third countries would do the same. Second, in case of harmonisation of standards, the less stringent one would be preferred. “With these two commitments in place, the rest of the world could follow the EU and US negotiations with hope rather than trepidation.” (Ibid.)

As far as trade in services is concerned, the EU “want to make sure make sure EU services companies can compete in the US on the same terms as US firms and safeguard EU governments' right to run public services just as they wish.” (Factsheet on Services in TTIP)

The field of public procurements has always been a central topic of EU-US trade disputes that is easily understandable if we take into account that the EU and the US have the largest public contracts markets all over the world and both parties have rules aimed at ensuring public money is spent in a transparent, efficient and non-discriminatory way. Nevertheless, companies have faced several and some times impenetrable obstacles in winning public contracts on the other side of the Atlantic. Sometimes, they are not even allowed to bid for a contract. The TTIP would provide an opportunity to remove remaining obstacles and this further market opening across the Atlantic would be fairly helpful for both negotiating parties. The European Commission wants “to open up public tendering markets on the basis of rules on transparency and nondiscrimination similar to those that apply under EU law. TTIP will not affect public authorities’ ability to choose to outsource a public service or produce it in-house (and) capacity to choose goods, services and works that promote environmental protection, social progress and labour law enforcement.” (Factsheet on Public Procurement in TTIP)

According to an official EU paper (European Commission, 2015/b: 4-5.) that provides an overview of the EU’s position on regulatory cooperation, this cooperation will/would outcome to several important mutual benefits: 1.) since the costs of transatlantic trade will become lower,

<sup>20</sup> For cars: EU duty on imports from the US is 10% and US duty on imports from the EU is only 2.5%. For train carriages the US imposes a 14% duty on imports while the EU charges only 1.7% on imports from the US.

companies will acquire new customers and expand their businesses – creating growth and all the above will create new jobs and result higher wages. 2. If and when the US' and EU's regulation will be more compatible with each other, consumers will have more products to choose. 3. "TTIP will not mean lower levels of protection or safety (...). On the contrary, where TTIP boosts regulatory cooperation, consumers are likely to have better guarantees that they buy safe and legal products. (...) Regulatory cooperation means sharing that pool of talent, experience, and scientific knowledge, to the benefit of both sides. It will also mean stronger enforcement of rules, which is a key challenge for public authorities. Where TTIP removes unnecessary duplication (as in factory inspections for medicines and medical devices) it will free up resources for more worthwhile tasks" (Op. cit.: 5.) 4. A more effective regulatory cooperation between the EU and the US could contribute to the development and implementation of international regulatory rules and standards. If the US and the EU agree on an shared standard, there will be a much greater chance of being adopted by third countries. This kind of partnership will only become more important over time as emerging economies will play a greater global role in international trade governance. Increased EU-US regulatory cooperation will lower trade barriers across the whole world and it will help ensure that international rules provide the highest possible levels of protection of the rule of law globally.

The TTIP text on regulatory cooperation starts with general regulatory issues, the eventual operation of an international regulatory cooperation body and technical barriers to trade – plus sanitary and phytosanitary measures. Sectoral provisions of the EU's textual proposal on regulatory cooperation covers the following sectors: chemicals, cosmetics, engineering, medical devices, motor vehicles, pharmaceuticals, services, textile and clothing – and this chapter is concluded by the issues of regulatory cooperation and the SMEs. Since regulatory issues are hardly discussed by the European public, EU chief negotiator, Ignacio Garcia Bercero has considered necessary to emphasise that "regulatory discussions are based on very clear principles: • Nothing that we will do in the regulatory areas will reduce any of our high standards of consumer, health, labour or environmental protection. On the contrary, we will uphold them and, where possible, reinforce them. • Regulatory cooperation must be based on mutual interests and be lead by the regulators from both sides. • Our regulatory process is not going to change because of TTIP. So, any future decision will be adopted according to the domestic regulatory frameworks of each side." (EC, 2015/d: 3.)

The 3<sup>rd</sup> chapter on rules starts with trade abs sustainable development and in this field "The EU has developed a consistent practice (...) aiming at ensuring that increased trade is mutually supporting environmental protection and social development, and does not comes at the expense of the environment or of labour rights." (EC, 2013: 2.) EU's endeavour to set up a common energy policy is in line with its negotiating positions in the TTIP negotiations. Customs and trade facilitation in TTIP intend not to lower tariffs (it is worthless in today's environment of low duties) but to make it easier for companies trading to get their goods through customs in both sides of the Atlantic, to continue to ensure firms can only export goods which meet common rules. Such a common practice could protect people and the environment. A separate issue is the promotion of 20 million SMEs of the EU member countries in order to help them both to export and import and enable them to take full advantage of TTIP and to grow their business. In terms of competition policy the main objective is to promote free and fair competition that includes harmonised rules to stop large firms abusing market power, ensuring private firms to compete state-owned ones and making state subsidies transparent. Intellectual property rights (IPR) is a real hot potato of international trade negotiations and so it is in TTIP talks especially because of the high sensitivity of the US. The EU's position in this field is "to set out a jointly agreed interpretation, implementation and/or practice in relation to certain IP

issues debated in the international framework. The goal is to find a common denominator between EU and US rules, without modifying them, in jointly identified areas, thus increasing legal clarity and certainty for transatlantic trade. A non-exhaustive list of subjects to address could include: • Anti-bad-faith registration of trademarks; • Customs enforcement, including of counterfeit goods in small consignments; • Recalling established practices on patent procedures and patentability criteria including regarding secondary use or incremental innovation; interference of regulatory entities; provisional protection of patent applications.” (EC, 2015/c: 1.) As far as Government-to-government dispute settlement (GGDS) in TTIP is concerned, the mutual aspiration is to base on a system already in place at the WTO.

### ***Trade in Services Agreement (TiSA)***

General Agreement on Trade in Services (GATS) is a part of WTO (as GATT is) but has had no major operation so far. It is fairly contradictory if we take into account the extremely dynamic growth of international trade in services since the 1980s/1990s. The two main service sectors that are generating most of this growth are financial services and telecommunication. This contradiction resulted the start of a new plurilateral trade negotiation on free trade in services, that is TiSA. For the time being, there are 24 countries participating in TiSA. TiSA was born in consequence of two immanent problems of WTO: first, trade in services has always been captured by trade in agriculture and since the failure of the Doha Development Agenda was due to the lack of agreement in agricultural issues, it restrained an agreement in services; second, single undertaking has excluded any partial agreement, therefore, after the Ministerial Meeting of late 2011, Australia proposed to launch a plurilateral trade negotiation on services. The 24 participating countries represent 70 percent of world trade in services – although Brazil, India, China and the ASEAB-countries have not joined TiSA so far.<sup>21</sup>

TiSA negotiations are based on the GATS' rules, so this way any WTO member country can join – that is even easier since negotiations take place in Geneva. In consequence of that, if TiSA enlarged enough, that is the majority of WTO member countries joined it, TiSA would be transformed into a wider WTO agreement and then every WTO member country should enjoy the fruits of TiSA. Negotiations started in early 2013, 10 round took place since the end of 2014 – there is no designated closing time.

According to the estimation of the EU Directorate-General for External Policies, TiSA would result USD 15,6 billion income gain for Europe and a further USD 10,4 billion for the US. (De Micco, 2013: 1.) Beyond that TiSA has an extreme importance due to the fact that because of the inactivity of GATS, it is the first really important negotiation on free trade in services since more than twenty years. There are a lot of Preferential Trade Agreements (PTAs) in services among the 24 negotiating countries, therefore, therefore the enlargement/generalisation of the best practices of PTA-commitments would generate important benefit – mostly in terms of stability and predictability (especially if TiSA will contain an adequate dispute settlement mechanism as well).

Since the beginning of the TiSA negotiations, the US has preferred an agreement outside WTO, while the EU has advocated an agreement in conformity with the GATS that is an agreement within the WTO framework. A future plurilateral agreement on free trade in services agreement can be connected to GATS, and so to the WTO through different legal mechanisms.

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<sup>21</sup> China has already signed officially its interest in participating the negotiations.



### **After Bali: multilateralism versus plurilateralism**

It was clear for trade experts, in early 2013 when the 9<sup>th</sup> WTO Ministerial Conference was convoked that the WTO was at a crossroad: since early 2013 WTO has had a new leader, the Brazilian trade diplomat Roberto Azevedo, the Doha Development Agenda negotiations were at an impasse, there are many pressing new issues and challenges confronting the WTO (such as, for example, the trade consequences of global value chains) etcetera. There seemed to be two options prior to the 9<sup>th</sup> Ministerial Conference that was held in Bali, in November – December 2013: “to step back from Doha altogether or to take the realistic steps necessary for Doha’s re-birth and survival.” (Cantore – Marhold, 2013: 2.)

Formerly bilateral and multilateral trade negotiations were distinguished, where ‘multilateral’ automatically meant that every WTO members participated and the multilateral negotiations took place in the WTO framework. Following the start of TTIP, TPP and RCEP, a new special term was established: plurilateral trade negotiations which provide negotiation forum for a group of countries. It is very likely that plurilateral trade negotiation will be appreciated and it will probably lead to the marginalisation of multilateral trade negotiations and deals that is WTO is likely to lose a great part of its global importance.

After the “Informal Ministerial Meeting” of July 2008, in Geneva, the Doha Round didn’t worked furthermore and the 8<sup>th</sup> Ministerial Meeting in 2011 declared that the Doha Round was “deadlocked”. Negotiations were restarted in early 2013 when a “mini package” and an “early harvest” were envisaged. “In contrast to analysts’ wishful claims, however, WTO members have repeatedly stressed that any early package would not be the end of the line, but rather a milestone to gather momentum for the full conclusion of the Doha Round.” (Karmakar, 2013: 4.)

There are a lot of pessimistic experts saying “Doha is outdated” and a new Round must be launched in order to address the real challenges of our time. The Doha Round started at an extremely sensitive moment, only three month after 11/9 and aimed at the increasing of developing countries trading positions – in parallel with the priority of agricultural trade liberalisation. Since 2001, several developing/emerging economies have developed much more dynamically than most of the developed countries and were able, at the same time, to increase spectacularly their export performances. Under these conditions The United States and the European Union have had more and more interest towards bilateral and plurilateral trade negotiations.

Most problems and discussions are concentrated around agricultural issues (as it has been the case, by the way, since the establishment of GATT...) Developing countries are criticising agrarian protectionism not only in general, but they have a lot of concrete claims on the correction of differences of subsidies in agriculture at the developed and developing countries. Because of recent CAP-reforms, however, the EU is seemed to be better placed than the US and the EU may be more proactive and is more ready to attempt a resolution in possible post-Bali agricultural negotiations.

However, a solution to the Doha Round impasse cannot be found within the agricultural negotiations alone. Also key from a developing country perspective is putting to rest the unfinished business of industrial goods liberalisation, especially the persistent protection in developed countries of key labour-intensive manufactured goods of export interest. Some researchers have proposed that a conditional offer of reduction in tariffs be made in return for

opening negotiations in other areas, to be otherwise revoked by the countries concerned if sufficient progress is not seen. However drawbacks remain from the same unresolved special and differential reciprocity problem which has dogged the Doha Round negotiations. (Karmakar, 2013: 6.)

Although the Bali Ministerial Meeting helped to avoid the visible collapse of WTO, one can not declare that the WTO has regained its central role in international trade negotiations. It is obvious, that the progression of mega-regional/plurilateral trade negotiations represents the greatest ever challenge for WTO: governance of international trade negotiations easily slip out of WTO control. The Doha Development Agenda has been a clear failure and it is more and more obvious that WTO has not been able so far to follow a new trading program adequate to 21<sup>st</sup> century's challenges. "The successful conclusion of the Bali Ministerial Conference and its terrific reception in the international press and from government leaders means that the WTO now has the opportunity to restore its fortunes. Talk of the WTO's demise as a negotiating forum has been set aside, at least for now. If, in the coming months, the WTO membership takes the right decisions concerning its near-term work programme and assiduously follows up, then such talk might be banished for good. For sure, the Bali deal addressed only part of the Doha Development Agenda and was sealed after its fair share of drama. Still, the run-up to Bali and the Ministerial Conference itself showed that creative solutions could be found, that the membership is prepared to rally around them, and ultimately, that the prospect of another damaging deadlock was unacceptable." (Evenet – Jara, 2013: 1.)

Bali has proved once again that the WTO's main strengths are concentrated in organising multilateral negotiations as well as in dispute settlement. In recent years WTO has developed a lot in terms of transparency incentives, permanent control and supervision: these are values that can provide basis for a stable future. Along with the above mentioned points, it is sure that WTO has been unable to progress more and the DDA has become a failure because it has removed more and more from the realities of 21<sup>st</sup> century's trade issues. It is obvious that the enlargement and differentiation of global value chains as well as the expansion of electronic trade have influenced a lot the 21<sup>st</sup> century's international economic relationships – and one can not forget the negative trade effects of the global crisis of 2007-2009 either. It is a fact that new trade methods have not liquidated old fashioned protectionism. "Indeed, the distinction between 21<sup>st</sup> century and earlier forms of commerce can be somewhat misleading. While it is true, for example, that the existence of international supply chains alters the interpretation of trade data and potentially national commercial policy priorities, it is worth recalling that what is 'supplied' in supply chains are goods and services, for which longstanding multilateral trade disciplines exist. Moreover, since optimising supply chains implicates many different types of government policy any future WTO initiative on such matters may need to cut across existing 'silos' of the multilateral architecture as well as addressing some matters that have hitherto lay outside the WTO's remit." (Op. cit.: 5.)

### **Mega-regional/plurilateral trade negotiations – end of multilateralism? Is it the end of the WTO?**

The surveyed trade negotiations make it clear that global trade governance is getting more complex than what a bilateral multilateral dichotomy could describe. An in-between category needs to be included that can be referred to as plurilateral, multi-actor negotiations that exclude however some of WTO members. These plurilateral negotiations frequently involve actors from several regions, hence they are also referred to as mega-regional trade negotiations.

It seems obvious that the proliferation of mega-regional approaches are the reaction to a two-decade series of failures of WTO to reach an accord on certain issues: plurilateral negotiations are issue-based (Nakatomi, 2014), and these issues are identical to the ones that remained unsolved by WTO, such as non-tariff barriers; agreements on trade in services; on global non-discrimination; on the alignment of investment promotion and trade policy instruments; on intellectual property related commercial issues; on the intertwining of trade and sustainability; on access to peers' public procurement markets, etc.

Nevertheless, the emergence of mega-regional / plurilateral trade negotiations as alternatives of WTO raises some important questions. Will it put an end to the multilateral approach to trade governance? Will WTO's role be confined to that of a dispute settlement body?

If the ongoing plurilateral / mega-regional negotiations are successfully concluded, what will their implication be for third countries that are not included in the negotiations? Can two-thirds of the world, mainly developing countries, be excluded from meaningful international trade negotiations?

Is TTIP a reasonable deal after all? Can a plurilateral agreement on trade and investment protection be effective if it excludes the BRIC countries, especially China and India?

If one or several of the ongoing plurilateral / mega-regional negotiations are concluded with an accord their timing and outcomes will have crucial implications for participants' world economic positions. What will the consequences of the failure of one or several ongoing negotiations be from the point of view of world trade?

Shared standards (the mutual recognition of standards) will constitute an important step forwards in the dismantling of non-tariff barriers – but what about its implications for non-participants? How will it influence the export and market access opportunities of developing countries? Will shared standards denote a mutual recognition, a harmonisation of standards, or conformity assessment? The answer will define whether third parties, mostly developing countries, will gain or lose on mega-regional trade deals?

While talking about the future of international trade negotiation, one must keep in mind the two major developments that characterised world trade since the founding of WTO (in 1995) and the launch of Doha Development Agenda (DDA, in 2004): a) the sustained high growth rates in many developing countries, especially in the emerging market economies such as China, India, Brazil, South Korea etc. and b) the increasing share of world trade involving supply chains (global value chains) and firms located around the globe being specialised in specific activities and tasks that are part of a global value chain. This latter modify the very term 'market access' and produced a great variety of trade problems related to 'behind the border trade policies'. "Many of the relevant policy areas – including investment, certain subsidies, environment, procurement, data protection and privacy policy – are not on the table in the DDA. Many of these policy areas are the subject of negotiation in PTAs, including the TPP and TTIP. Time will tell whether mega-regional agreements will make substantial progress in crafting disciplines in such areas. Brazil, India and China have yet to conclude a deep PTA with another large economy, developed or developing. The large emerging economies have not been active in negotiating deep PTAs with each other or with large OECD nations. This suggests that the WTO will remain an important vehicle to engage on and address trade issues, both as regards market access for goods and services, and for potential new policy areas." (Hoekman, 2014: 61.)

Not everybody is so optimistic about the future of WTO as Bernard Hoekman's in his above quotation, but it is for sure that the Bali Ministerial Conference has prevented WTO's Doha Round from becoming an outright failure, but it has not contributed to preserving WTO's traditional role as a platform for multilateral rule-making. „The WTO has so far failed to deliver any significant multilateral trade liberalisation. (...) the conclusion that the WTO is a failure would clearly be premature. Its punchline is that the WTO's success at preventing trade wars far outweighs its failure to promote trade talks. Overall, the WTO is therefore much more successful than the ailing Doha Round suggests.” (Ossa, 2015: 1. – italics added by Gy. Cs.) Let's try it not to take as a joke!

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## THE INNOVATIVE WAREHOUSE ACTIVITIES OF GYERMELYI HOLDING PLC. PASTA FACTORY

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### Abstract

The aim of this study is to analyze the logistic processes of the innovative warehouse of Gyermelyi Holding Plc. and its effects on the company. If the logistic processes are built appropriately, then due to the decrease of expenses incurred, it improves the efficiency of the company's operations. For the research, we are mainly concentrating on the scientific investigation of the amount of shipped products, the rate of pick-ups and the formation of the workforce fluctuation. We survey the reason why this company wanted to make a unique investment happen, how this effected the market share and the company's revenue. The findings of the research are based on the interview that we had with the managers of the company. The results of the innovation have been worked out by using a variety of statistical methods. In conclusion, by comparing the before and after status of the warehouse enlargement, we can confidently state that this long-term investment is rewarding for the company. Using an innovative warehousing technique can lead to a significant improvement in the logistic processes, as well as support the implementation of future goals.

**Keywords:** *automated high-bay warehouse, innovation, increasing efficiency, increasing productivity*

### Introduction

As consumer society grows, companies are in need of having a greater range of products, reduced lead times and constantly improving customer service. The high-level expectations of customers to ensure modern products, excellent quality, quick and prompt road transportation may present major challenges to the companies. All of these cause companies to use modern methods in their operational processes (Bailey, 2015). Installing innovative techniques in the processes of storing will result improved efficiency, better managed supplies, better planning and increased transparency. Installing techniques in warehouses, such as automated high-bay storage has many benefits: it guarantees full automation in orders patching, faster flows of goods, easier placing in storage and picking, cost-efficiency and shorter process time in reaching products (Schäfer, 2015).

### Company overview

In the Hungarian market this unique innovation was exclusively realized by one pasta factory, the Gyermelyi Holding Plc. Since they became a Public Limited Company in 1971, due to their continuous investments and developments, they have integrated their activities. Beside manufacturing high quality raw materials, products are also produced with the most modern machines (Gyermelyi, 2013). It is important to note that most customers think of Gyermelyi as a pasta brand. But in addition, eggs and flour are also available in the consumer market under the name of Gyermelyi. According to an interview with the Assistant Director of Marketing, the goal is to strengthen the brand expansion of Gyermelyi, which includes the eggs and flour

as well (Bokros, 2014). Since 2013 the warehousing processes of the company have been working properly, due to their 2 stage investment, achieved for more than a decade (Bederna & Mohr, 2015).

### ***Background assessment based on the interview***

We had the chance to get to know the pasta factory's logistics activities through an interview, which we conducted with the Logistics and Warehouse managers. During the interview we asked them about the reasons for the innovation and the future targets set by the company.

*What were the problems that caused the need for innovation?*

We had to make a decision - said the Logistics manager - and change the system of storing because we could not handle the large amount of products stored in the warehouse, the systematization, the order-picking and the delivery of the products anymore. Before 2004, the warehouse was not modernized, but it could satisfy all the processes at that time. Since then, the storing needs have increased, and with the old system we were not able to manage these. The reason is that around 2004, an innovative technique was discovered. A pasta production line was created, and we could produce sufficiently, but the warehouse was at maximum capacity. When we outsourced the process of order-picking to one of the enterprise's subsidiaries, we delivered the pallets to them. Their workers were given the tasks of picking, transferring them in and loading the trucks. At the time, it proved operational because we only produced 80 items but on the other hand, it was a completely uneconomical solution. This led to the idea that next to the automatic high-bay, in the shipping area, we would setup roller tracks. The loading of the trucks with pallets and smaller amount of products are implemented here.

*What are the advantages of the warehousing techniques of Gyermelyi Plc. compared to its competitors?*

This is a unique kind of warehousing technique in Hungary. When the management of the pasta factory travelled to Switzerland to visit the automated storing practice operating there, it convinced them to use this technique, as it would mean a significant improvement in the logistic processes of the company. The primary aim was not realizing savings, but rather taking a great leap forward for the good of improvement. The company can only achieve this extended production by applying these warehousing methods.

*When did you start the enlargement of storage and when did you finish it?*

The enlargement of the warehouse was divided into 2 phases. The first one occurred in around 2004, but this expansion was not sufficient. Therefore other improvements were needed, which were completed 3 years ago. The place has already been built, the development utilized, and therefore the 2 systems have been working simultaneously since then.

*Was the external spread also a reason for innovating the warehouse?*

Around 2004, during the development, the external spread was not our intention. Gyermelyi Plc. started exporting only 4 years ago, which represents 10% of the total production. The management envisions the future mostly in this way of extension because increasing our 40% market share in Hungary, would put the activities of the company in danger and would increase



our risk exposure. The 40% growth could only be achieved by selling at unrealistically low prices, which would not pay off in a long run.

*What further purposes has Gyermelyi made up so far?*

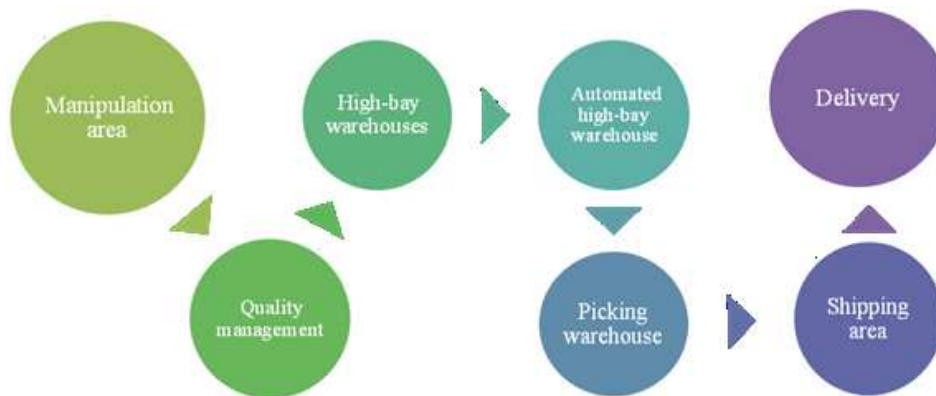
Currently, the production in the field of technology has been 95% exploited, which is considered quite remarkable. For this year, we have created 2 primary goals – said the Logistics manager. In 2015, according to our plans, we wish to reach 30 thousand tons of production volume and increase the production efficiency of our machines by 10%. Most importantly, the leadership is focused on the central premise. This can be gained by establishing an entirely new agricultural base on a different premise, so as to gain ground for further expansion of the production facility (Bederna & Mohr, 2015).

### **The introduction of the present logistic processes of Gyermelyi Plc.**

The 1. figure shows the flow of goods from the manipulation area to the shipping area, after which the goods are delivered to their destinations. The process is presented in the following chapters in detail.

#### ***The role of the manipulation area***

By studying the on-going storing processes in this section, we present the flow of products going from manufacturing to delivery. In the manipulation area, the production line is connected to an automatic conveyor, where a carrier takes the items to the automated packaging machine and the carton machine. After placing the items onto pallets (EP-01), the unit loads arrive from the receiving point to the central wrapping machine, which prepares the products for inspection. Following the wrapping, the pallets go through a data recording, which is operated by a scanner run by a warehouse control software. The EUR pallets are marked with identification tags that contain important data, such as the serial number, unique code and the expiry date of the products. The system knows exactly which conveyor the pallets are coming from and then reads their tags. The pallets move along the conveyor belt in the direction of the weighing point (IP-01), where upcoming actions are decided. If they meet all the requirements (weight, height, width), they could be placed in the warehouse. However, if a pallet does not meet the criteria, it is sent to the so called wasting point (AS-01), where the day shifters proceed according to the error messages shown on the display. In case of an error because of weight, the pallets are set aside, after which they control the conformance of the identification tags. If the problem is not resolved, the manager of the packaging area has to be informed, as he or she is in charge of finding out and solving the problem (Bederna, 2014). In order to speed up processes, they make the pallets fully ready on the automated system of the manipulation area, according to the delivery order and the axle load of the trucks. Because of this method, the pallets are transferred to the warehouse in approximately thirty seconds. In the old system the material handling was only done by forklifts, which would not be able to handle this fast moving system. Today each load is either moved by forklifts or the automatic system. Due to the innovation, the products produced on one day, can be sold the very next day (Bederna, 2015/c)(see 1. figure).



**1. figure: The path of goods from the manipulation area to the shipping area**

*Source: own construction based on company documentation of Gyermelyi Plc.*

### ***Packaging warehouse***

In the packaging warehouse, storage is solved by the configuration of serial access storage and drive-in pallet racks. In this type of storage method, the packaging materials are placed on the right and left side of the aisles. This way, 2 rows of pallet racks can be created next to each other, which creates the advantage of the packaging materials being easily reached (Prezenszki, 2002). The materials used by the pasta factory, the mill and the egg packaging are also stored here. From here, the materials are carried to the storage hall by forklifts, where they are placed on separate racks according to the upcoming production needs (Bederna, 2015/c).

### ***Quality management***

In order to keep their quality products, quality management is an essential step for pasta factories. There is always a quality check of pasta and mill products before they are sent to the warehouse. The function of the laboratory is to filter out products during auditing that are below the quality regulations. Only Normal state products can be placed in the warehouse. In case of not meeting the requirements, they place them in the Quaran state. These items cannot be taken out of the warehouse for sale purposes because they have to be tested again (Bederna, 2014)(see 1. figure).

### ***Formation of high-bay warehouses***

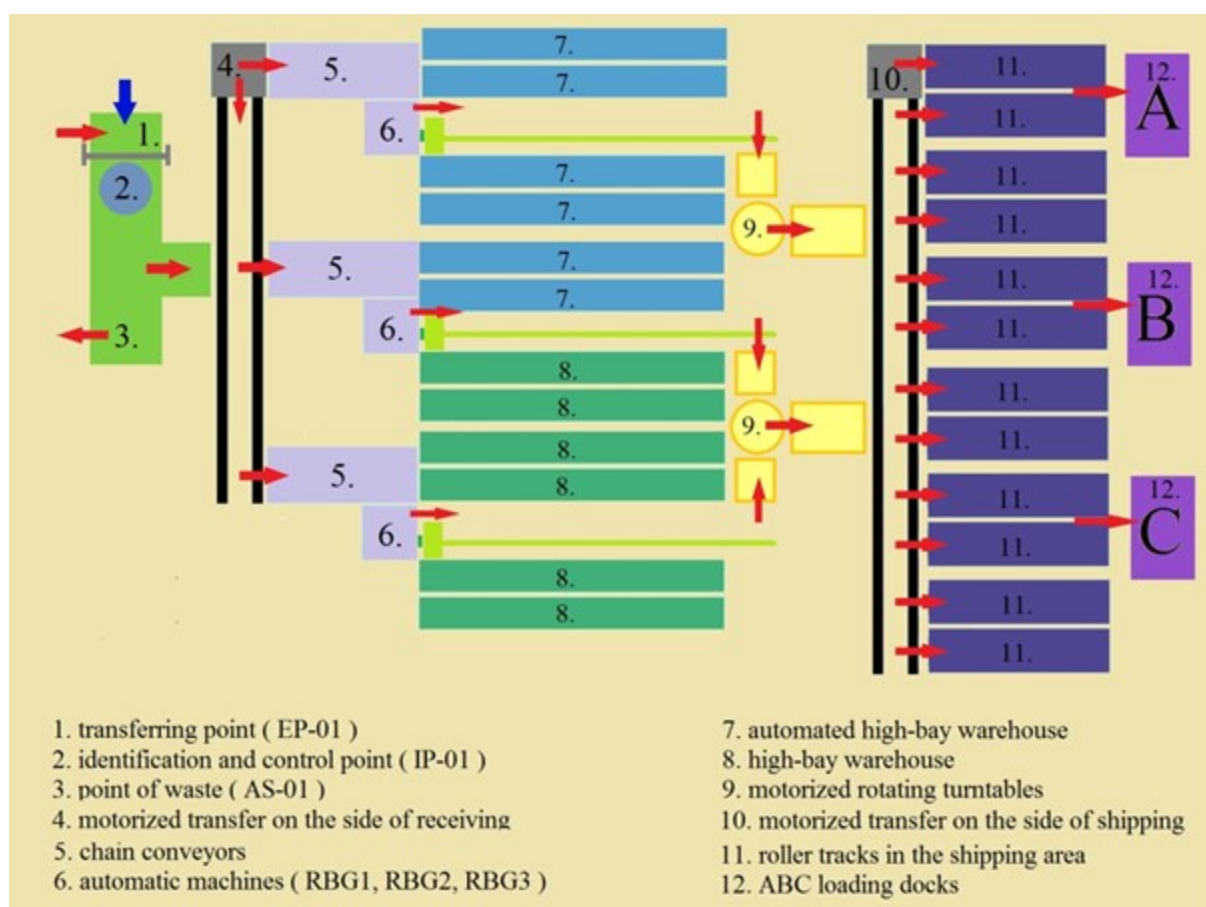
Beside the pasta products, mill products are also kept in these warehouses. Due to the continuously growing product range of Gyermelyi Plc., establishing additional drive-in based storing capacity was created recently. After the first phase of the enlargement of the warehouse, which occurred in 2004, it can receive around 6,400 pallets. Later, in 2011-2012 the further enlargements resulted in another 3,300 pallets being able to be received. That resulted in 2 separate warehouses being built next to each other, as both are connected with the conveyor belt of the pasta factory. In one of the warehouses, the standard 1260 mm high pallets are stored. In the other storage unit 2 types of locations can be found, which are 1600 and 1800 mm high (Bederna, 2015/c) (see 1. figure).

### ***Automated high-bay warehouse***

Due to the system implemented by the German SSI Schäfer in 2004, Gyermelyi Logistics Ltd. is able to support the company's logistics processes by this unique method. The company

Gyermelyi Logistics Ltd. as subsidiary, was established in the context of tender possibilities in 2010. This company is an integral part of the Gyermelyi Holding that enables a more effective coordination of processes (Bederna, 2015/b).

The automated high-bay warehouse is 47 meters long, 22 meters wide and 26 meters high. Pallets are placed in the warehouse in double-deep rows. One row is 37 positions long and 14 positions high, thus the maximal capacity of the warehouse is 6216 EUR pallets. The first stage of the warehouse system is operating with 3 automated machines, which is able to store 500 pallets in 16 hours and send out 550 pallets in 24 hours. In the complete system there are more than 200 types of pasta products and 15 types of mill products, stored in 5 rows and placed in 2 deep channels. The moving of placements and dispatching of the products is done by an automated carrying machine (RBG). The warehouse management system handles the stock, taking into account the principle of First In First Out (FIFO) and contributes to delivering products before their expiration date (Bederna, 2004).



**2. figure: The flow chart of the automated high-bay warehouse**

*Source: own construction based on company documentation of Gyermelyi Plc.*

The processes in the warehouse areas follows. In the section of the pasta factory the pallets are placed onto the EP-01 transferring point. The EUR pallet then passes to the IP-01 identification and control point. Before storing a necessary check is needed. In case of any problems, pallets are moved to the AS-01 point of waste products. After that, the places for storing are selected, which is naturally done by a fully automatic way. The WAMAS warehouse management system handles the operational control of the logistics and other flows of goods. The management program meets all the requirements of any listing or logging needs, thus all processes and the storing of pallets can be retrieved quickly and efficiently. The management system sends the

command of picking to the Enterprise Resource Planning software, which contains the type of products and quantity needed. During the shipping process, the products that have spent the most time in the warehouse are picked first, thus, in addition to the careful production plan, there are no products close to the expiration date left in the warehouse (Bederna, 2004)(see 2. figure).

### ***Picking warehouse***

In this warehouse, the products are stored on the ground level of racks, the higher level is used for the replacement of products. As in the high-bay warehouse, the flow of goods is managed by the WAMAS warehouse management system. The only difference is that this warehouse does not have automated equipment, so the flow of goods is done by forklifts. As was mentioned before, all the pallets are marked with a unique identification tag before they are placed in the high-bay warehouse. When they arrive in the picking warehouse, these tags are read and processed by mobile data collectors. The same instructions appear on the screen of the mobile data collectors as the automated forklift trailers receive in the high-bay warehouse. Each location is marked by an identifier. The reason for this is because when the pallets are transferred from the high-bay warehouse to the picking area, they read the identification tags that indicate where to locate them (Bederna, 2015/c).

Each pallet can be queried(location, the number of item, quantity, serial number, the time of placement in the warehouse, etc.).During picking, the pickers remove the right amount of products from the given location and then book by reading the barcode. The picking order always starts at the beginning of the row. The picker continues picking the next row and then returns to the other side. They collect the item within each of the orders according to this method. The placing of items in the picking warehouse was not created by the strategy of the products' turnover ratio but primarily by taking into account the stacking aspects of the products (Bederna, 2014).They receive orders for next-day delivery until 9 AM, at EDI (Electronic data interchange), by e-mail, phone or fax. After 10 AM they start the automatic pallet shipping operations. The loading instructions received from the freight forwarders are scheduled by taking into account the arrival time of the trucks. In conclusion, the most important part is that the order of picking has to be based on the loadability and stability of products. The largest products are put at the bottom of the pallet (Bederna, 2015/c)(see 1. figure).

### ***Shipping area***

The Enterprise Resource Planning system JD Edwards provides basic information to the independently working WAMAS warehouse management system. The system coordinates the flow of goods in the warehouse, receives the needs and answers to the ERP system. The unit loads arriving to the shipping area are marked with identification tags, which are queried from this system. These tags contain such information as, the order number of the product, the location on the roller tracks, customer number, customer name and the name of the ordered product (Bederna, 2015/c)(see 1. figure).

### ***Delivery***

The innovations have had a huge effect on warehousing but increased the efficiency of delivery as well. Before the innovation, the company satisfied the needs of customers with 6 24-ton trucks and 3 vans. At that time bulk delivery was typical. The production fluctuated between 14,000 and 18,000 tons. Since the picking and loading docks have been built, smaller packs are

also sold, as well as the pallets. In addition to the retail customers, the number of bakeries and smaller shops also increased. They outsourced the deliveries to local entrepreneurs, who nowadays are picking up items many more times than they previously had. The biggest reason of outsourcing this action is that the production grew from 14,000 tons to 27,000 tons. The daily number of freight shipments increased from 10 to 35-40 times per day (Bederna & Mohr, 2015)(see 1. figure).

## Results

### *Improved efficiency in the area of logistics*

Since 2005, thanks to the modified organizational structure of logistics, the company has managed to rationalize each division. On the basis of the obtained data, we measured the impact of the implemented logistics improvements on the following divisions at Gyermelyi Plc. pasta factory.

### *Procurement*

Concerning the inbound logistics of Gyermelyi Plc. it is a key requirement for the raw materials and other products, such as packaging materials to arrive in the company at the right time, in the right quantity, as well as in the suitable quality.

**1. table: The formation of staff in the area of purchasing in 2005 and 2015 (members/year)**

Sphere of activity	Staff Members in 2005 (members/year)	Staff Members in 2015 (members/year)
Leader	1	0
Central warehouse	3	2
Buyer	2	0
Other	3	0
<b>Total</b>	<b>9</b>	<b>2</b>

*Source: own construction based on company documentation of Gyermelyi Plc.*

Today, the whole procurement is made through the central warehouse. In relation to this – the trade corresponding to 120 million HUF –, the total purchase can be handled by 7 less staff members, compared to 2005 (Bederna, 2015/a) (see 1. table).

### *Storage*

Within the framework of the modernized in-house logistics system, after the pasta manufacturing and packaging, the finished products are transported to the warehouses. In Gyermely, at the central premise of the company, the finished goods are stored altogether on 13,200 pallet locations. In addition, 2,100 pallet locations are available for storing wrapping materials. In a separated warehouse, 1.5 million pieces of eggs are stored. (Bederna, 2015/b). As a result of the development, it was necessary to restructure the labour force, which is shown in the table below.

**2. table: Number of employees in different activities of storage in 2005 and 2015 (employees/year)**

Sphere of activity	Number of Employees in 2005 (employees/year)	Number of Employees in 2015 (employees/year)
Warehouse manager	1	1
Staff of the warehouse of finished products	1	1
Staff of the high-bay warehouse	2	2
Picking staff	4	3
Staff of the flour warehouse	1	3
Staff of the warehouse of packaging materials	1	2
Staff of the department of the pallet warehouse	2	0
Administrative assistant	2	1
Cleaning staff	1	external service
<b>Total</b>	<b>15</b>	<b>13</b>

*Source: own construction based on Gyermelyi documentation of Gyermelyi Plc.*

What we can see from the 2. table is that the picking process requires one less employee, while the packaging process requires one extra employee in 2015. Additionally, there was a slight increase in the number of staff in the flour warehouse compared to the year 2005. Moreover, thanks to the automation, the staff members are not employed full-time. Its number decreased by 2 employees. As the cleaning activity is outsourced to an external company, Gyermelyi Plc. can save costs. In summary, based on our experiences it can be concluded that growing production and expanding warehouse capacities can lead to workforce transfer and the number of staff decreased from 15 to 13 in the warehouse.

### **Removal process**

In addition to the automated high-bay warehouse of the shipping side, the company has developed roller tracks. From this place the trucks are loaded with outgoing goods. While 6 employees loaded the trucks by hand in 2015, today these tasks are done by fully automated machines (Bederna, 2015/c).

### **Delivery**

Due to the current production in Gyermely, the company can take advantage of road transport exclusively. This is the best and the most cost-effective solution for the company. Within the developed outbound logistics system, the delivery was outsourced to external companies. As a result, there was no need to employ drivers. The outsourced fleet consists of 4 permanent subcontractors where nearly all of the 14 drivers of Gyermelyi Plc. were given a job. The tasks connected to transportation are carried out by 2 people within the company. According to the data taken from the warehouse manager's summary, from 2013 to 2014 in addition to the delivered quantity, the number of mileage also increased. The delivered quantity rose by 10,000,000 kilograms in 2014 compared to the previous year. In terms of mileage, the vehicles are running 400,000 kilometers more per year than before. In terms of milk run tours (milk run tour is a special term for delivery of smaller unit loads to bakeries, restaurants etc.), the carriage fees increased by 13.3% and the delivered quantity rose by 5.3%. The number of destinations increased by 67.2% which is an outstanding data (Bederna, 2015/b).

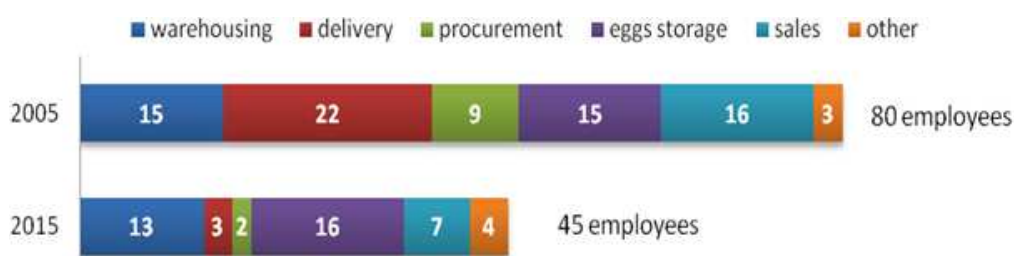
### ***Electronic Public Road Trade Control System***

In order to track the actual route of the goods, the Electronic Public Road Trade Control System was initiated by Gyermelyi Logistics Ltd., based on the newly introduced Government Regulation. The regulation ensures the payment of taxes incurred during the course of supplies and sales, as well as reporting compulsory good sales to the Valuation Office Agency. That causes a significant administrative burden, the increase in the staff by one person, as well as making the processes of the parcels delivery becoming complicated (Bederna, 2015/b).

### ***Summary***

Owing to the development implemented in the company in 2004, there were major changes made in the logistics department. As a result, 44% fewer employees could fulfil the growing orders.

This diagram represents the change in the number of full-time employees between 2005-2011.



**3. figure: The formation of staff as a result of development in 2005 and 2015 (employees/year)**

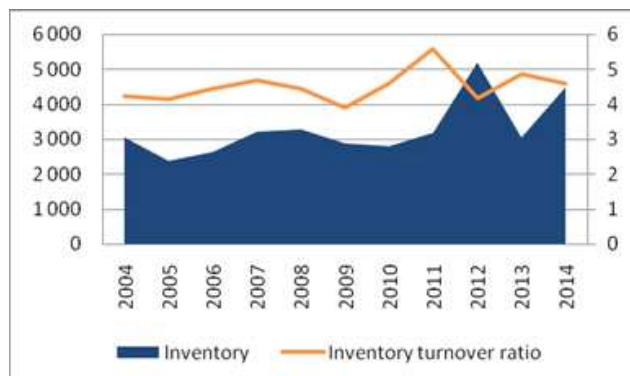
*Source: own construction based on company documentation of Gyermelyi Plc.*

The changes occurred due to several factors. As can be seen in the 3. figure, the greatest decrease was caused by the outsourcing of transportation. It is crucial to mention that Gyermelyi Logistics Ltd. has outsourced its shipping operations. In this case, the corporation must pay only outsourcing fee, thus it may save money on operations, vehicle maintenance, and employees. The centralization of procurement reduced the necessary headcount by 3 people while the transform of sales did so by 9. Naturally in every sphere of activity, in every field they work with different wages. Therefore, in addition to the stock changes, the impact of development and restrictions on costs are worth investigating. While before 2004, a worker was able to handle approximately 2,100 tons of products, in 2015 the amount was 5,000 tons of products per worker. The wages rose by 10% in order to meet the growing demands in payment. However, the wage cost per ton fell by 50% (Bederna & Mohr, 2015). In summary, the restrictions and developments resulted in a formation of a quite efficient company structure, which efficiency extends to nearly every part of the company's effectiveness.

### ***Fluctuation of Inventory***

The efficient use of stock depends on many factors, such as the production equipment capacity, lead-time, moreover its current financial opportunities and the way of customer services. It is recommended to companies to keep as much stocks, which size is able to ensure smooth flow of materials on the lowest stock levels. This can be measured by the turnover ratio indicator. This indicator represents the efficiency of goods turnover (Econom, 2010).

The data from 2004 to 2009 show that the inventory turned over with an average of 4 times a year. Then, there was a substantial growth, where turnover rate reached a peak at more than 5 times in 2011. Afterwards, it fell again to 4 times a year (see red line of 4. figure). The main reason of this is that the company launched its own commercial brands on domestic markets and at the same time, began to expand in foreign markets. In summary, the company took the necessary steps well before the development in order to prepare for achieving the future goals.

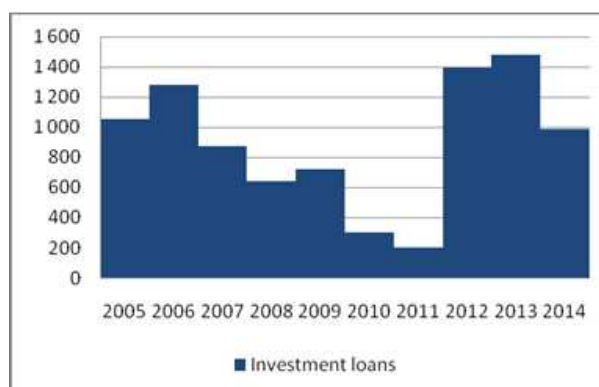


**4. figure: The relationship between inventory (in million HUF) and inventory turnover ratio (in%) between 2004 and 2014**

Source: own construction based on [www.e-beszamolo.kim.gov.hu](http://www.e-beszamolo.kim.gov.hu)

#### *Financing of investment*

The 5. figure shows the amount of bank loans over the last 10 years. The company needed around 1-1 billion HUF in loans for investments in the last decade. In some areas the implemented modernization required the development of the related fields in the company. The investments were mainly covered by the company's own financial resources and bank loans. In addition, a small proportion of state support was also provided. In 2005, the Gyermelyi Plc. borrowed 1 billion HUF to execute the first stage of the warehouse development. The main reason for this is that consumers recognized the company's high-quality products and the demand for different types of pasta increased. Thus the production volume rose steadily over the past years. In the next years the Hungarian government provided financial support for the construction of the second mill, for a regional warehouse and a poultry farm. As we can see that from 2012, there was a sharp increase in the amount of loans. It reached a peak at around 1.5 billion HUF. Gyermelyi Plc. successfully implemented the second-stage of the warehouse expansion and bought harvesters. This led to more effective production, storage and transport processes.



**5. figure: The formation of investment loans between 2005 and 2014 (million HUF/year)**

Source: own construction based on [www.e-beszamolo.kim.gov.hu](http://www.e-beszamolo.kim.gov.hu)



### *The developments in the year 2012*

The company accomplished the second major warehouse development in 2012. We analyzed the changes in some important logistics indexes based on data between 2011 and 2014. The data in the 3. table show the average weekly rates.

As it may be seen from the 3. table, the developments resulted considerable improvement in efficiency. The average route utilization fell minimally by 0.9%. This includes that the departed consignment per performed order quantity grew by 12.36% compared to the year 2011, which indicates that up-to-date technology allows more efficient transport.

Moreover, there was a remarkable, 53% rise in the number of supplied logistics destinations per week. As a result, it was possible to serve - on average – 560 pieces logistics unit from the main store per week in 2014.

The development of the automatic picking system has resulted in a 21% growth in unit load efficiency. Due to the development it is possible to collect and match 146 kg more products according to the orders in one hour.

**3. table: Primary results in 2011 and 2014**

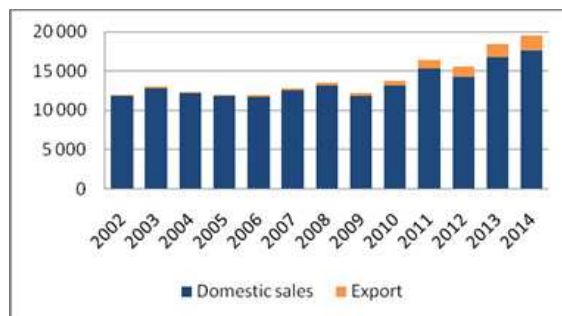
Fields of investigation	Calculation	2011	2014	Fluctuation
<b>AVERAGE ROUTE UTILIZATION (%)</b>	Delivered amount of goods (tons) / Maximum capacity of transport equipment (tons)*100	69.40%	68.50%	-0.90%
<b>NUMBER OF LOGISTIC DESTINATIONS</b>	Supply of logistic destinations in a period (piece)	364 pcs	560 pcs	<b>195 pieces</b>
<b>PERFORMED ORDER QUANTITY PER FREIGHT TASK</b>	Performed order quantity (piece) / number of departed freights (piece)	4.45 pcs	5 pcs	<b>0,55 pieces</b>
<b>PRODUCTIVITY OF PICKING PROCESS</b>	Picked quantity (kg) / completed working hours in warehouse (hours)	692	838	<b>146 kg/h</b>
<b>PRODUCTIVITY OF STORAGE PROCESS</b>	Delivered amount of pasta, eggs, flour (kg) / completed working hours in warehouse (hours)	4 671	5 472	<b>801 kg/h</b>
<b>TURNOVER RATIO OF FINISHED PRODUCTS (PASTA)</b>	Weekly level of closing stock (day) / Total (Gyermely and warehouses) daily average sales in last quarter (days)	54	51	<b>-3 days</b>

*Source: company documentation of Gyermelyi Plc.*

The developments had a positive effect also on the productivity of the storage process. The mentioned indicator rose by 17%, which plays an important role in meeting the increased demand on time. Currently, the highest removal rate could reach or even exceed 120 pallets per hour, while using the old storage and material handling methods only 30 pallets could be removed and loaded onto trucks.

**The exporting activities of Gyermelyi Plc.**

Export has been given a high priority in the company’s strategy, as 2 items, domestic sales and export affect its net revenue significantly. In recent years, the volume of export has grown rapidly but at the same time, the net revenue also increased. Currently, the total sales represent 10% of the foreign market (see 6. figure).

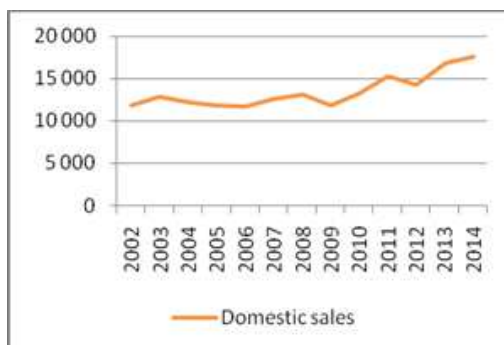


**6. figure: Increased proportion of export within total sales between 2002 and 2014 (million HUF/year)**

*Source: own construction based on [www.e-beszamolo.kim.gov.hu](http://www.e-beszamolo.kim.gov.hu)*

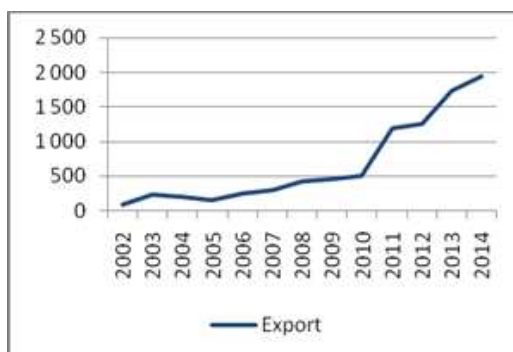
The 7. and 8. figures represent the dynamics of domestic sales and export. We can observe a dynamic improvement beyond the rate of changes. While the domestic sales rose only by 5%, the export increased by 32%.

As a result of the dynamic growth, the company increased 3 times its net revenue coming from export during 3 years.



**1. figure: The formation of domestic sales between 2002 and 2014 (million HUF/year)**

*Source: own construction based on [www.e-beszamolo.kim.gov.hu](http://www.e-beszamolo.kim.gov.hu)*



**8. figure: The formation of export between 2002 and 2014 (million HUF/year)**

*Source: own construction based on [www.e-beszamolo.kim.gov.hu](http://www.e-beszamolo.kim.gov.hu)*

## **Conclusions**

The analyses carried out in this research, represent that what changes could be observed after the 2-phase expansion in the key investigated areas. The number of full-time employees changed from 80 employees to 45 employees. Thanks to the development, approximately 44% less staff could fulfil the growing orders (Bederna & Mohr, 2015).

In addition, the picking ratio improved as well, thus the picking staff is able to collect and match 146 kg more products in one hour. This means that the unit-load training efficiency increased by 21% in 3 years (Bederna, 2012).

As a result, the storage activities became more productive compared to the state before the company could implement the development. The previous storage- and material handling activities were able to ship 30 pallets from the warehouse and load the trucks. In contrast, currently the highest shipping rate reaches the volume of 120 pallets per hour (Bederna, 2012). Since the transport activity is outsourced, freight has become more efficient. This finding is supported by the fact that compared to 2011, the average number of completed orders per freight increased by 12.36% in 2014. Moreover, the served number of destination increased weekly by 53% as well. In this way, from the central warehouse of the Gyermelyi Plc. pasta factory, it is possible to serve 560 pieces logistics unit per week (Bederna, 2012).

## **The vision of the company**

Beside the main areas of investigation, we assessed the effects of innovations on other factors. It was declared in the company's vision. Gyermelyi Plc. considers the expansion of export realization as a main target. In our homeland its market share rose from 33% to 34% in a time period of 8 years, although from 2012 to 2015 it went up to 40%. In addition to this, net revenue rose from 11,949,536 thousand HUF to 19,502,465 thousand HUF (Gyermelyi, 2015).

This growth appeared by reason of - along with the prosperous, yet existing products – Vita pasta (made of durum wheat and no eggs) and DiVita, a unique, world patent product (Bokros, 2014). 10 years ago, the production capacity was reached, which forced the company to automate and enlarge their warehouse. Besides, the logistics software brought in made the operation more cost efficient and the storage expansion ensure more ergonomic working conditions for the employees as well (Bederna & Mohr, 2015).

As for their plans, export realization will be carried out in more and more countries which mainly can be served from the master depot in Gyermely, partly served from the regional warehouses, as well as from the foreign subsidiaries of Gyermely Plc. According to their future goals, the present productions 10% export rate will be increasing continuously from year to year. The utilization of storage capacity has grown constantly beside the market share. It resulted in an always growing range of products, the appearance of foreign sales and the national tenders won (Bederna & Mohr, 2015).

In terms of foreign markets, contracts were already signed with Slovakia, Romania and Ukraine. In their 5-year-plan Slovenia, Austria and Croatia are also listed. Further enlargements - such as newer pasta factory establishment – depend on their export activities and the success of contracting with foreign countries (Bokros, 2014).

Overall, the management of Gyermelyi Plc. is far-seeing, accordingly they chose a strategy that can later be turned into the use of their operation.

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**RAIL AS A NATURAL MONOPOLY AND POSSIBILITIES OF ITS REGULATION****Forgács Anna<sup>(1)</sup> – Szabó Szabolcs<sup>(2)</sup>**

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**Abstract**

Government regulation is required for goods with a gap between social and private costs and social and private benefits. Such goods can be classified into three types:

- a) toll goods, which are non-rival but exclusion from use is possible;
- b) common pool goods, which are privately consumed and exclusion is not possible;
- c) collective goods, which are jointly consumed and exclusion is not possible.

Toll goods (the railway for example) are characterized by the need of a significant amount of capital and an almost zero marginal production cost. As one single asset is enough to meet the entire public demand, providers of such services can be defined as natural monopolies and as so the issue is to avoid those monopolies to supply scarce services at high prices. Efficient regulation requires the government to stand apart from and an independent regulatory agency to restrict monopolist operation. This regulatory task can be accomplished by simulating competition (price cap regulation) or by motivating competition (free access to networks).

We address this issue focusing mainly on the Hungarian railways.

**Keywords:** *railway, public costs-private costs, natural monopoly, price cap regulation*

**JEL classification:** *R41*

**Intorduction**

According to related literature, goods where social or private costs or social or private benefits respectively differ significantly require state regulation. These goods have three basic types:

- Toll goods where non-payers are excludable
- Common pool goods, where potential non-payer beneficiaries cannot be excluded rationally and which are consumed individually and
- Public goods, where no one can be excluded from consumption and are consumed collectively.

Services provided by network industry (to which rail is part, too) belong to the group of toll goods, characteristically requiring large capital and functionally behaving as natural monopoly. Decreasing marginal cost (average cost) implies the charge of higher prices and insufficient quantity of supplies, would not the state to prevent it with legal regulations and by operating independent regulatory agencies. The state may fulfil this role through stimulating market (by price cap regulation) or through promoting competition (by free access to networks). This means that all possible efforts should be made that the given service would be provided via a single (and practically short) network and that the service operator is bound by law to ensure the use of infrastructure capacity for other railway undertakings to employ cost-based pricing

and to maintain the prices by price cap regulation, respectively; thus realizing the competition of service providers. (Csillik et al., 2000)

In the mid- or post-crisis state of world economy, optimizing the use of resources at the macro level by economic regulations still remains a crucial question. Transportation emerges as key sector as further increase in world trade, and a strong expected increase in demand for infrastructural capacities, of which the railway service is a high priority factor. Bearing in mind the above logic let us look into the current state and future of the Hungarian rail.

### **Logistics-Transportation-Rail**

The process of globalization has accelerated, and boosted increased international factor movements, resulting in explosion in logistics services. To a big proportion logistics mean transportation (it is 44% in the EU), that is, the use of transport infrastructure, in which rail plays a significant role. The final aim of our research is to reveal the possibilities of optimizing the operation of Hungarian railway transport (freight and passenger transportation) by regulations. To achieve this, first we summarize the relation between logistics and economic growth (GDP), trends and figures in logistics; then the role of transport played in it. Finally, we break down transport into its elements highlighting rail as one of them. Our overview is primarily taken from EU aspect. We will also discuss the questions of developing infrastructural capacities as the crisis brought the strengthening of opinions, seeing the possibility of recovery in (mainly state-financed) infrastructure developments (Krugman,2012; Duncan, 2012), emphasizing transportation infrastructure capacity priority. McKinsey Global Institute for example, named transportation infrastructure investments as a potential game changer. At their estimate, an additional 1% of the GDP spent on this purpose will increase economic growth by 1,8% (Lund et al., 2013). This paper serves as a preliminary study to a larger research which would analyse the possibilities for optimizing Hungarian rail transportation, with special regard to the operation or closedown of side railway lines.

### **Logistics**

In high-income economies, logistics plays a key role in securing sustainable mobility, also contributing to realizing such goals as clean environment or energy safety. (European Commission, 2006)

In the USA, -logistics costs have stayed at a stable 8-10%-of the GDP in the last decade (Gilmor, 2014), In the EU we see a slightly lower percentage around 6-7% (it will be approximately a yearly 900 billion in Euros) (European Commission, 2015). Hungary has a narrower logistics market. In 2012, according to the EU the value of logistic costs reached, 4,2 billion Euros which is barely higher than 4% of the GDP.

A considerable part of logistics costs (some 60-65%-a) is freight transportation cost, (Schulz, 2014) 40-50%-is passenger transport (European Commission, 2015). The flow of goods among companies and the demand for freight required to implement this flow defines the division of labour at the given supply-chain, i.e. vertical integration (depth of manufacturing) and appointed stocking locations including the quantity of stock. Supply-chain management aims to optimize activities taking part in the activities, so to analyse and define freight and other services it is essential to know the anatomy of the given supply chain. Those freight services which can adapt to the new requirements in demand represent a bigger proportion, but other branches can adapt less, this way they do not provide eligible services.

Although the rapidly increasing freight transport contributes to the growth of economy and job creation, it also causes negative externalities such as bottlenecks, casualties, environmental pollution, and a stronger dependence on hydrocarbon import. As the infrastructure capacity is scarce and economy has a strong demand for it, serious bottlenecks may occur unless appropriate measures are taken to optimize transport. Logistic approach has to be integrated into transport policy and this policy should be shaped to meet the economic challenge of our days, at the same time handling negative impacts as well.

„Logistics centres of huge capacity and having the ability to create added value have emerged in recent decades. These centres have become network nodes between the co-operating organizations which accomplish the management of supply chains (networks) by connecting different modalities and networks with their infrastructure and informatics.” (Karmazin, 2015)

### ***Transport***

Globalization and the EU enlargement requires new European transport policy. The transport sector employs more than 10 million people in the EU (4,5% of employment) and amounts to 4,6% of the GDP (Eurostat). The European Union gives prominence to transport policy, but as earlier it has been marked by liberalization and harmonization, now other priorities have also emerged. The single European transport area is in focus with high-standard transport services in all member states and sustaining the competitiveness of the EU.

In order to achieve the main goals drawn up in the Lisbon strategy (economic growth and job creation) it is essential to create the single European transport area, the completion of the internal market, to secure sustainable growth, to expand the transport networks throughout the entire continent, to improve transport safety, and to strengthen international cooperation. Transport policy is one of the first common areas of sector policy within the EU, but only the last decades have seen significant changes in it. The idea of the establishment of a trans-European network and the requirements for environmental protection appeared in the Maastricht treaty in 1992. The central issues of the White Paper of Maastricht of 1992 were sustainable mobility and the opening of transport markets to competition. The White Paper of 2011 'Roadmap to a Single European Transport Area - Towards a competitive and resource efficient transport system' (European Commission, 2011) included the action plans indispensable to the completion of the internal market (integrated transport network, elimination of scarcity, infrastructure development for the countries joined in 2004, cutting carbon emission, reducing dependence on imported oil) (European Commission, 2014). The EU supported the completion of goals in transport policy with legislation as well. The aim of transport laws is the integration of national markets on one hand, on the other hand, entry to the market, also promoting access to infrastructure capacities and compatible technical standards, eliminating the technical and administrative barriers that impede competition. Key elements to legislation are the four railway packages that further we will discuss in detail. Infrastructure must be extended and modernised in many ways for creating the trans-European transport network, (TEN-T), which facilitates a technologically front-rank, resource-efficient and environment-friendly transportation.

The aim of the supply chain management that optimizes the activities in the chain all together. So the knowledge of the structure of a supply chain given so essential to the definition to the definition and analysis of transportation service. (Horváth-Pónusz, 2011)

## ***Railway***

European railway policy is shaped to the general transport policy, aiming at creating the single Europe and the free movement of factors through the liberalization of the market and structural reforms. Here we summarize the history of railway policy in brief, paying special attention to the two core elements in the aspect of creating market conditions: free and non-discriminatory access to infrastructure capacities and charging principles (price regulation).

### *EU regulation of network industry*

Until the 1980s the network operators in Europe functioned in social roles as well. Therefore, in most cases they had exclusive rights, they were public property and a ministerial apparatus exercised legislative and supervisory power. The emergence of new technologies, competitors' threat, and the growing difficulties in financing the expanding services led to the need for involving private capital as well. The EU created supranational regulations, with reform waves embodied in directives.

The main goals of the first wave of directives (from 1998) were opening the market, elimination of the exclusive rights for services, and to harmonize transport sector and competition regulations. A group of the member states quickly adopted the directives, but in several member states this process was a lengthy one and although each member state setup their own independent regulatory agency, their competence was not clarified entirely. (Valentiny, 2013) 2002-2004 was the period of acceleration, the directives adopted during the second wave of reforms advanced opening of the market and in the period between 2007 and 2009 further steps of harmonization were taken towards a single European market. (Baldwin, 2013)

### *Rail regulation in the EU*

By the beginning of the 1990s the railway companies were state monopolies in most of the member states (in several member states they still are), and railway transport both in its regulations and technical standards strongly differed by member states. By the end of the 80s the opening of the internal market and the growing competitiveness of road freight transport put railway under pressure. The 91/440/EEC directive about the development of the Community's railways stated that railway undertakings and infrastructure operators shall become independent from the state (with separate assets, accounting and budget), and the access to infrastructure capacity shall be secured in non-discriminatory and transparent way. The user fee shall be charged by the infrastructure manager and be payable by the railway undertakings. The directive about establishment of railway undertakings was created, then the 95/19/EC directive on the allocation of railway infrastructure capacity and the charging of infrastructure fees as well. The regulations of the latter were ambiguous, resulting in different practices in different member states. After this, the four Railway Packages followed in which, through separating the infrastructure and the operation, the liberalization of the sector, especially that of the freight transport were taken into account by the legislation.

The first railway package which aims at the liberalization of the freight transport market (2001/12-13-14/EC directives) regulated the principles of the allocation of railway infrastructure capacity and the charging of infrastructure fees. The directive instructed transparent and non-discriminative allocation of capacities and it defined the scope of services the rail operators shall provide for the railways undertakings on a non-discriminatory basis, and what principles they shall adopt when determining transport fees.



The second railway package, drafted in 2004, is characterized by market opening, transport safety and interoperability. The 2004/51/EC directive includes the goal of the full rail freight market opening of the continent, the 2004/49/EC records the Community's railway safety standards to consider when creating the national safety rules, the intention to improve and integrate those rules, and the 881/2004/EC regulation is about the establishment of the European Railway Agency. The Agency has been established to provide the EU member states with technical assistance in the fields of railway safety and interoperability.

The third railway package (2007) contains the proposal to open up the international passenger transport market by 2010, instructing that any railway companies with operational licence and certificate of safety may enter international passenger transport market. The third package includes 2007/58/EC directive on the development of the Community's railways and the 2007/59/EC directive.

On the certification of train drivers and the regulation of passenger rights was adopted.

The fourth railway package is a new (perhaps final) phase of the market opening process, aiming at promoting competition and innovation and implementing structural and technical reforms towards the establishment of single European railway area. The main contents of the package are proposals of the EC: 2013/0014/COD is a proposal for revising the regulation on the European Railway Agency, 2013/0015/COD is a proposal for revising the interoperability of the rail system within the European Union and 2013/0016/COD would revise the directive on railway safety (European Commission, 2015). This package sets out four areas of reform:

- technical standards and licences (reducing administrative barriers to entry to market);
- a functioning structure meeting the requirements (separation of the user and the operator of railway network);
- opening up internal passenger transport market (public service contracts should be awarded through tenders), ensuring non-discriminatory and efficient access to railway vehicles);
- retaining skilled workforce (protection of employees by obliging railway companies with awarded public service contracts to take over crew) (Koós, 2013).

In part two we reveal the performance of Hungarian railway on the strongly competing transport market within the above discussed community regulatory frame.

### **The Hungarian Railway**

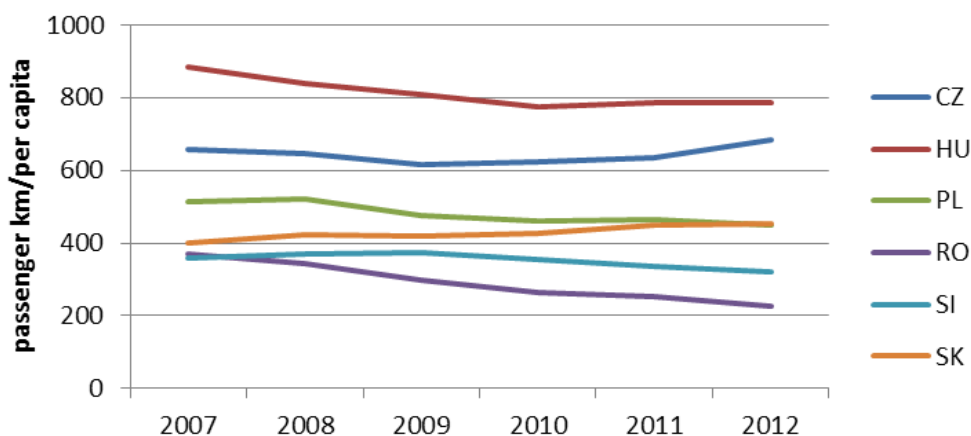
In the economically developed regions of Western Europe, transport policies emphasise the importance of developing high-speed traffic systems, therefore, networks are shaped which generate connections among one another. Central and Eastern European countries represent a minor market possibility. Internationally, the quality of rail networks, the standard of vehicles and services shows substantial differences. The reason for such diversion is the economic and social condition in particular. Outstanding partners of Hungary includes Austria, Germany, and Romania, where 60% of international passenger traffic takes place.

In the Western regions of Hungary a tendency of growth can still be appreciable for the railway industry (for example: new railway carriages, extended Wi-Fi accessibility). Only by considering local efforts for development, ensuring modern vehicles and high standard services might these potentials effectively used. Nevertheless, the continuous defaults in improvements does not enable the railway industry in Hungary to preserve its market share. Here, in the

Western regions of Hungary, threats are also present, since on some lines even market based passenger transportation services might be available

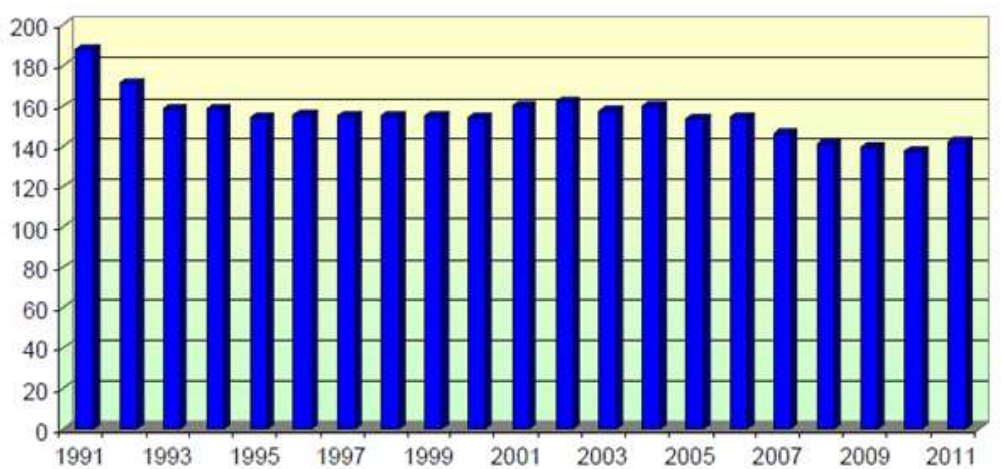
**The Tendencies of Hungarian Passenger Transportation**

On the private premises of the Hungarian railway network only MÁV-START Ltd. and GySEV Ltd. operate. The efficiency in passenger transportation of MÁV-START Ltd. between 1991 and 2011 shows an almost constantly decreasing trend. A slight increase appears in 2001 and 2002, then between 2003 and 2006 the number of passengers transported by MÁV-START Ltd. stagnates, though from 2007 a major set-back occurs. In 2010, statistics shows only 137,3 million people. The trend, which meant less passengers, reversed in 2011 and by 142 million people, this has been the highest rate of efficiency in the last four years. (Figure 1.)



**Figure 1. Passengerkm/person, in comparison with countries from the same region**  
 Source: based on Eurostat, self-edited

The trend of passengerkm values corresponds to the changes in the values of calculated number of passengers. Consequently, the average distance of journeys did not change significantly over the last few years and from this point of view, passenger transportation shows stability. (Figure 2.)

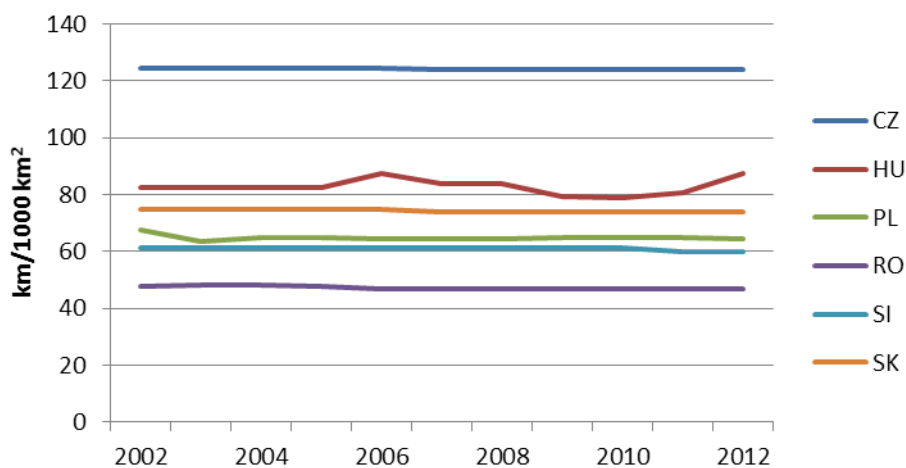


**Figure 2. The calculated number of passengers transported in Hungary between 1991 and 2011 (million passengers)**

Source: NKS, 2013

Examining the domestic and international performance separately, it is concluded that the factors affecting these two regions are different, thus their efficiency also differs. Analysing passenger transportation in a longer period of time, it is noticeable that following the changes in economic structure in the early 90's, similarly to other countries in this region, a severe set-back took place in the number of passengers transported.

Compare to the top performances of the 70's and 80' the number of passengers transported annually was cut in half and stabilized around 150 million/year in 2000. (Figure 3.)



**Figure3. Railway track density (km/1000km<sup>2</sup>)**

*Source: based on Eurostat, self-edited*

### Transportation of Goods on the Hungarian Railway

Railways and roads play a crucial role in the transportation of goods in Hungary. The concentration of railway freight is high, however due to private railway companies it decreases. The market barriers to entry are higher, compared to public roads and new entrants are primarily focusing on the single wagon load segment. Also, problems with interoperability are significant, which is disadvantageous to the market competition.

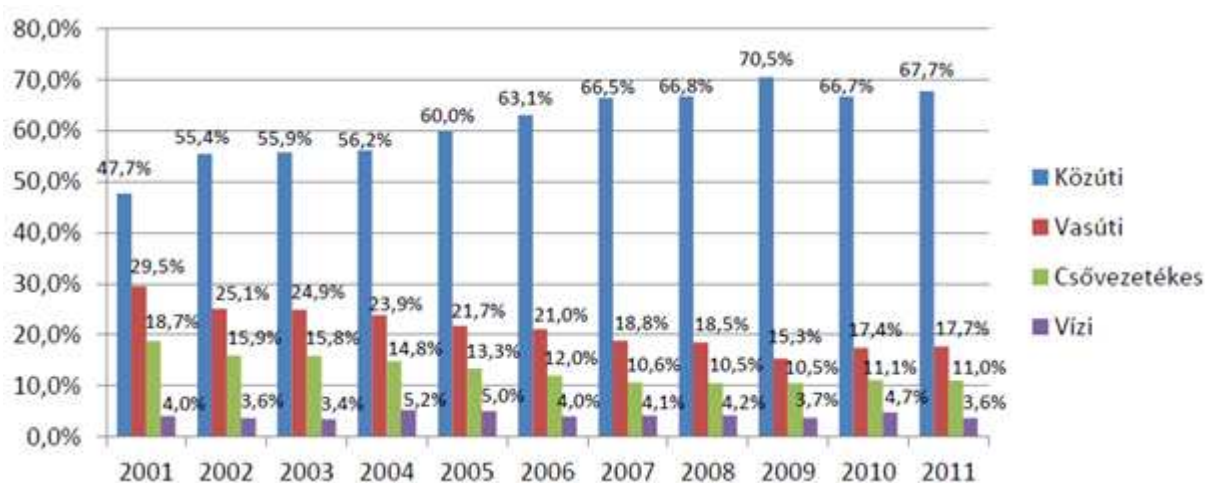
The volume in the transportation of goods on railway started to decrease from the 80's, but freight on roads increased. Following the EU accession, Hungary reached a ration in the division of labour which is the characteristic of Western-European countries (modal split). In 2011, the 50,937 billion ton-kilometre (tkm) efficiency in the transportation of goods divide as follows: the share of inroad transportation was 68%, railway 18%, delivery by pipeline 11%, shipping 4% (source: NKS, 2013). The neighbouring countries, excluding Austria, had similar percentages in the road and railway shares.

The white book of the EU transport policy in 2011 set an objective that by 2030 the 30%, and by 2050 the 50% of road freights, longer than 300km should be replaced by other means of transportation (for example: railway or shipping). Considering the size of Hungary, it may be a challenge, especially since the way of transportation is defined by the owner of goods or the assigned logistic company.

In Hungary, the change in the structure of the economy right in the beginning of the 90's and its negative effects lead to an extreme decrease in the transportation of goods. Compared to the 70's and 80's top performances, transported tons of goods on railway was reduced to its third.

The changes after the shift in economic structure and the opening of free markets (for example: decreasing production volumes, bankruptcy of industrial branches, the collapse of the Eastern market, the demand of SME for transporting goods on roads, competitive carriers) lead to the set-back in the performance of the transportation of goods on railway. It stabilized on a much lower level, though it has a decreasing tendency ever since.

Considering the data of the Hungarian Central Statistical Office from 2012. I-III. quarters and the tendencies in 2011, it seems two thirds (66%) of the goods transported by companies registered in Hungary was transported in road. This means 11 million inland trucks (132 tons of goods) and 1,7 million trucks internationally (34 million tons of goods). Only 20% of the goods were transported by railway in 2012. According to the own research of the MLSZKSZ the Hungarian intermodal transportation (including Ro-La) scarcely reached 10-13% within the railway transportation branch, while this proportion in Western European countries was 20-25%. (Figure 4.)



**Figure 4. The Hungarian division of labour in the transportation of goods from 2001 to 2011**

*Source: Hungarian Central Statistical Office*

## Suggestions

According to the European Commission, as a part of the fourth railway package, railway companies get access to the infrastructure in all EU countries in order to enable inland railway services in passenger transportation as soon as the 1st of January in 2017. The proposed liberalization of passenger transportation may severely influence Hungarian railway companies. The introduction of such market competition is only advantageous for railway companies at a higher technical standard with financially favourable environment. Open borders might become a competitive disadvantage for Central European railways.

As a result of their aggressive market strategy, well-funded competitors might easily become dominant on the market that would trigger spiralling prices or it may significantly pull down supplies. Considering the difficult financial situation, low prices are not to be competing with, which might also result in a monopoly situation of new market entrants.

In Hungary, the lower standard of services and the lack of intermodality together means a weak competitiveness compared with in road transportation. In the absence of a general scheduled timetable is untraceable for passengers. Railway traffic is incalculable, while the rigid system

does not respond eligibly to social and market challenges. The insensitivity for the market results in subsequent loss in the division of labour.

A more and more significant involvement seems to be present in the suburban railways of Budapest due to recent developments. "House to house" traveling, which can be organized as one single route in long-distance traveling, is optimized for intersections of transfer and the integration of a well-structured scheduled is in process. On the renewed lines, intermodal connection is assured, therefore an increase in the number of travels is appreciable in this segment. Among others, it is due to the constantly renewed railway carriages that the railway transportation of passengers is socially accepted and the comfort of travelling is significantly increasing.

Because of the requirements in environmental and energy efficiency, but also these factors being socially accepted, demand rises for railway services. High standard and customer focused railway services are created. By developing international corridors in long-distance travelling market share could be extended.

Without the measures influencing the division of labour and the prolificacy of a self-controlling set of rules, new competitors appear so a loss in market shares will be evident in both passenger transportation and the transportation of goods. Because of the rapidly worsening competitiveness, transit traffic will be diverted to other neighbour countries. Targeted measures including the modernization of safety rules and its homogeneity. Lacking these, the favourable tendency in the safety of transport cannot continue in the long run, therefore it will be underdeveloped comparing it with the EU average.

According to the strategies in passenger transport on railway, considering the opening of markets, it is fundamentally a responsibility of the state, because of the features of this segment being a public service. Taking everything into account, surrounding countries also have European corridors which, in spite of their unfavourable facilities, could divert some of the traffic of Hungarian railway networks if unexpected difficulties in liberalization occur in Hungary.

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## RELATION OF THE CAPITAL STRUCTURE AND PROFITABILITY BASED ON LITERATURE

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### Abstract

The corporates are regularly forced to use different inner and external capital elements in their life. Of course, the companies will use that kind of sources, which they are able to achieve a value-creation progress with, thereby contribute to the increment of the trade industry sector. According to many literatures, the income-generating's ability of the enterprises can be affected by the major financial's decisions, following the inner and external financing opportunities, strategics, forms and principles, and the capital structure of all these. Of course, we can make differences among the lifecycles of the corporate's life. The small and medium sized enterprises need to have capital for the fluently running, but it is, that from where and how it is available. The capital structure theories helps us to understand this wide range of consequences. There are also two differencies between the creator's outlook of the traditional and the new capital structure theories. Modigliani-Miller theorems are classified into the new capital structure theories, where there are no taxes originally, but the effects of the taxes are already taken into count by the modified theories.

**Keywords:** *Capital structure, profitability, capital structure theories, inner and external capital elements, corporate life cycles*

**JEL classification:** *G32*

### Introduction

To start-up and operate a business is needed capital from the owners. The venture get assets with capital investment. The capital it can be coming from the owners and lenders also. The capital shows, that where it comes from and how much of the purchasing power, which is held by the contractor acquires assets necessary to begin or resume the activity, as well as a source of business growth.

No exists one theory for the optimal level of composition of the capital structure, which could determine clearly that what is acceptable in the individual industry sector and what is not. Presumably in the company's life, there is an optimal ratio of debt stock, which can be between 65 and 70 percentage. When the company reach this level, we can stop to increase debt, because on this upper level (70 percentage), the lenders will wait bigger yield irrespectively of the company profit capacity. In this situation the lenders can be motivated to stay in the company in the following time/years, or if the company get worth, the lenders can get out of any losses. When the company exceed the optimal ratio of debt level, evidently the banks can not grant money for the company, until the banks do not realize just the pieces of loans, or nothing of the money. It will be unprofitable to the banks.

We can establish company without debt or foreign capital. In this situation we can say that the company operates of the owners capital. We can not base the company's activity to work of debts merely. Nowadays, the foreign capital can able to complete the owners capital, what is



needed for the company for operating. Sometimes, we can not finance all of the company's process with owners capital, because on the money-market we can realize profitable debts, and in this way we can develop the owners capital out of the company. In addition to the previous situation In company's life, there is a term when the company wants to invest shares or it can not pay it's partners, because the company is out of the money. In this way the company also needs debt.

There are many types of debts, but it is not screw that the company impress of them. By some sources the debts can be sorted to refundable and non-refundable. The refundable debts contains other 3 types, what I introduce in the following. The non-refundable contains preferred stock and the utterance of ordinary share. The refundables contains the following 3 types, which includes Run finance (bill of exchange, trading loan), Indirect ((Bank loan, Factoring, Leasing), and Direct (Bond, Deposit ticket).

The internal finance elements contains: profit, depreciation, reduced working capital and the sale of invested assets. By another sources the external and internal capital elements are different that we can view by the following table.

**Table1. The elements of internal and external financing**

INTERNAL FINANCING	EXTERNAL FINANCING
("Public") self-financing (by increasing equity reinvestment of profit)	Self-financing (equity - enhancing existing owners)
Amortization ("Secret self-financing" does not appear on the balance sheet)	Share of Funding (raising new equity owners) • Extern share capital increase (eg .: capital increase through by public issue of shares) • Involving Risk Capital (Private Equity)
Employees (profit) share (equity)	Equity loan (current owners) (source of foreign creditors' rights)
<b>Equity release</b> (property transfer) (existing fixed or rotating equipment mobilization, or the sale or hire)	<b>Foreign funding</b> • bank loans, • shape foreign policy source
	Hybrid Financing (the combination of shareholder and creditor rights) • convertible, option bond

*Source: Katits (2002), 25 p.*

**Material and method**

Equity can be from two sources. One source is that the owners welth permission, and the other one is that the company realizes profit before the years and the owners can not take out of the company. The owners submit the founders capital and the capital surplus for the company.

The entrepreneur's equitiy equals to the amount of the company's capital, if the entrepreneurs equity financed by the shareholders, and members. The owners additional welth permission to the equity is define as that the company reaches profit before the years, and the owners allow of the part, or all for the company.

The company capital structure means the ratio of long-term liabilities and long-term equity. The company's financial activity is a complex task, which involves the examination of investment, investment opportunities, investment selection decisions between the possible. And the establishment of short and long-term financial, operational and strategic funding decisions, organizing the financing, managing financial relationships with different partners.

One of the main task of the company financing is to provide to the require capital for the company's working process on long-term. The amount of company's value, profitability the return of assets and the efficiency of sources can be influenced by the acquration and the use of long- and short term sources which needs for the investment and the finance of the current assets. (Herczeg, 2009. 6. pp.)

The financing section of the companies happens at different stages of their life cycles:

- In the company's start-up and increasing section, it needs more and more capital, and as a rule that in this time the company pofitability capacity is low.
- The preparing section of the company financed by the seed capital.
- To start up a company (and gain impuse) it need starter capital, and your company's products and services to sell too.

Seed capital is typically used in the company's preparing section. In this time the risk is big, and for the financing the risk capitalist's get rights for the proprietary shares. In the following I would like to present the external capital and debt elements of the institutionalized financing forms.

Kovács (2012) says: "Business angels, that investors, who buy up the innovative company's in the beginning of it's process, or provide the seed capital for its. This sector's partners will be probably become from simlpy investors, patent mandatory of micro-company's, who hasn't got any money, any plan, and management to make several utilization, and there is not any spiritual capital anyway. The know-how speciality, or later the business monopol righths will going to provide the return."

Bank loan needs to the increasement and the running tendency.

This includes the purchase of fixed assets, the use of innovation and R & D.

The company needs venture capital, when it hasn't got any bank loans, that on the one hand the higher rate is risky, the company do not fill a long time in the sector. On the other hand, start up enterprise can not get any money from banks, because the company hasn't enough capital, profit and experience. This capital demand check in the bank loans, where the investment amount get bigger. The venture- and private capital investments are economic, when the company gets money in the financing progress. So in this way the ratio of the venture- and private capital which finance(s) the company's beginning, expansion, and the change of proprietary circle.

On the company's fast increasing, and expand section primarily has liquidity problems, and needs more capital to improve.

If the owners can not withdraw capital to the process, then they have to go to public capital issue, and begin to stock market. However this financing form insure profit expectation, which causes the investors to invest money to the company.

In the previous section, we could see the capital necessity forms from a starter to a booming company. Every company has a different financing form, which depends on its size, profit- and yield expectations.

The aim of the financial leader is a form of a capital structure, where the company can be maximalize their value. For this step, the leader needs external environmental experience, which the company reaches at the optimal capital structure level.

The measurement of the capital structure could be define by some theories. The operational leverage index shows us that the company's profit growth and the sale growth.

These growth(s) are depend on the ratio of fixed and variable costs.

This index shows us, the profitability when the fixed costs are high.

$$\text{DOL} = \text{gross margin} / \text{EBIT}$$

EBIT - earnings before tax

The investors leverage report, where there is not any money for the transactions on the investment. (Sulyok-Pap 1995, 309. pp.)

### ***The determining factors of the capital structure***

The classical capital structure theories, which are working with the optional capital politics, and the defining of the company's value, which was made by Modigliani-Miller.

According to the traditional capital structure theories, there are two different valuation method in the defining of the company's shares.

- The first type of the name is the so-called method NOI (Net operating income). It is based on the discounted value of the company operating profit equals to the aggregate value of the cost of capital shares and bonds.
- The second method is called NI (Net Income), which, in turn, net profit, which takes into account the reduced interest income associated with the bond subjects in the present value calculation for the capital cost. With this, we can calculate the value of the shares, while the company's value can be determined of the value of the shares, which are added to the value of bonds.

There are two differences between the traditional and the new capital structure theory creators outlook. The creators of the traditional theory and the new capital structure theory, we can notice two differences between them. The first difference is that what method they can use, the other hand, that how they imagine the evolution level of capital expenditure for the discounted leverage depends on.

The traditional theory assumptions are the following (Krénusz, 2007):

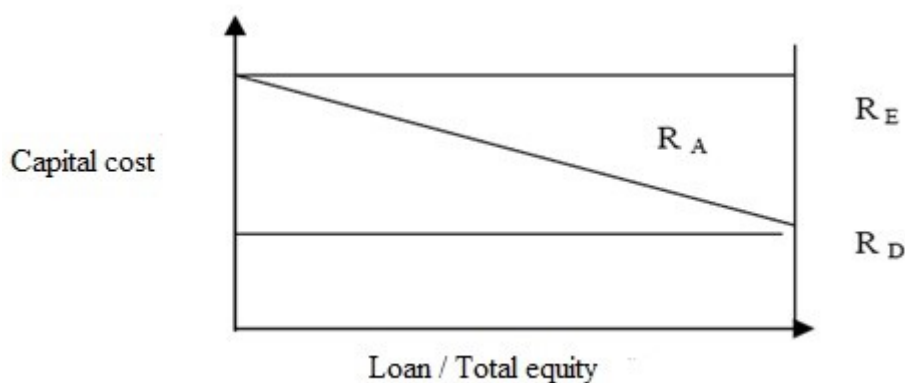
1. The company's business risk is constant.
2. Each company asset risk and fixed assets are constant.
3. Cash flow is stable such as perpetuity.
4. There are no taxes.
5. There isn't preferential share issue.

6. There are no transaction costs.
7. The expectations are homogeneous.
8. Only two devices are available in the financing section: Credit and ordinary shares, both of which are possible at any time involvement.

The traditional theory creators made some changes on the NI method, because their opinion was that the method is acceptable. These changes were not in the base of the method, but basically the amount of the capital cost(s) which depends on the venture capital and the profit. The authors stated the following, that the increasing loan enrolment level growing the company's value at a critical capital structure level. If this critical point reaches or put off the company's value decrease because the increased result is equilibrate to the increasing profit value.

The financing has two effects, which contains revised net present value, and the revised discount rate, called by WACC method. /In the following/, I would like to present these now.

The net profit theory suppose that the company has two chances, when its begin or continue its activity. These chances the requisition of equity ( $r_E$ ) and debt ( $r_D$ ), which cause costs, what I would like to show in the Figure 1.

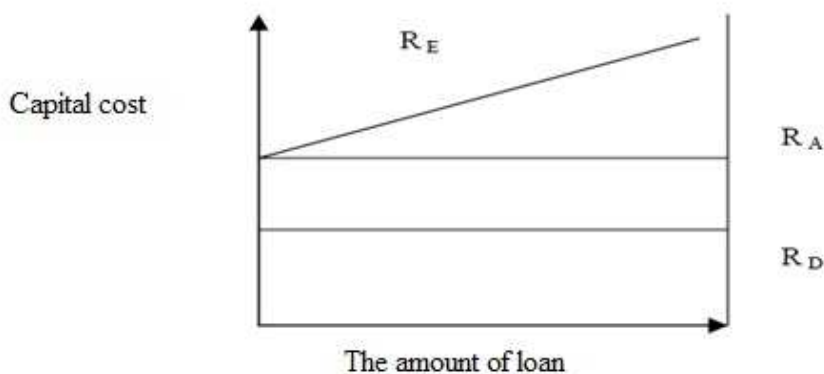


**Figure 1. The theory of capital structure of net income (before taxes)**

Source: *Bárczi (2010), 36 p.*

Due to the prevailing high rates the use of equity is more expensive than the debt, so that it is more preferable. When a company can not capable to get debt, we can use the equity watchful. We have to notice about the ratio of debt, because the increasing debt amount causes that the company's value to increase.

The continuous process of the small and medium-sized enterprises need capital, which is important that the source where and how is available. For this, I will examine the ordinary- and the foreign capital costs, which are in given structure would be changeless. And I illustrate this on the Figure 2.



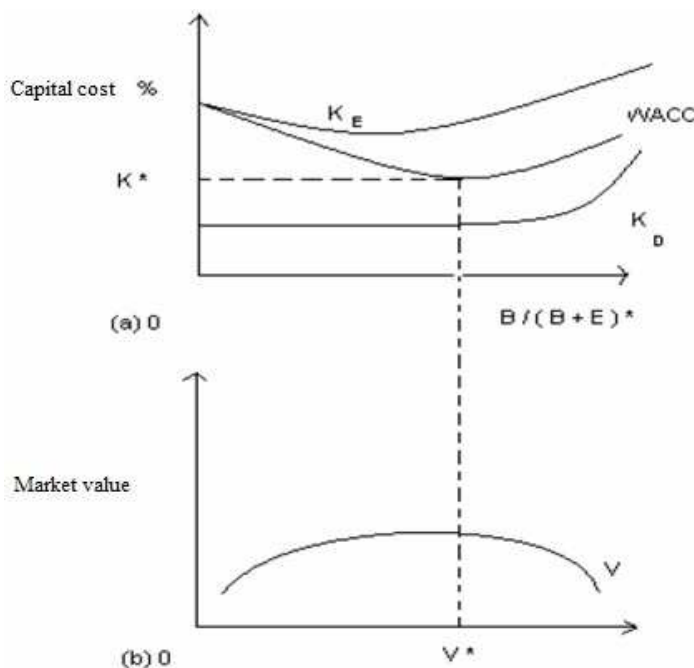
**Figure 2. The net operating income theory of capital structure (before taxes)**

*Source : Bélyácz (1997) , 262 p.*

The stock costs will be increase, when the company it going to increase(s) the relative weight of the foreign capital. The increasement of the indebttness causes that the owner capital cost increase, because this thing grow the risk, then the stockholders require more rate of return. An advanteg of the foreign capital is the lower cost, than the equity, which is compensated by the increasing costs. The ordinary capital cost and the company's value do not depend on the changes of the capital structure. (Bárczi, 2010)

There is not any optimal capital structure, which increase the company's value with the ratio of equity and debt during the finance.

The traditional theory shows us, the transition between the net operating income and the net income theory. The theory assumption of is that the stock capital cost is bigger than the equity capital cost, which causes the the foreign capital financing is not risky, which is shown on Figure 3.



**Figure 3. Cost of capital, capital structure and corporate value**

*Source: Illés (1999)*

The foreign capital cost in the beginning is constant, but the increase rate of the venture, causes that the debt is growing, that the loans taxes require bigger risk, because the risk increased.

However, the cost of equity capital increases when the leverage ratio increases, so the average cost of capital WACC will be U-shaped curve, so the ratio of debt and equity has an optimal level, where the average cost of capital is minimal, while the company's value will be maximized. The theory suggest that there is an optimal capital structure, if we disregard the taxes.

The upper three theory contradict each other, which propose an unanswered question, even that the change in the capital structure effects to the company's value. The answer will be in Modigliani and Miller's 1958 theory, that the two creators theorem formulated in the corporate capital structure and cost of capital in relation to the impact on the company's value. According to their views on the base of the illustrated three theories, which can make an objection closer to the net operating income.

Bárczi (2010, 38. pp.) say's: "If all of the company financed by equity, then this is the expected profit of the assets, that is the company capital structure is equal to the expected profit of the stocks. If the company cases debt, then the capital structure from the stockholders and the creditors added as the weighted average of the expected profits, where the weights corresponding to the company's venture."

(1.) MM theorem states, that dividend policy does not train to the company's value, because it can determine by the profit capacity of the assets under pure market conditions. (Borszéki, 2008)

Krénsuz (2007) says: „As a result, that the pure market rate is independent of the company's capital source, and arrange with the profit of company's who financed by stocks in the same solid class.”

The company's value is independent of its capital structure, when we suppose perfect capital market, and there is not taxes. The transcription causes that the ratio of loans increase, whereby the stockholders expectations about the profit get bigger. When the company gets newer loan, the stockholders risk get high, therefore in this condition when the risk is high, the creditors expect bigger profit.

$$r_A = \frac{D}{D+E} \cdot r_D + \frac{E}{D+E} \cdot r_E$$

Where:  $r_A$  = corporate cost of capital,  
 $D$  = debt,  
 $E$  = equity,  
 $D/(D/E)$  = ratio of debt (bonds),  
 $E/(D/E)$  = ratio of shares,  
 $r_D$  = expected return on debt,  
 $r_E$  = expected return on equity.

Capital cost is the profit of the all assets, which can be also determine as the weighted average of the expected profit of the equity and debt. We can get the capital cost by the quotient of the

operational result and the all of assets, but we can calculated by the weighted average profit of the odd capital elements.

(2.) MM theorem the venture company's expected profit of shares proportionately increase with the capital quotient which is calculated by on market value. And the measure of growth depends on the difference of the profit of ordinary capital cost and debt. (Borszéki, 2008)

In other words, the original formula is applied:

$$r_A = \frac{D}{D + E} \cdot r_D + \frac{E}{D + E} \cdot r_E$$

And we finally get the corrigated formula with taxes:

$$r_E = r_A + \frac{D}{E} \cdot (r_A - r_D)$$

Where:  $r_A$  = corporate cost of capital,  
 $(D/E)$  = ratio of debt (bonds) and equity,  
 $r_D$  = expected return on debt,  
 $r_E$  = expected return on equity.

## Results and discussion

The own stocks value increase when the debt growth. This method gives a chance that we can be indebtness because that's a good business. but is not, because the debt's profit depends on the indebtness. When the owing rate overstep particular ratios, cause an increasing process after the debt. The creditors risk depends on the increasing ratio of debt, then the equity's profit is not independent from the ratio of the equity and debt. When we can increase the ratio of equity and debt, then the profit of equity is slow. When the company debt's substance increases, than the profit of the equity increase slowly.

MM 2. theorem still valid, when the loan risk-free, and still a ratio when the rate risk premium does not change. (Bárczi, 2010, 43. pp.)

Weighted average capital cost can be determine as the company's expected profit of all stocks, which contain(s) portfolios.

$$WACC = \frac{D}{D + E} \cdot (1 - T_c) \cdot r_D + \frac{E}{D + E} \cdot r_E$$

Where:  $D$  = debt,  
 $E$  = equity,  
 $D/(D/E)$  = ratio of debt (bonds),  
 $E/(D/E)$  = ratio of shares,  
 $r_D$  = expected return on debt,  
 $r_E$  = expected return on equity,  
 $T_c$  = corporate tax rate.

We take notice of using WACC, when we calculate the company's value and the profit of the debt which depends on the capital structure. The loan cost after tax will be smaller than the original formula  $rA$ . Hereby the new estimated capital cost expresses loans with tax savings.

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## LOGISTICAL PROCESS ANALYSIS OF A GLASS FACTORY

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### Abstract

Our paper is about the Logistical Process Analysis of the Glass Factory. The reason why this topic has been chosen is because in today's cost-sensitive world, enterprises need to participate in a strong market competition to keep operating and if those companies want to stay capable of living and make the highest profit possible, they need to overtake their competitors. The way for those firms to reduce their expenses is increasing the standards of services linked to their product and integrating, optimising them as much as possible. We had the objective of providing help to make the logistical processes of the company more efficient.

During our analyses and examinations, optimisation possibilities were mainly found in fields of stock management, storage and production, which are written about in details in our paper, including solution suggestions.

Our hypotheses proved to be true, after finishing our prior examinations and studies, using primary and secondary researches. Consequently, by adapting techniques in particular parts of logistics the found problems could be solved. However, if it comes to implementing our suggestions, it is to be considered that these are only theories at the moment. Hence, without any expertise, foresight is necessary to prevent possible difficulties and solve them.

**Keywords:** *logistics, lean process, supply chain, MRP,*

**JEL classification:** *L61*

### Introduction

Our study is about the analysis of the intra-logistics of a glass factory. The analysed glass factory is not a separate enterprise, but a part of an Ltd, so its single processes blend into the processes of the full company. Our observations mainly focused on the improvement of the glass factory. Our goal, among others, was that they optimize their processes and decrease their costs by analysing and reorganizing the single processes.

Logistic processes analysed in our study: Procurement, Stock management, Storage, Inverse Logistics, Distribution, and production, which is the function that creates the highest value.

I stated the following hypothesis concerning the areas that can be improved:

- stock management can be improved, especially with regards to packaging material,
- the process of warehousing could be simplified and thus, improved,
- by applying the appropriate methods production costs could be lowered.

The methods applied at certain professional fields of logistics serve as basis for our hypothesis, by the appropriate application of which methods the problems identified in certain areas can be improved, rectified.

### **Material and Methods**

“Value is created by the producer.” (Womack-Jones, 2003) With this value creation the producer fulfils the needs of customers, and to do this, the value itself must be defined. Much of the literature, many experts studied this, considering different viewpoints, but the point of it, the creation of value, remains in the centre. James P. Womack and Daniel T. Jones conducted a global research concerning whether the managers of the companies are familiar with what constitutes as value for their customers, what are they willing to spend money on.

Another approach, which, in my opinion, defines value according to the customer from a financial viewpoint: “Value for the customer is created when the customer’s feeling of usefulness due to the transaction exceeds the full ownership costs.” (Chikán-Demeter, 2003).

I made a deep interview with the manager of the Glass factory. Date: 2014 April.

We are searching for the answer to the relations of certain material processes:

- Inventory management of packaging materials
- Transition analysis in the Glass factory
- Process of Warehousing

We came to the conclusion that the stocking of packaging materials can be improved to be more precise and more transparent by applying methods applied in the field of contemporary stock management. There are several transitions in the Glass factory on an annual level, the annual costs of which are high. The number of transitions could be decreased by analyses, examinations and Lean elements, and due to this, the costs would decrease too. According to our observations the process of warehousing (procurement, stock records, taking out) and its methods can be made more effective, more accurate and easier by using a logistics information system.

Thanks to the developments in the field of information studies computer software also helps our work in several cases. Our software analyses are mostly aimed at production logistics and within it, we concentrate on planning project and material needs: MRP with WinQSB software, and project management module with Gantt Project Brno software.

### **Results and Discussion**

Procurement is connected to all logistics processes. On the other hand, because this logistics function is on the highest level of development at the company.

In this case, due to the already mentioned causes, the procurement processes of the Glass factory blend into the procurement of the parent company, Lamp production.

Strategic procurement is in place at the lamp production company, it can be concluded from the fact that procurement is at the higher levels. A combined procurement system is in use, the characteristic of which is that centralised procurement is combined with decentralised procurement and together they enhance their advantages and decrease their disadvantages.

Companies often apply a combined procurement system, which “can have several versions; the most usual one is where the company centre and the organizational units share tasks, thus trying to combine the advantages of centralised and decentralised procurement and to eliminate their disadvantages.”(Chikán-Demeter,2003)

According to the contemporary science of logistics a company can decide between three kinds of strategies concerning their suppliers: competitive (supplier is an enemy), cooperative (supplier is a partner), strategic (long term relationship, an important element of which is the exchange of information). (Demeter, 2013)

**Table 1- Bill Of Material list of the Glass factory**

Glass BOM list	
Name:	Integrated (kg)
Sand	127,7
Soda	49,5
Dolomite	24,4
Alumina	2,95
Barium-sulphate	2,54
Potassium-nitrate	2,36
Antimony	0,8
Glass shards	120

*Source: author edited table in his own*

We applied the matrix based on the Bill Of Material (BOM) list of the Glass factory (see Chart 1). I found that Sand is a strategic product, in this case it is more advised to use the cooperative model. Dolomite and Soda are leverage products, the other materials of the BOM list, Alumina, Barium, Potassium and Antimony are routine products. In these cases it is more advisable to have the suppliers compete. There are no bottleneck products among the used materials.

Stock management can be closely related to procurement, since when we decided how the procurement will be done, we must also decide in what amount and when (timing) we want to procure the desired products, basic materials. It is a very useful professional area of logistics. When applied correctly, it helps us so for example our equity in stocks can be as small as possible, and we can also decrease and eliminate our losses due to stock shortage. In case of stock management it is also not advised to apply the same stocking strategy to our stocks. The ABC analysis is a method that can be applied well to differentiate between our stocks; it is based on the principle of Pareto and with its help we can break down our materials we wish to stock into 3 groups, and we can also apply different stocking procedures for the single groups. The principle of Vilfredo Pareto is based on his observation that “80% of the produced goods get to 20% of society in the course of property distribution characteristic of society, so 20% of the people own 80% of the goods” (Vágány-Nagyné, 2011) This principle was adapted to countless areas of life. Also to the business life, among others, where the principles are “80% of the income of enterprises operating in a market environment is formed due to the orders of 20% of their customers, or 80% of the profit of the company is produced by 20% of the employees, or 80% of the failed profit of companies is caused by 20% of company problems, or employees deal with tasks that define 80% of the effectiveness of the company to the extent of 20%.”(Vágány-Nagyné, 2011) The essence of the ABC analysis is that we group the stock based on their importance and we apply different stocking strategies to the single groups. Making groups can be done based on several criteria, like the costs of using the given product

in the given period. In case of the Glass factory I took a period of one month as basis and applied the ABC analysis to its basic materials based on costs of use.

The analysis I conducted showed that Soda makes up for 42,51% of the costs spent on basic materials, see Table 2. This is an outstanding rate and elevates soda to be the only Category "A" material, the consequence of which is that the Glass factory is advised to put daily records in place concerning soda, and to regularly analyse lead times.

Similar procedures are advised in the case of Category "B" materials (sand, antimony and potassium), but less frequently.

In case of Category "C" materials (Barium, Alumina, dolomite) it is advised to use large batch sizes when ordering, to maintain a higher safety stock level and to conduct surveys less frequently.

In the course of my analysis I found that no restocking models are used due to which such events can manifest like the lack or surplus of packaging material the Glass factory experiences.

**Table 2 - ABC analysis (Considering stocks of basic materials)**

BOM list	Unit price (HUF/kg)	Used amount(kg)/1 month	Value of Using	Decreasing sequence %	Groups
Sand	8,7	172184	1498000,8	Soda: 42,51	A
Soda	60	64716	3882960	Sand: 16,40	B
Dolomite	7,7	32904	253360,8	Antimony: 14,25	B
Alumina	150	3978	596700	Potassium: 10,70	B
Barium	192	3255	624960	Barium: 6,84	C
Potassium	330	2961	977130	Alumina: 6, 63	C
Antimony	2523	516	1301868	Dolomite: 2,77	C
summa	3271,4	280514	917673499,6	100	

*Source: author edited the table on his own*

Our procured and stocked materials must be warehoused, stored. We can find several forms of warehousing in the glass factory, depending on what is stored. If finished products are stored, then the bulk storage method is used, the greatest advantage of which is that there is a very small cost involved and its use of space factor is high, however, the greatest disadvantage of it is that it is a problem for its owner to apply the FIFO principle, the presence of which would be an important factor with regards to the glass.

Furthermore, in the course of my observations I found such analogous elements in the reception-dispatch procedure of the warehouse like the requisition sheet on the picture. By eliminating these elements a much more precise, more transparent and simpler warehouse management could be implemented.

The introduction and maintenance of a linear or two-dimensional bar code system, the further advantages of which would help increase the possibility to implement the FIFO principle, due to which losses caused by it could be decreased.

The internal operation of the systems and the prediction of the critical factors' which have significant effects on the results can be difficult for a number of reasons, therefore the IT -

system of decision support is not satisfying, despite the fact that it could be useful in many.’ (Gyenge-Kozma, 2015)

### ***Positive effects of its application among others***

Production can be started from the procured and stored basic materials, which is the value creating function of the highest priority in the life of a production company, since profit is realized from the results of production.

Production must be planned, and for this we have several options considering the timescale. The production plan that deals with the largest time period is the aggregated plan. Projected data to plan it is gained from the existing orders and forecasts.

### **Conclusion**

In the beginning of our study it was among my goals that by studying the logistics processes of the company I wish to find solutions to problems using the methods of the single fields of logistics with which the value of their products can be raised and together with it the cost per unit for one product can be decreased. Our paper mostly concentrates on creating value within the company limits of the supply chain, but in certain cases it slightly exceeds it. I endeavoured to shed light on all the participating processes.

We started our analyses with procurement as the starting point of the full value creating process. In case of the Glass factory the strategy applied to the procured base materials is greatly influenced by special requirements in the individual cases, which are demanded by the technology. In certain cases the company is depending on the individual suppliers and base material producers, and the market opportunities.

A company can tie down a high amount of equity when stocking base materials, packaging materials and half-finished and finished products, which is defined as loss in certain ways of thinking. The ABC analysis conducted in the case of base materials showed that soda represents a high value from the total amount dedicated to base materials, so more attention must be paid to warehousing it. Based on my observations no warehousing models are used in the case of the Glass factory, due to which events can happen like the ones experienced concerning the packaging materials. It is important to mention that the suggested restocking models can be applied to storing any material, but we must be able to identify which model can be applied to which stock.

Observing the Glass factory from the perspective of warehousing, I found that the procurement and requisition technique of the warehousing of half-finished and finished products contains such analogous elements that make it harder to perform work effectively and quickly, and provide opportunities to make mistakes. Besides, due to the analogous elements the application of the FIFO principle becomes more difficult as well. The mentioned negative factors could be greatly improved or even eliminated by introducing, maintaining the linear or two dimensional bar code system, and integrating the used ERP system.

With regards to production, based on the available data it can be observed that transitions of the Glass factory make up for 12% of the total production time, the material expenses of which greatly increase the costs of the Glass factory. In the introduction I mentioned that the elements of Lean management could be the solution to improve this rate, based on which I would firstly

suggest SMED aimed at decreasing transition time, and the application of the “flanging machine” that can be found in the Glass factory which has a similar structure. Inadequate products and their handling are a further improvable problem, for this issue the Kaizen of the lean thinking, together with an ABC analysis capable of ranking mistakes could mean a long-term improvement. To decrease or avoid the so-called “stagnant stocks” and extra costs due to it a solution could be to move towards the JIT production system in certain cases. In this case fast and precise flow of information based on which production can be started is a very important criterion.

It is worth noticing that thanks to the development of information technology we can find software facilitating computer support in almost all areas of logistics, which I presented in my paper. These software products can greatly facilitate our future work, can make it more accurate, more precise, and more transparent, and provide possibilities for analyses like planning projects and material needs.

My observations concerning stocking, warehousing and production can be improved by techniques that can be applied to the individual fields of logistics. However, we must consider that my suggestions are of a theoretical nature, so special attention must be paid at their possible implementation to avoid and solve the arising difficulties.

A more tangible plan that deals with a smaller time frame is the Master Program Solution (MPS), which ranked under the aggregated plan, but at the same time it is the basis for planning material requirements. It is mandatory to adhere to it; otherwise it could result in the collapse of the system. Using a project planning software can be a great help in compliance. Such a software can be GanttProject Brno, the details of the possible application of which, reports about it I presented through an actual example. The program basically relies on the Gantt diagram, which is a graduated schedule. Its main purpose is time scheduling. It is not complicated to read the diagram. Horizontally we indicate the activities as they come after each other, and vertically we can show activities that can be performed parallel to each other.

Above I mentioned that the master program also means the basis for the material requirement planning, precision is an important condition for it as well, and to achieve said precision we can also receive software support. Such a software can be the free WinQSB, the possibility to apply it and its results can also be found. (Table 3) MRP table based on an production sample.

Based on my further studies concerning production and the available data I came to the conclusion that the time spent with transition and machine repairs make up for almost 12% of the full production. If I consider its distribution then transition is 49% of this 12% and time spent repairing machines is the remaining 51%. Considering its costs it exceeded 66 million Forints in the year 2013. Methods used in the Lean management Kosztolányi J. – Schwahofer G. (2011) (that already proved their worth in the Japanese industry) that is greatly popular these days could be applied well to decrease these costs. From among the several techniques I suggested using the SMED in paper which serves the final purpose (through several steps) of decreasing the time of transition as drastically as it can. Furthermore, the kaizen, which aims at continuous improvement, could be successfully applied; it reaches its goal, continuous improvement, through several small development steps and the involvement of co-workers as the most experienced persons.

Table 3. MRP final table according a production sample

03-06-2014	Overdue	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Total
<b>Item: Egységábrakomány</b>		LT = 0	SS = 20	LS = LFL	UM = Each	ABC = A	Source =	Type =
Gross Requirement	0	0	0	23	46	0	45	114
Scheduled Receipt	0	0	0	0	0	0	0	0
Projected On Hand	20	20	20	20	20	20	20	
Projected Net Requirement	0	0	0	23	46	0	45	114
Planned Order Receipt	0	0	0	23	46	0	45	114
Planned Order Release	0	0	0	23	46	0	45	114
<b>Item: Fólia</b>		LT = 1	SS = 0	LS = LFL	UM = Each	ABC = B	Source =	Type =
Gross Requirement	0	0	0	506	1 012	0	990	2 508
Scheduled Receipt	0	0	0	0	0	0	0	0
Projected On Hand	1 000	1 000	1 000	494	0	0	0	
Projected Net Requirement	0	0	0	0	518	0	990	1 508
Planned Order Receipt	0	0	0	0	518	0	990	1 508
Planned Order Release	0	0	0	518	0	990	0	1 508
<b>Item: Élvédő</b>		LT = 2	SS = 0	LS = LFL	UM = Each	ABC = B	Source =	Type =
Gross Requirement	0	0	0	92	184	0	180	456
Scheduled Receipt	0	0	0	0	0	0	0	0
Projected On Hand	200	200	200	108	0	0	0	
Projected Net Requirement	0	0	0	0	76	0	180	256
Planned Order Receipt	0	0	0	0	76	0	180	256
Planned Order Release	0	0	76	0	180	0	0	256
03-06-2014	Overdue	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Total
<b>Item: Rakodólap</b>		LT = 2	SS = 0	LS = LFL	UM = Each	ABC = B	Source =	Type =
Gross Requirement	0	0	0	23	46	0	45	114
Scheduled Receipt	0	0	0	0	0	0	0	0
Projected On Hand	30	30	30	7	0	0	0	
Projected Net Requirement	0	0	0	0	39	0	45	84
Planned Order Receipt	0	0	0	0	39	0	45	84
Planned Order Release	0	0	39	0	45	0	0	84
<b>Item: Pántkapocs</b>		LT = 1	SS = 0	LS = LFL	UM = Each	ABC = B	Source =	Type =
Gross Requirement	0	0	0	92	184	0	180	456
Scheduled Receipt	0	0	0	0	0	0	0	0
Projected On Hand	1 000	1 000	1 000	908	724	724	544	
Projected Net Requirement	0	0	0	0	0	0	0	0
Planned Order Receipt	0	0	0	0	0	0	0	0
Planned Order Release	0	0	0	0	0	0	0	0
<b>Item: Pántszalag</b>		LT = 1	SS = 0	LS = LFL	UM = Each	ABC = B	Source =	Type =
Gross Requirement	0	0	0	529	1 058	0	1 035	2 622
Scheduled Receipt	0	0	0	0	0	0	0	0
Projected On Hand	1 000	1 000	1 000	471	0	0	0	
Projected Net Requirement	0	0	0	0	587	0	1 035	1 622
Planned Order Receipt	0	0	0	0	587	0	1 035	1 622
Planned Order Release	0	0	0	587	0	1 035	0	1 622
<b>Item: Búrákötég</b>		LT = 0	SS = 320	LS = LFL	UM = Each	ABC = B	Source =	Type =
Gross Requirement	0	0	0	368	736	0	720	1 824
Scheduled Receipt	0	0	0	0	0	0	0	0
Projected On Hand	320	320	320	320	320	320	320	
Projected Net Requirement	0	0	0	368	736	0	720	1 824
Planned Order Receipt	0	0	0	368	736	0	720	1 824
Planned Order Release	0	0	0	368	736	0	720	1 824
<b>Item: Végsapka</b>		LT = 2	SS = 0	LS = LFL	UM = Each	ABC = C	Source =	Type =
Gross Requirement	0	0	0	736	1 472	0	1 440	3 648
Scheduled Receipt	0	0	0	0	0	0	0	0
Projected On Hand	1 500	1 500	1 500	764	0	0	0	
Projected Net Requirement	0	0	0	0	708	0	1 440	2 148
Planned Order Receipt	0	0	0	0	708	0	1 440	2 148
Planned Order Release	0	0	708	0	1 440	0	0	2 148

Source: author edited the table on his own

Regardless of my suggestions I had to notice in the course of my analyses that the glass production technology does not make it possible for the company to use a purely pull-based system, the consequence of which is that it is not possible to create a glass factory actually built on Toyota philosophy.

Based on my observations it can be said in the Glass factory:

- Stocking can be improved with the techniques of stock management,
- Warehousing can be made simpler and can be improved by using a Logistics Information System and
- Extra costs that arise due to transitions and machine repairs in the field of Production can be decreased by using the methods applied in Lean management.

In the course of my observations I found that the perspectives of logistics are not applied in the glass factory, and because of this reason my analyses performed in the paper provide an appropriate basis for further studies to be conducted in the individual fields.

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**THE INNOVATIVE EU – THE FUTURE OF EUROPE****Keresztes Gábor**

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E-mail: [gabor.keresztes@nyme.hu](mailto:gabor.keresztes@nyme.hu)**Abstract**

In this study, I am going to compare the current innovation performance of the European Union with that of its competitors and give guidance on how to promote the flow of knowledge in Europe thereby enhancing the efficiency of the R&D sector. These processes might be solutions to recover from the economic crisis and make progress in the 21st century.

**Keywords:** *innovation, European Union, Triple Helix, higher education*

**JEL classification:** *I23, O31, Q55*

**Introduction**

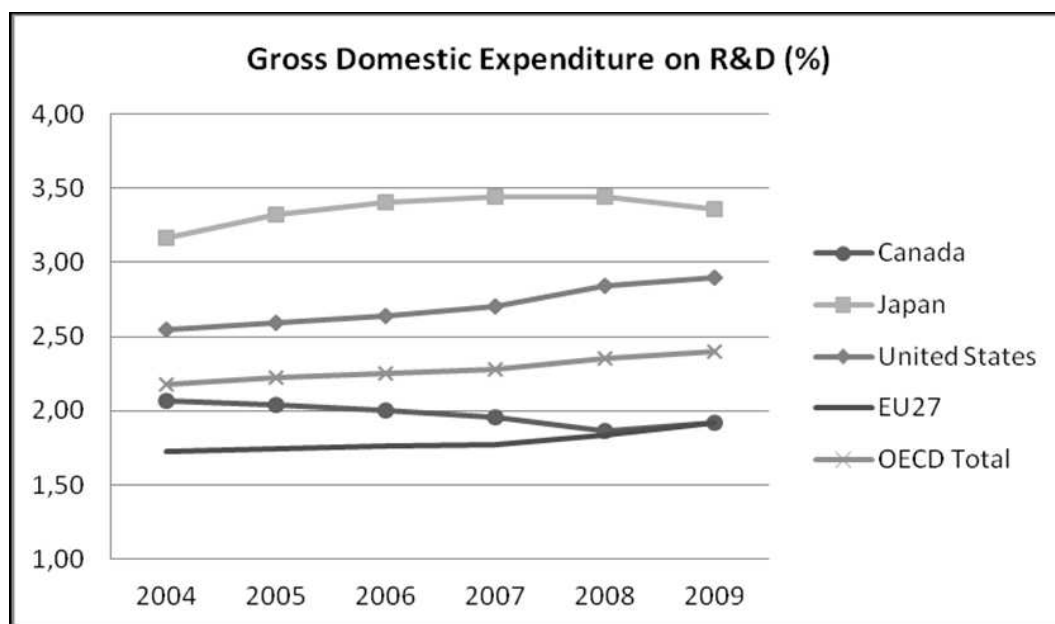
Nowadays we get news about that the backlog of the „slow and old” Europe in the global competition is increasing because it is struggling with problems of competitive force. Fact is that the EU’s lag is significant in certain sectors. However, from the world’s three big development poles, the stability of the USA and Japan has shaken, too, and has changed since the start of the global economic crisis in 2008 rooted in the American lending processes. Meanwhile, a “new world order” is forming in the innovation sector, too. In this respect, the progressive development of the countries of the Far-East is unquestionable, mainly because of the Chinese expansion.

**Innovation in the European Union**

Europe’s present prospects are not good, amongst others slowness, excessive bureaucracy, high state debts and budget deficit stand in the way of progress. The political leaders of Europe have already recognized the competitive disadvantage of the continent and established for this reason – inter alia – the Lisbon strategy as a solution to become competitive with the world’s other economic poles. According to a corner point of the strategy, the European knowledge creation should rather become a flow of knowledge, for scientific results are rarely implemented in economy. [1]

The European Union accepted the Lisbon strategy in 2000. Pursuant to its main goal, Europe was to become the most competitive region of the world by 2010. [2] In order to reach this goal, several sub-goals were defined; one of these was the tenor of the member states to invest at least 3% of their GDP in R&D. However, from the EU’s reports (e.g. Aho report) it became as early as in the middle of the decade clear that the targets cannot be kept. The global financial and economic crisis which broke out in 2008 has deepened the situation.

In my opinion, the necessity of change is obvious from Fig. 1, since the intensity of the R&D expenditures of the EU is far behind of that of its competitors. Since the evolutionary economic theories it has been known that it is the innovative technological activity that is capable of leading the economies out of a crisis and encouraging economic growth.



**Fig. 1.: Gross Domestic Expenditure on R&D**

Source: [3]

Because of the failure of the strategy, the EU has set a new date whereby it wishes to attain the original goals by 2020 as laid down in the Europe 2020 strategy. The three main priorities of this strategy are: intelligent, sustainable and inclusive growth. [4] The headline targets of the intelligent growth by 2020 are the following:

- a minimum of 3% GERD/GDP ratio (R&D&I) and strengthening the cooperation of these three sectors,
- to raise the employment rate of the population aged between 20-64 to 75%,
- to reduce the share of early school leavers under 10% as well as to increase the share of the population aged between 30-34 having completed tertiary education to 40% (the same rate in the USA is 40%, in Japan over 50%) [5]

The EU aims to implement intelligent growth with the help of the following flagship initiatives:

- “Digital Agenda for Europe”: high-speed internet for an increasing number of people. Final aim: broadband Internet access in all households.
- „Innovation Union”: R&D&I should focus on the main challenges mankind is facing: climate change, demographic problems, energy-resource efficiency and healthcare. At the same time, the process of innovation must be improved by developing the connection from the base research to dissemination in the market.
- „Youth on the move”: to increase the opportunities of student study programs and traineeships abroad, to enhance the performance of education systems in order for the workforce to meet the demands of the market, to reinforce the attractiveness and national acclaim of universities and to improve education towards quality and innovation at all levels.

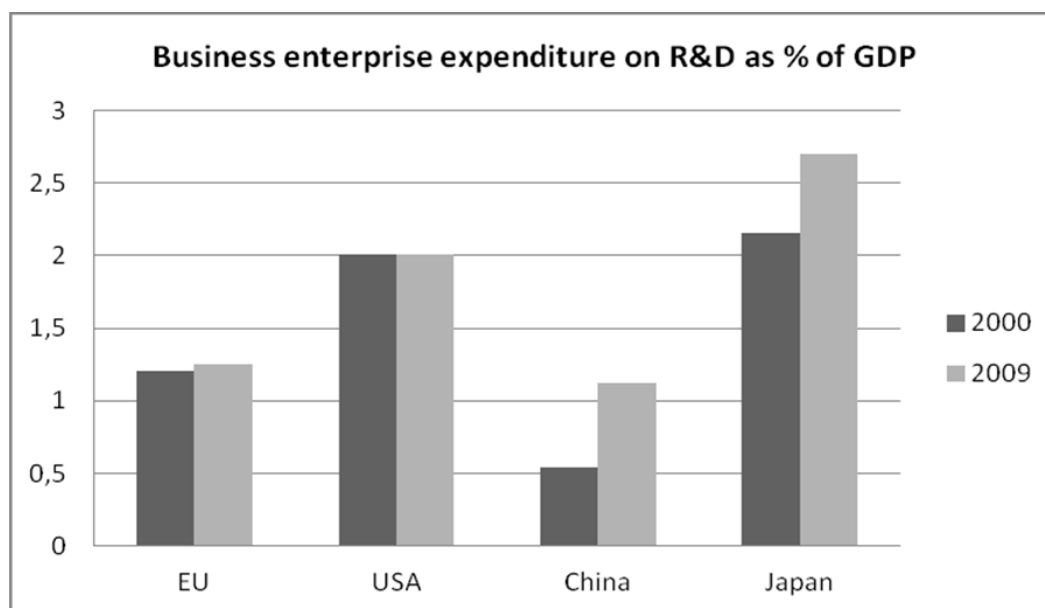
According to EU standpoint, the level of investments in innovation is low and a lot of citizens do not have access to novelties, they cannot make use of them. This can be traced back to economic reasons on the one hand and the lack of knowledge on the other hand. EU population has not the adequate knowledge to adopt innovation and apply it in practice, which makes it harder to decrease the competitive disadvantage.

These targets are clearly committed to a more forcible R&D&I as well as appropriate and high-quality trainings. The population of the European Union needs self-development in order to achieve progress in this sector. In my opinion this may have several obstacles, for example the financial, cultural and social circumstances of the different social groups, as well as their level of education. Without doubt, the key to the way out of the crisis is the enhancement of the innovational performance, its rationalization and application. European people should become more open for novelties, they should deepen and extend their knowledge and at the same time, they should be offered easy access to innovations.

Not only the European Union, but also the OECD prepared an innovation strategy for its member states. In it, they defined the following sectors as in need of development:

- empowering people to innovate,
- encouraging companies' innovation,
- fostering the creation and the flow of knowledge,
- innovation possibility should be applied for global challenges,
- improving the institutional system of innovation at political level.

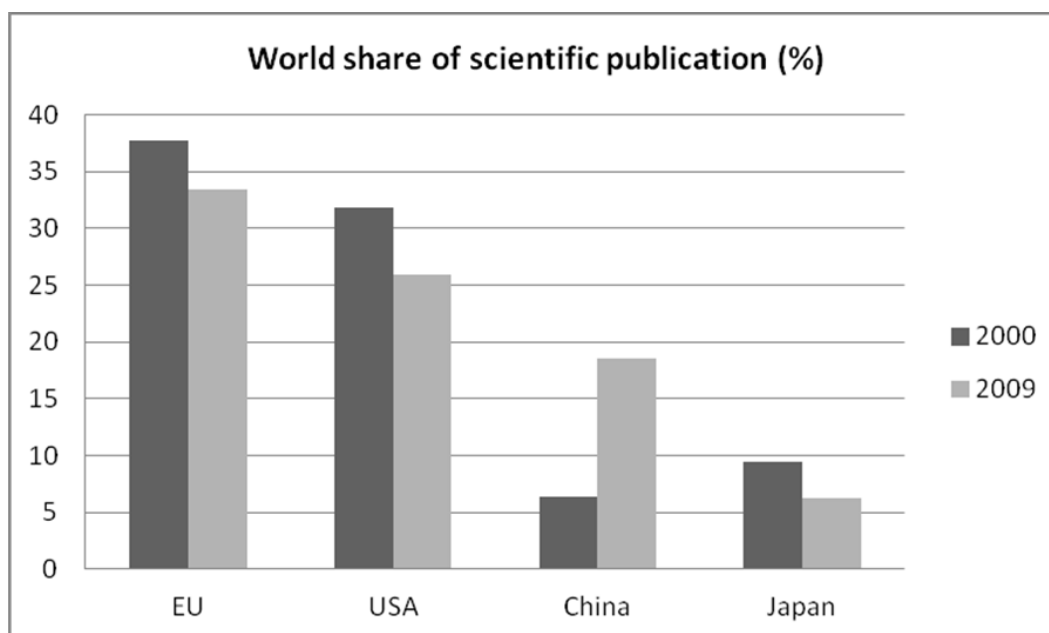
One of the main reasons of the competitive disadvantage is clear: the BERD-intensity is the lowest in the EU, i.e. the contribution of the corporate sector to R&D expenditures is the lowest here. (Fig. 2.) It is obvious that the European companies are lagging behind. As long as the share of the private sector does not grow and state orders remain to support this sector. This negative tendency will persist.



**Fig. 2: Business enterprise expenditure on R&D**

Source: [6]

The EU shows dominance in terms of scientific activity and publications, the countries of the Far-East are way behind them. (Fig. 3.) It would be worth examining the same statistics per number of population; nevertheless, the advantage of Europe would not be then so unequivocal because of its population of half a billion being the largest. So, per number of population, Japan and mainly the USA would take in a more favorable position.



**Fig. 3.: World share of scientific publication**

Source: [6]

Europe is marked by a strong scientific-theoretical performance and a weak performance in practical innovation results: this is called the European paradox. According to some authors, there is a deep gap between research, and the spreading and application of knowledge, i.e. innovation - [7] in contrast to the American or the Japanese corporate research sector, where the process of innovation is much smoother. The European competitive disadvantage can not only be accounted for the low rate of R&D investments, but also for the low propensity to entrepreneurship and innovation. Patent power is weak and so are the institutions that had been founded to build bridges between industry and science.

### Developing the flow of knowledge

As the analyses have pointed out, regarding innovation, the EU has problems primarily concerning the flow and the usage of knowledge. Managing knowledge is essential to the spreading of innovation.

Some researchers think that the modern economic systems are in a state of so called 'learning economies'. [8] Pursuant to this belief, knowledge is the most important and most valuable resource that is based on learning, the most significant process for mankind and economy in the beginnings of the 21st century. Basically, knowledge can be divided into two parts: the individual knowledge, that everyone can acquire who takes part in education. This knowledge is independent of corporate practice; its level is determined by the level of education that is financed by the state as well as tax payers. Virtually everyone is free to gain this knowledge. In case of the corporate specific knowledge however, we mean the development of skills which are acquired in a cumulative way, they are based on corporate experience and become an element of knowledge while acquiring routines. [9]

A significant part of skills are the so called tacit knowledge. These elements cannot be codified and typically enough, they can only be acquired to a certain extent by way of practice. The transmission of such skills is extremely difficult for firms and requires serious efforts from the employees of the company. [10] From a practical point of view, the transmission and passing

over of knowledge as No. 1 technological transfer, and the development of skills that enable the acquisition of knowledge can be considered as requiring largely the same costs and being of roughly the same volume. [11]

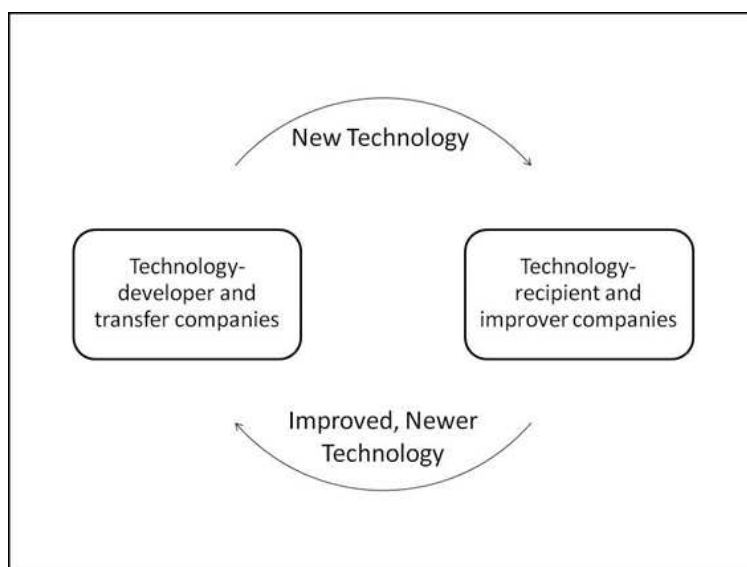
The new technology that is created as a result of the innovation presents –as effective knowledge- a significant value for certain companies. And since it bears value, it can obviously generate demand. As a result, technology becomes purchasable for virtually everyone, because it is sellable, transmittable and obtainable. Technology transfer is thus the process of the acquisition of technology and knowledge. Technology transfer is a quite complex process that incorporates the receipt of the manufacturing technology and organization, i.e. knowhow of the new products as well as the procurement of the means necessary for the production process, their putting into operation, their continuous maintenance and development, and also the organization of the production processes and production management. Further elements of the process are the production, the testing, analysis and repair of the produced product, the detection of faults during the production process, their handling and resolution. [12]

Regarding technological transfer, the literature distinguishes between two basic approaches: according to the first approach, (which is already out-of-date) technology transfer is practically a take-off that is not concerned about the development of the technological background. The recipient only gains the knowledge, copies it and uses, but does not bother about the possibilities of further efficiency and improvement. The modern approach states the opposite: according to it, in the course of technology transfer, the recipient not just takes over the technology but puts enormous efforts into further improving this valuable knowledge, and selling it later to another user, together with the added value. [13]

Thinking through this theory, some think that since technology transfer generates such processes and further developments, and because it can be purchased and sold as well as transferred between the firms, nowadays it should rather be referred to as knowledge sharing. [14]

Technology transfer can take place within and outside the company, at regional, national and international level. The most typical example of transfer within the company is the flow of knowledge between the parent company and its subsidiary. The parent company imparts the technology developed by itself to the company belonging to its own circle of interest.

Leaders of the regional and state level aim to achieve an increased flow of knowledge, involving more individuals and organizations and provide free access to the most modern knowledge elements for everybody. The flow of knowledge at the highest level is the transfer process taking place at international, transnational level. This is the most frequent case of flow of knowledge in modern companies. The transfer can be regarded as profitable, if the company adopts the international trends, improves the technology so that it can be sold later. As a result of the process, a new technology can come out of a modern technology, so the innovation can be happen. During the process of technology transfer, the company that had first transferred the technology, may receive it back from the recipient company in an improved state, thereby creating a circle that can start all over again. (Fig. 4.) This model is called bilateral technology transfer. [12]

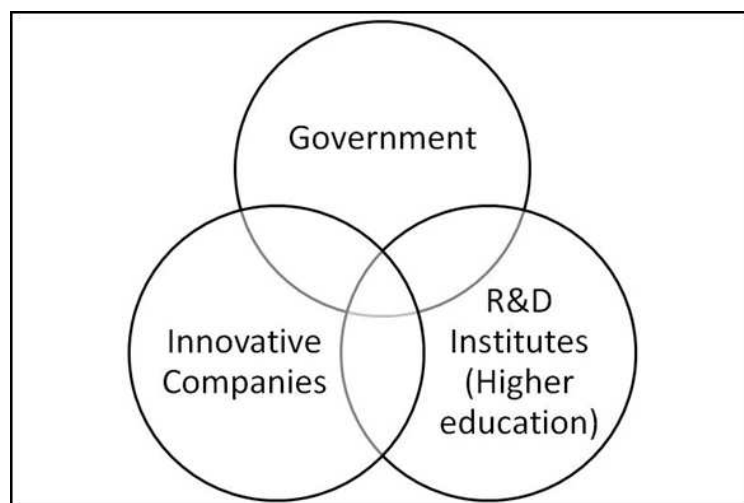


**Fig. 4.: Bilateral technology transfer**

Source: [12]

### Enhancing the Triple Helix effect

The efficiency of the flow of knowledge depends on how efficient the actors of the innovation process cooperate. Therefore, it is also a priority of the EU to develop this cooperation. In literature, the Triple Helix model examines the cooperation between the state (government), the companies and the higher education. (Fig. 5.)



**Fig. 5.: The Triple Helix model**

Source: [16]

All three sectors have their own role in the model: universities are primarily responsible for the creation of new and practicable knowledge; companies (economy) have an important role in the exploitation and use of knowledge; whereas governments control the interactions in the first place. These roles may change throughout the interactions, they may merge and split; the requirements and the responsibilities could change, too. The number of universities operating also in the economic sector is increasing; such institutes establish and run science parks or incubators. Companies also carry out research in the course of development; however, base

researches are generally state-funded. Governmental non-profit organizations take on educational and business tasks, too. [15]

The Triple Helix model is based on three main assumptions:

1. higher education institutions have an outstanding role from the three actors of the innovation process,
2. a relationship based on cooperation should be established among the actors, instead of the government prescribing the innovation policy,
3. the functions of each actors are not separated, rather all three institutes assume a role in the scope of the other two. [17]

Properly functioning European higher education institutions may thus gain in importance and become determining actors in the social and economic life. They may look after an ever better human resource, and as a new task, they may initiate new research projects and make their results adoptable by society. At present, already several governments aim to run the Triple Helix model as smooth as possible, with the common goal to establish such an innovative business environment in which the role of the state is already decreasing.

Universities have to cover the creation of knowledge, its transmission and the entire knowledge management system in the 21st century. Beyond the base researches, they have to do applied researches, developments in laboratory, synthesis, analysis and researches based on corporate orders. To meet the requirements of the international trends however, they also need to deal with incubation (establishing and running spin-offs, research, and development and innovation projects management, participation in critical phases of corporate developments). This is all rounded off by the dissemination of the scientific and practical results (conferences, workshops, scientific debates, organizing exhibitions, publishing books and journals, organizing case study contests etc.).

## **Conclusion**

We can say that the European Union will need substantial developments in the innovation sector in order to overcome its global competitive disadvantage. Its strategy is in harmony with this objective and both member states as Europe's citizens will have to get involved in this strategy to a great extent.

The prerequisite for future development is the improvement of the flow of knowledge. The relationship between the actors of the innovation process will have to be refined. R&D&I processes will need further development and increased support. Higher education has a dominant role but it will need to modernize and open up for the market. European companies should by all means emphasize innovation, whereby they can reinforce their market position in the world. The EU will have to increase its support of activities and services fostering R&D&I in order to increase the efficiency of technology transfer. People and the companies will need to be urged and educated for greater sensitivity to innovation. The cooperation between science and industry will have to be intensified and expanded. The practical approach to scientific results needs a change. EU policies and the member states will have to support the success of innovation processes by means of law and other regulatory measures.

In my opinion, the European Union can regain its competitiveness and strong economic potential by improving the innovation processes.

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**ROUTE PLANNING OPTIMIZATION PROBLEM AT A LOGISTICS COMPANY****(<sup>1</sup>) Kinga Lepsényi, (<sup>2</sup>) Mónika Pónusz**

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**Abstract**

A 21th century company's main goal is to increase their income and decrease their expense, even so they give great attention to social responsibility, the protection of the environment and other factors, because if does not prospers the company, then it cannot properly strive for their goals. In the light of the current keen competition on the market is essential to minimize the expenses. In the case of a logistics company one of the most determinative cost is the shipping related expenses. To minimize the amount of money spent on shipping a good solution can be the fuel cost reduction.

In this study I aimed to minimize the fuel consumption with the optimization of routes. To find the best possible solutions I chose the LP Simplex method, using a highly beneficial add-on of Microsoft Excel called Solver.

**Keywords:** cost optimization, route planning, fuel minimization, Solver, LP Simplex method

**JEL classification:** R41

**Introduction, actuality of this issue, raising questions**

One of the 21th.century's frequently mentioned and determining factor is the consumer society. The dynamism of the economy, the continuing technological development and the fact that the geographical distances are bridged by the information technology make the trade almost borderless. Our life is being assisted by newer and newer fast advancing devices, which can be used in many parts of our daily life. For a long period only the positive consequences of the ongoing development and globalization was mentioned. However, in the last decade more and more recognized their disadvantages too. The rapid technical development, the shortened product lifecycles result an increasing volume of waste. Which often threatens the environment and the human health, because of the modern (and mostly artificial) materials.

From my point of view the current use of non-renewable resources, in the light of the gradually resources increased caution because, according to the recent studies, our oil supplies are limited, which will have foreseeable consequences, so the optimization of shipping is not only important because of its cost-effectiveness but also in the aspects of environmental awareness.

The importance of this issue is further strengthened by the fact '... the interpretations of complex systems' processes are not always coherent, moreover the results are not always consistent either. The internal operation of the systems and the prediction of the critical factors' which have significant effects on the results can be difficult for a number of reasons, therefore the IT - system of decision support is not satisfying, despite the fact that it could be useful in many.' (Gyenge-Kozma, 2015)

Through mathematics difficult and complex economic problems can be solved. In my study I would like to explore the possibilities of a hazardous waste transport and disposal company's transportation and development cost-optimization with mathematical methods of decision-making and Operations Research.

### **Materials and methods**

The analysis in this study was solved by using of operation research based on Ferenczi et al. (2002). The calculations used in the optimization were made based on the company's and the competitors' public data. I solved the cost optimization with a routing process using the Excel add-on called Solver, applying the LP Simplex method.

### ***Route planning optimization problem by a logistics enterprise***

A firm concerned with transport of dangerous goods wants to minimize their transportation costs. By examining the data from the company management has concluded that one way of minimizing costs is, to optimize the distance traveled by the vehicle, so a route must be determined in which vehicles take the shortest path between the stations. To solve the optimization's process I chose an add-on of Microsoft Excel called Solver and the LP Simplex method. One great advantage of the computerized solution is that it simplifies the calculation tasks in a way that manual counting becomes completely unnecessary. So it calculates the given objective function and the associated solutions extremely fast.

The investigated problem is that we must go through from the departure site, all Hungarian site of Lukoil network with using the available vehicle fleet and human resources. The hazardous waste must be transported to the appropriate site, then the vehicle must be returned to the departure site.

To transfer the problem into an Excel table I need the following data:

- addresses of the vehicle's starting and ending location
- addresses of the delivering sites of Lukoil network
- the amount of hazardous waste which needs to be transferred from each delivering site
- addresses of the operating locations
- the purchase prices (/kg) of the operating locations
- the cost of transporting vehicles per kilometer, which I determined as 228 HUF/km based on preliminary studies

Let's assumed the following: firstly, the hazardous waste is delivered with a vehicle which has infinite capacity, so it can transport any number of goods at the same time, secondly we can take waste from more transfer destination, without dropping off the first shipment to the recipient site, thirdly for every transfer destination there is only one recipient site to where transfer is possible, and finally it is possible to transport any number of goods to the receiving destination. However we cannot take into account the toll, driving time requirements and consumption data.

To handle the volume of the data I divided the national Lukoil filling station network into 3 different regions, so having a region of western Hungary, eastern Hungary and Budapest. I restricted the further analysis to the western Hungarian region which region contains 24 Lukoil filling stations (transferring station) and 6 operating stations (receiving station).

In all cases I included the receiving station of RewoxHungáriaLtd.'s in Szentes even though it is located in the eastern part of Hungary, because I'm curious that under what price and distance circumstances they would transport hazardous waste to the hazardous waste station in Szentes.

We can achieve the minimization of cost in two major steps.

First, we should determine the ideal recipient site for every transfer site. The goal is to deliver the given amount of hazardous waste to the receiving station where they take the waste over in the best price and as close to the transferring station as possible. The process is illustrated by the Figure 1.

	Átvételi árak Ft/kg	15	13	21	15	14	13		
Adott mennyiség t. kg		Teljes Környezetvédelmi Zrt.	Ecovispa Kft.	Magdala Környezetvédelmi és Korlátozott Kft.	Orion Kft.	Szaberműhely Művelői Kft.	REWOX Hungária Kft. Világos központi telephely	Korlátozás	Recipient Sites
1. 9 957	Lukoil Abda	1	0	0	0	0	0	1	Transfer Sites
2. 8 466	Lukoil Balatonakaratya	0	0	0	1	0	0	1	
3. 7 069	Lukoil Balatonkenesztúr	0	0	0	0	1	0	1	
4. 10 931	Lukoil Bátaszék	0	0	0	0	0	1	1	
5. 11 760	Lukoil Böhönye	0	0	0	0	1	0	1	
6. 1 276	Lukoil Celldömök	0	0	1	0	0	0	1	
7. 1 200	Lukoil Enese	1	0	0	0	0	0	1	
8. 8 114	Lukoil Dunaföldvár	0	0	0	0	0	1	1	For every transfer destination there is only one recipient site to where transfer is possible
9. 1 236	Lukoil Fülöpcsanak	0	0	0	1	0	0	1	
10. 9 586	Lukoil Galambok Déli	0	0	0	0	1	0	1	
11. 9 485	Lukoil Keszthely	0	0	0	0	1	0	1	
12. 11 382	Lukoil Mecseknyádasd	0	0	0	0	1	0	1	
13. 4 816	Lukoil Mohács	0	0	0	0	1	0	1	
14. 3 165	Lukoil Nagytarcsa	0	0	0	0	1	0	1	
15. 7 759	Lukoil Pacsa	0	0	0	0	0	1	1	Delivery is created
16. 674	Lukoil Pécs I.	0	0	0	0	1	0	1	
17. 11 394	Lukoil Pécs II.	0	0	0	0	1	0	1	
18. 4 920	Lukoil Péter	1	0	0	0	0	0	1	
19. 3 914	Lukoil Rábafüzes	0	0	1	0	0	0	1	
20. 7 598	Lukoil Sámueliék	0	0	0	0	1	0	1	
21. 2 490	Lukoil Sédtek	0	0	0	1	0	0	1	
22. 7 000	Lukoil Szántód	0	0	0	0	1	0	1	
23. 3 577	Lukoil Veszprém	0	0	0	1	0	0	1	
24. 7 472	Lukoil Zalaegerszeg	0	0	0	0	1	0	1	

Figure 1. Interpretation of Assignment Matrix

Source: own construction

Once we have this matrix, we need to define the objective function, which in this case is to minimize the cost of whole transportation task. To determine the objective function we need to use the following formulas:

$$\text{transporter vehicles' cost/km} * (\text{1. Table's and 2 Tables sumproduct}) + \text{3. Table's sum}$$

In this case the objective function is 2,618,825 HUF, this is the lowest cost, which is enough to transport the hazardous waste from every transfer site to a waste station. (Figure 2)

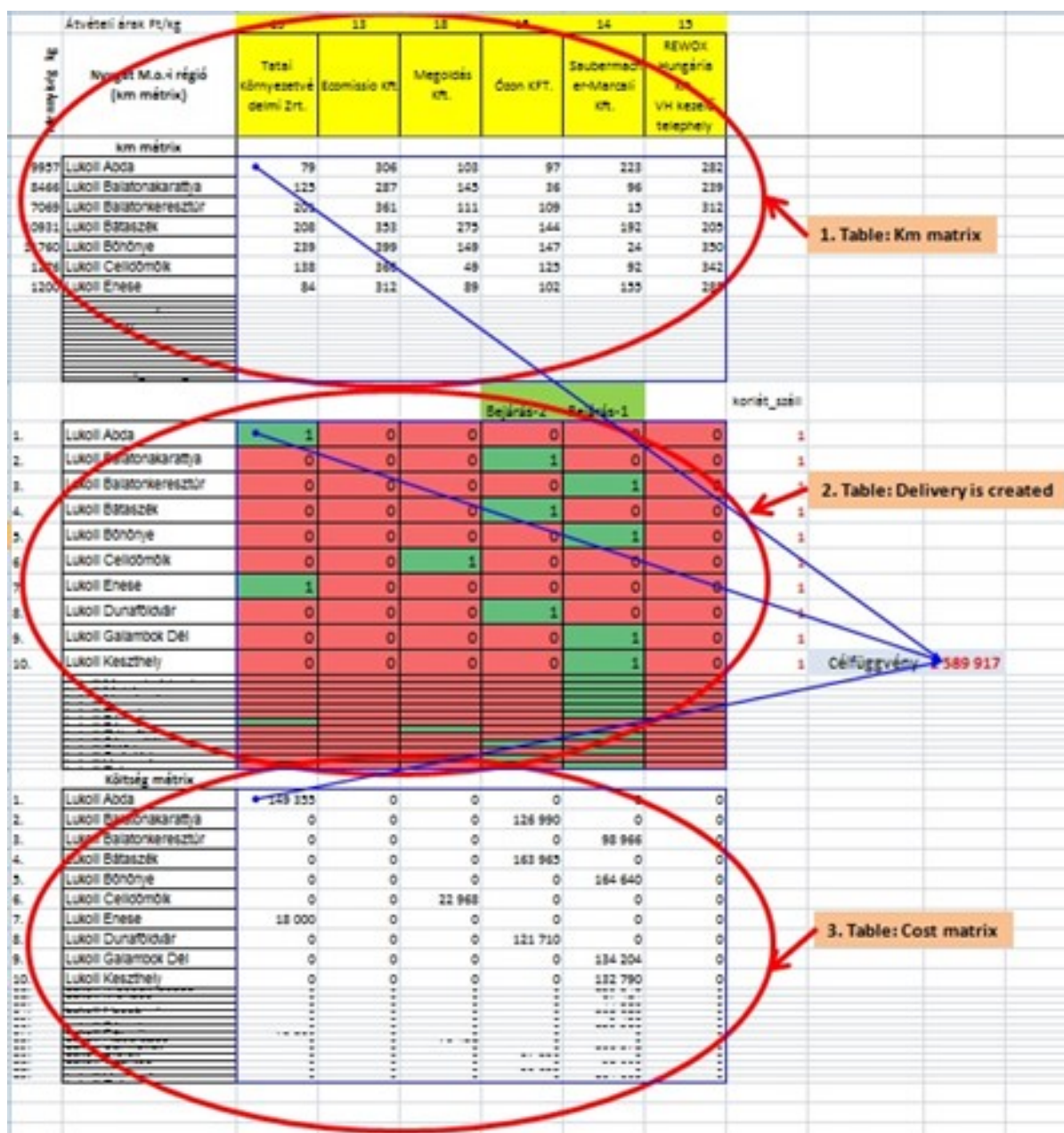


Figure 2. Interpretation of Assignment Matrix

Source: own construction

In this case the following correlations were diagnosed between the 24 transfer sites and the 6 recipient sites, so we can see which recipient sites are the best matches for every transfer sites. In the 2nd Figure 1 means that the delivery is created and 0 means that it does not. So the procedure described above can be interpreted to solve any routing problem for the transport of any kind of goods. The point is that we got the route, which allows the company to minimize shipping cost.

	Árvesztési árak Ft/kg	13	13	21	13	14	15	
Árvesztési mennyiség Ft/kg		Tatai Környezetvédelmi Zrt.	Écs Közmű Rt.	Megoldás Környezetvédelmi (S) Környezetvédelmi Rt.	Ózon Rt.	Sauber macher- Marcali Rt.	EUWOK Hungária Rt. Vt. Környezet védelmi Rt.	Écs Rt.
9957	Lukoil Abda	1	0	0	0	0	0	1
8466	Lukoil Balatonakarattya	0	0	0	1	0	0	1
7069	Lukoil Balatonkeresztúr	0	0	0	0	1	0	1
10931	Lukoil Bátaszék	0	0	0	1	0	0	1
11760	Lukoil Böhönye	0	0	0	0	1	0	1
1276	Lukoil Celldömök	0	0	1	0	0	0	1
1200	Lukoil Enese	1	0	0	0	0	0	1
8114	Lukoil Dunaföldvár	0	0	0	1	0	0	1
1236	Lukoil Fülöpszállás	0	0	0	1	0	0	1
9566	Lukoil Galambok Dél	0	0	0	0	1	0	1
9485	Lukoil Keszthely	0	0	0	0	1	0	1
11582	Lukoil Mecseknádasd	0	0	0	0	1	0	1
4816	Lukoil Mohács	0	0	0	0	1	0	1
3185	Lukoil Nagykanizsa	0	0	0	0	1	0	1
7759	Lukoil Pacsa	0	0	0	0	1	0	1
674	Lukoil Pécs I.	0	0	0	0	1	0	1
11394	Lukoil Pécs II.	0	0	0	0	1	0	1
4920	Lukoil Pév	1	0	0	0	0	0	1
3914	Lukoil Rábafüzes	0	0	1	0	0	0	1
7598	Lukoil Sármellék	0	0	0	0	1	0	1
2490	Lukoil Siófok	0	0	0	1	0	0	1
7000	Lukoil Szántód	0	0	0	0	1	0	1
3577	Lukoil Veszprém	0	0	0	1	0	0	1
7472	Lukoil Zalaegerszeg	0	0	0	0	1	0	1

Figure 3. Assignment Matrix in the Western region

Source: own construction

As we can see in the Figure 3 every transfer site has exactly one recipient site where the wares are shipped to. It means the first problem is successfully solved. Based on the calculations 4 single centre tours generated which are the following:

1. single centre tour: Lukoil Abda – Lukoil Enese □ Lukoil Pév □ Tatai Környezetvédelmi Ltd.
2. single centre tour: Lukoil Celldömök □ Lukoil Rábafüzes □ Megoldás Ltd.
3. single centre tour: Lukoil Balatonakarattya – Lukoil Bátaszék – Lukoil Dunaföldvár – Lukoil Fülöpszállás – Lukoil Siófok □ Lukoil Veszprém □ Ózon Ltd.
4. Star tour: Lukoil Balatonkeresztúr – Lukoil Böhönye – Lukoil Galambok Dél – Lukoil single centre tour: – Lukoil Mecseknádasd – Lukoil Mohács – Lukoil Nagykanizsa – Lukoil Pacsa – Lukoil Pécs I. – Lukoil Pécs II. – Lukoil Sármellék – Lukoil Szántód □ Lukoil Zalaegerszeg □ Saubermacher-Marcali Ltd.

The second step is to determine how we can further reduce the costs of the transports. This means we have to determine the shortest route during the single centre tour. I will present this process in the 4 case of the 4th single centre tour.

The task is to find way to transfer the single centre tour into a ringroad. So it will take less km to deliver the materials to Saubermacher-Marcali Ltd.

A traversal method should be developed so that the departing and arrival station need to be the Rewox Hungária Ltd. site in Szentes, we should only stop once at every 13 transferring stations and the hazardous wastes must be delivered to the recipient station of Saubermacher-Marcali Ltd. The goal is to determine the objective function, what can minimize the kilometers traveled. Determining the objective function:

4th. Table's and 5th. Table's sumproduct

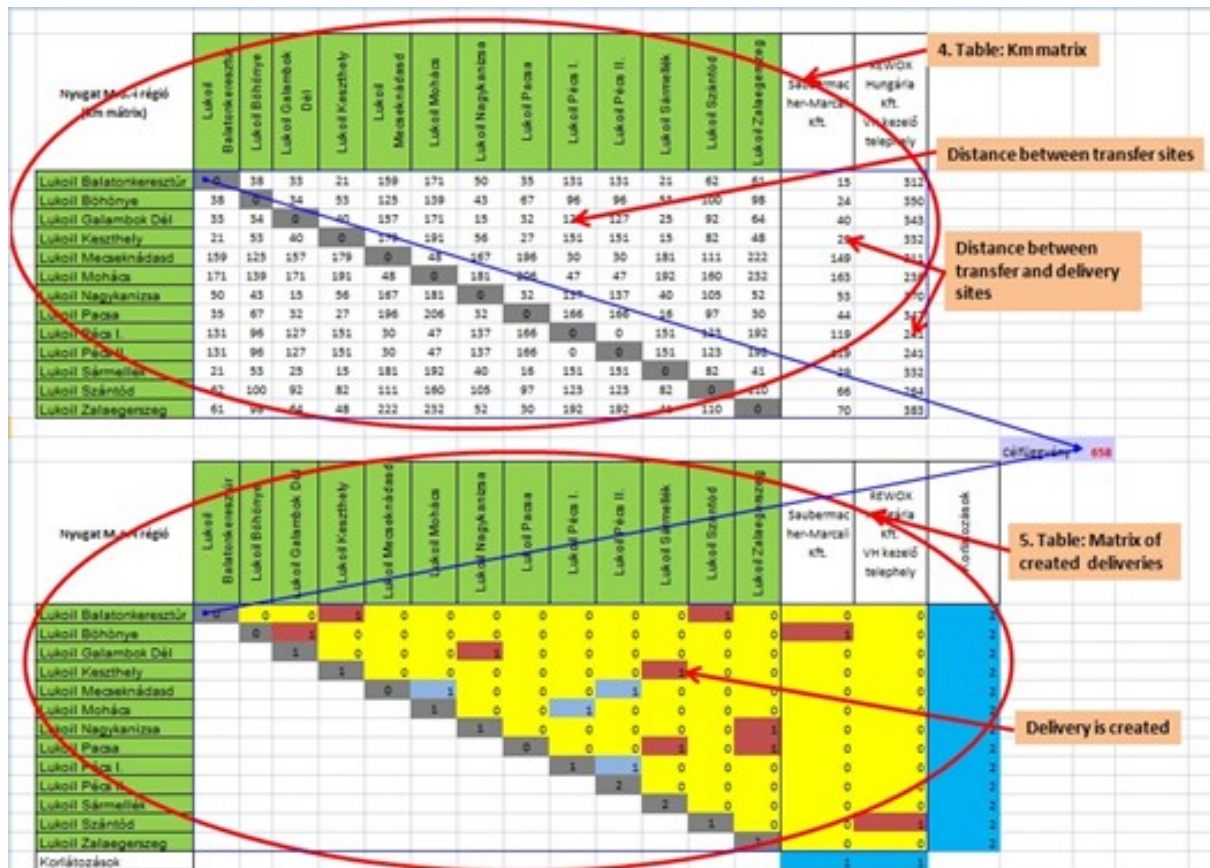


Figure 4: Interpretation of Assignment Matrix

Source: own construction

In this example the object function is 658 km, so the shortest distance between the sites that have to be visited is 658 km.

The Figure 5. shows the order in which the transport must be carried out. The table above displayed on the map shows, that the shortest way can be achieved with the vehicle traveling around the locations in 2 separate roundroad.

If we improve this solution further with a heuristic way we can get the route which is really the most cost-effective. Among other things, this is the reason why there is a great need for an experienced logistics specialist's knowledge, because the computing solution often cannot accurately model the reality. I present the manually corrected tour on the map below.



**Figure 5: Roundroad**

*Source: own construction*

### Conclusions and recommendations

In my study I concluded that a firm concerned with transportation can achieve cost reduction if it can find the best tour with the suitable route planning process. As a result the shortest route can be realized. In addition, it was found out that there is need for a professional's knowledge, even if we use a computerized solution, as they might need of his heuristic correction.

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## AZ IDŐBENI PÉNZÁRAMOK KEZELÉSE A GAZDASÁGI SZÁMÍTÁSOKBAN

### MANAGING THE ECONOMIC CASH FLOW CALCULATIONS

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#### Összefoglalás

A befektetések, beruházások gazdasági megítélése: A legjobb döntés meghozatalához rengeteg szakértelem, de emellett intuíció és kockázatvállaló készség szükséges. E tényezők jó része nem számszerűsíthető vagy szubjektív dolog. A ráérzések megerősítéséhez, a megbizonyosodáshoz és a döntéshozatalhoz viszont a rendelkezésre álló információk összegyűjtése, feldolgozása szükséges. A következőkben azok a módszerek kerülnek bemutatásra, amelyek segítségével a befektetési lehetőségek közül kiválasztható a leggazdaságosabb, és a "még kezelhető kockázattal" megvalósítható. Az ismertetésre kerülő számítások az üzleti tervek, megvalósíthatósági tanulmányok, privatizációs ajánlatok valamint banki hitelpályázatok pénzügyi fejezetének elkészítéséhez nyújtanak segítséget.

#### Abstract

In order to make the best decision you need wealth of expertise, and also the necessary intuition and risk-taking skills. Many of these factors are not quantifiable or subjective thing. Collecting and processing of the available information is needed for strengthening the original intuitions. The following are described the methods that help to select from the available investment options the most economical, and feasible "manageable risk". The described calculations are good for preparing business plans, feasibility studies, preparation of privatization bids and bank loan applications.

**Kulcsszavak:** beruházás, befektetés, investíció, cash flow, gazdaságossági számítások, érzékenységvizsgálat

**JEL besorolás:** D92, G21

#### Beruházás, befektetés, investíció

Gazdasági megbeszéléseinken általában szinonimaként használjuk a fenti fogalmakat érezvén, hogy jelentésük egymáshoz közeli. A befektetés kifejezés általánosabb, pénzeszközök lekötését jelenti későbbi hozam reményében. A beruházás fogalma szűkebb, tárgyi eszköz létesítése, hozam (megtérülés) céljából. Az investíciót mindkét fogalom meghatározására használjuk. A beruházások fogalmi meghatározásának keresésekor a leghasználhatóbb megfogalmazás a következő:

Minden megtérülési lehetőséggel kecsegtető befektetés beruházásnak minősül.



A fenti meghatározás megmutatja a beruházások lényegét: a közeljövőben pénzt adunk ki valamilyen üzleti elképzelés megvalósítására, majd a távolabbi jövőben pénzbevételt remélünk.

A beruházások tervezésénél a fenti mondatból három fontos tényező szerepére kell figyelniük:

1. Meg kell tervezni a várható kiadásokat és bevételeket. A pénzáramlás tervezését a kifizetett osztalék vagy az adózott jövedelem kimutatásáig kell végezni, hiszen ezt az összeget "viheti el" a befektető, ebből a pénzből térül meg a beruházás.
2. A gazdasági folyamatokat időben, időtengelyen kell tervezni. (Nem mindegy, hogy egy kiadás vagy bevétel most vagy évek múlva jelentkezik.)
3. A jövő természetszerűen bizonytalan, így tervváltozatok készítése szükséges, amelyek alapján készített érzékenységvizsgálatok és kockázatelemzések tájékoztatnak a beruházással járó kockázatokról.

A beruházások alapvetően három területen befolyásolják a vállalkozások eredményességét. Elsősorban közvetlenül a vállalkozás nyereségére gyakorolt hatáson keresztül, a többleteredmény vagy a hatékonyabb termelés révén. A második terület a likviditási helyzet alakítása, amely a kivitelezési időszak kiadástöbbletét, a beruházásokkal kapcsolatos hitelek törlesztését valamint a működtetés során jelentkező bevételeket foglalja magában. Végül a vállalkozások vagyoni helyzetének, (a vagyon nagyságának és összetételének) megváltoztatása révén hat a gazdálkodás eredményességére.

### **A beruházási döntések sajátosságai**

A későbbiekben bemutatásra kerülő beruházás-gazdaságossági vizsgálatok megértéséhez, gyakorlati megvalósításához néhány jellemző sajátosság megemlítése szükséges.

1. A beruházásokkal megvalósított létesítmények általában hosszú élettartamúak, így a működésükkel kapcsolatos kiadások és bevételek is hosszabb időtávon jelentkeznek. Mivel a beruházási döntések jövőben végbemenő folyamatokra vonatkoznak és az információk a jövőről hiányosak, a döntéseket mindig terheli valamilyen bizonytalanság. Az információhiány és az ehhez kapcsolódó kockázat egymástól elválaszthatatlan jelenségek.
2. Az állóeszközök mobilitása korlátozott. A létesítmények, tárgyi eszközök újraértékesítése csak veszteséggel képzelhető el ezért az eszközök létesítésére fordított pénzeszközök hosszú távra lekötöttek.
3. A beruházások során létrehozott eszközökhöz, azok működéséhez speciális költségek kapcsolódnak. Különös figyelmet érdemelnek az üzemeltetési, fenntartási, rekonstrukciós és amortizációs költségek.
4. A mezőgazdasági beruházások rendelkeznek néhány további sajátossággal, amelyek csak ebben az ágazatban jellemzőek. Az állattenyésztésben a létesítmények működéséhez nagy értékű forgóeszközök (állatállomány, takarmány stb.) szükségesek. Az ültetvények termőre fordulásáig hosszabb időszak telik el számottevő bevétel nélkül. A mezőgazdasági termelés alapvetően élő objektumokkal foglalkozik, a termelés paramétereinek prognosztizálása ezért különösen nehéz.

### **A gazdaságossági számítások módszerei**

A beruházások gazdaságossági előkészítése három alappilléren nyugszik:

- Megvalósíthatósági tanulmányok készítése, több egymástól lényegileg eltérő változatba – adott esetben más beruházási területekkel, lehetőségekkel történő összevetésben.

- A legjobb eredményű megvalósíthatósági tanulmányokban szereplő tervváltozatokra Projekt terv<sup>1</sup> készítése a kivitelezési folyamat tervezésére, valamint a beruházási költségek minél pontosabb meghatározására.
- Az üzleti terv részeként időarányosa vállalkozás életpályájához alkalmazkodó árbevétel és költségterv a tervezett beruházás pénzügyi működésének előrejelzésére.
- Az időtényező figyelembevételén alapuló korszerű mutatószámok számítása a vállalkozás pénzügyi adatai alapján. A tervezés pontatlanságának ellensúlyozását szolgáló érzékenységvizsgálatok elvégzése, amely az adott beruházás stabilitását mutatja az elkerülhetetlenül bekövetkező társadalmi, közgazdasági változások mellett.

A vállalkozások és beruházások gazdaságossági vizsgálata során a következő három fő terület meghatározása szükséges:

- beruházási költségek,
- árbevételek és a
- működési költségek.

A beruházás pénzügyi tervezésekor a fenti tételeket részletezve időbeni esedékességük szerint kell tervezni. A beruházási költségeket a projekt terv, az árbevételeket és a működési költségeket a működési terv tartalmazza.

### ***A projekt terv és projekt menedzsment***

A projekt tervezés és menedzsment módszere a beruházási folyamat során

- az elvégzendő tevékenységek,
- a szükséges emberi- és anyagi erőforrások,
- az idő és a
- kivitelezési költségek összhangját biztosítja.

A projekt tervezés és menedzsment adott célok elérését segíti adott határidőn és pénzügyi korlátokon belül.

Ilyen cél lehet például:

- Kutatási-fejlesztési tevékenység új kutatási eredmény elérésére, új termék létrehozására, vagy meglévő továbbfejlesztésére.
- Szervezeti átalakítási folyamat a működőképesség fenntartása mellett.
- Beruházási folyamat – meghatározott objektum létrehozása – optimális feltételek biztosításával.

Szemponctunkból főképp ez utóbbi, tehát a beruházási tevékenységek támogatása lehet fontos. A projekttervezés segítségével megválaszolhatók a következő kérdések:

- mennyi idő alatt valósítható meg a beruházás,
- elegendőek-e az erőforrások a beruházáshoz,
- melyek azok a kritikus tevékenységek, amelyek az adott idő- és költségkereten belül veszélyeztetik a projekt megvalósítását,
- mennyi lesz a beruházás teljes költsége?

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<sup>1</sup> A **projekt** olyan, egyszeri alkalommal elvégzendő komplex feladat, amelyet viszonylagos újszerűség, rögzített kezdési és befejezési időpont, időbeli ütemezés, különleges bonyolultság és különböző szakmai területeket érintő feladatkitűzés jellemez.

A projekt terv tipikus megjelenési formája a hálóterv és a Gantt-diagram. A hálóterv idődimenzió nélkül mutatja az elvégzendő tevékenységeket és az azok között meglévő logikai kapcsolatokat. A Gantt-diagram az idő függvényében ábrázolja a tevékenységeket. Leolvashatók róla az egyes résztevékenységek kezdeti és befejezési időpontjai valamint a teljes folyamat időszükséglete is.

A projekt menedzsment gyakorlati megvalósítása a személyi számítógépek megjelenéséig nehézkes kézi, ill. nagyszámítógépes feldolgozásokat jelentett folyamatábrákkal, ajánlott szervezeti sémák felhasználásával, speciális űrlapok kitöltésével.

A projekttervek gyakorlati elkészítése a személyi számítógépek elterjedésével gyorsan végrehajtható feladattá vált.

### ***A pénzügyi tervek***

Az üzleti tervezés során a beruházások pénzügyi tervei egyrészt közép- és hosszútávra szóló gazdaságossági vizsgálatok, másrészt rövid távú likviditási tervek. A tervek más-más vizsgálatok alapjául szolgálnak, de természetesen szervesen kapcsolódnak egymáshoz.

A beruházás-gazdaságossági vizsgálatok tulajdonképpen hatékonyság vizsgálatok, amelyek a befektetés jövedelem termelését számszerűsítik.

A likviditási tervek a tervváltozatok finanszírozhatóságát, életképességét vizsgálják, különös tekintettel a működés első időszakára. Itt különös figyelemmel kell tervezni a vállalkozással kapcsolatos pénzügyi megvalósításának és kifizetésének időpontjait, a működés és a forgóeszköz-finanszírozás törvényszerűségeit. Sok problémát okoz az ÁFA-val kapcsolatos bizonytalanság, amely abból adódik, hogy – különösen az induló vállalkozások esetében – az adóhatóság az első nagyobb összegű ÁFA visszaigénylés után adóellenőrzést rendel el és ez a vizsgálat befejezéséig halasztó hatályú az összeg kifizetése szempontjából. Hiába fizet esetleg késedelmi kamatot az adóhatóság, ha a vállalkozás likviditási egyensúlya veszélybe kerül.

A befektetés megítélésének egyik legátfogóbb szempontja a vagyonszerzés készítése. A beruházás tényleges hozama a működés során jelentkező jövedelmek és a létrejött vagyongyarapodás összegeként határozható meg.

### ***A beruházás gazdaságossági mutatók ismertetése***

Számos gazdaságossági mutató számítható egy beruházással, vállalkozással kapcsolatban. Ezek kalkulációja után megállapítható, hogy a különböző megközelítést tükröző mutatószámok egy része egymásnak ellentmondó eredményt adhat, nehezítve ezzel a tervező, döntéshozó munkáját. A valós értékeléshez szűkíteni kell az alkalmazott beruházás gazdaságossági mutatók számát oly mértékben, hogy viszonylag egyszerűen, érthetően de teljes körűen jellemezzék az adott tervváltozatokat.

A beruházások ökonómiai megítélésére elsősorban a következő mutatószámok alkalmazhatók:

- nettó jövedelem jelenlegi értéke,
- megtérülési idő,
- belső kamatláb.

Nettó jövedelem jelenlegi értéke - (NPV - Net Present Value)

A nettó jövedelem jelenlegi értéke azt fejezi ki, hogy mennyi a beruházás – tervezett időszak alatt megtermelt – nettó nyeresége a beruházás időpontjára diszkontálva. A mutatószám segítségével megítélhető a vállalkozás abszolút eredményessége. A számítás alkalmas kompetitív, – egymással ugyanazon forrásért versengő – tervváltozatok összehasonlítására.

A nettó jövedelem úgy számolható ki, hogy a keletkező bevételek jelenlegi értékéből kivonjuk a felmerülő költségek jelenlegi értékét, melyek egyrészt az egyszeri beruházás-ráfordítások, másrészt a folyamatos fenntartás, működtetés költségeit jelentik.

A nettó jövedelem jelenlegi értéke mutató a következő összefüggés alapján számítható:

$$NPV = \sum_{k=1}^n \dot{A}_k * \frac{1}{(1+i)^k} - \sum_{k=1}^n M_k * \frac{1}{(1+i)^k} - \sum_{k=1}^n B_k * \frac{1}{(1+i)^k}$$

ahol NPV = a nettó jövedelem jelenlegi értéke  
 $\dot{A}_k$  = az adott időszakban esedékes összes árbevétel  
 $M_k$  = az adott időszakban esedékes összes működési költség  
 $B_k$  = az adott időszakban esedékes összes beruházási költség  
 $k$  = az adott időszak száma  
 $n$  = az időszakok száma  
 $i$  = kalkulatív kamatláb

Amennyiben az NPV mutató értéke negatív a beruházás veszteséges, mivel az árbevételek nem fedezik a költségeket. Nulla nettó jövedelem jelenérték azt jelenti, hogy a befektetés kifizetett minden felmerülő költséget, de jövedelmet még nem termel. Erre az időpontra térül meg a befektetett tőke. Pozitív NPV esetén a döntéshozó megítélésen múlik, hogy a tervezett jövedelem elegendő-e a befektető számára az adott időszak hozadékként.

Megtérülési idő

Tulajdonképpen az előző mutatóból származtatott érték. Megmutatja, hogy a befektetett tőke a vállalkozás működésének hányadik évében fizetődik vissza, térül meg. A mutató számítására "kézzelfoghatósága", közérthetősége miatt van szükség. A beruházás megtérülési idejét az adózott jövedelem idősorának szakaszosan halmozott jelenlegi értékeiből számíthatjuk ki. A szakaszos halmozás azt jelenti, hogy évről-évre megvizsgáljuk, hogy a vállalkozás addig az évig termelt jelenlegi értéken számított nettó jövedelemtömege meghaladja-e a befektetett tőke jelenértékét. Abban az évben térül meg a befektetés, ahol ez az egyenleg először pozitív.

Belső kamatláb - (IRR - Internal Rate of Return)

A belső kamatláb megmutatja, hogy mekkora az a kalkulatív kamatláb, amely mellett a beruházás egyszeri és a működés folyamatos költségei a bevételekből éppen egyszer térülnek meg az élettartam alatt.

Ez a fedezeti pont, ekkor még nem képződött nyereség. Ilyen értelemben a belső kamatláb a beruházás "belső" jövedelmezőségét mutatja. A befektetés annál jövedelmezőbb minél magasabb a belső kamatláb. A beruházást akkor érdemes megvalósítani, ha annak belső

kamatlába meghaladja a számításokban alkalmazott kalkulatív kamatláb nagyságát. A beruházás kölcsönből történő megvalósítása esetén, a belső kamatláb meg kell, hogy haladja a kölcsön után fizetendő kamatláb mértékét. Ilyen értelemben a belső kamatláb a beruházás hitelképességét mutatja. Számítása meglehetősen bonyolult, számítógépes iterációval végezhető el.

A belső kamatláb értéke mutató a következő összefüggés alapján számítógépes iterációval számítható:

$$\sum_{k=1}^n A_k * \frac{1}{(1+i)^k} = \sum_{k=1}^n M_k * \frac{1}{(1+i)^k} + \sum_{k=1}^n B_k * \frac{1}{(1+i)^k}$$

keressük azt az "i" értéket, ahol NPV = 0  
(a jelölések megegyeznek az előző összefüggésben alkalmazottakkal.)

Ezen alapvető mutatószámoknak létezik egy „szigorúbb” számítási módja a Módosított Belső kamatláb (MIRR – Modified Internal Rate of Return). A számítások során a nettó pénzáram pozitív és negatív elemeit megkülönböztetjük úgy, hogy az időszaki pénztöbbleteket egy „betéti-kamatlábbal”, míg a negatív értékeket egy „hitelkamat-lábbal” súlyozzuk. A fenti számítási alkalmazásával modellezhető például egy külső finanszírozással megvalósított beruházás.

A gazdaságossági kalkulációk bemutatása során felmerül néhány más tényező értelmezése is.

Ezek a következők:

- az infláció és prognosztizáció kapcsolata,
- az amortizáció kérdése és a
- kalkulatív kamatláb nagysága.

#### *Az infláció kezelése a tervezés során*

A gazdaságosság mértékét nem befolyásolja az a tény, ha az infláció következtében a ráfordítások és hozamok árai azonos arányban változnak. A gazdaságossági számításokban az infláció ilyen szempontból figyelmen kívül hagyható.

Az infláció hatásának kiszűrésére alapvetően két módszer alkalmazható:

- a bevételek és a költségek tervezésekor nem veszik figyelembe az infláció hatását, csak az arány változásokat tüntetik fel,
- a hozamoknál és ráfordításoknál beszámítják az infláció hatását, de egy inflációs ráta segítségével az infláció hatásait kiszűrik.

Az árak előrejelzései, prognózisai általában tartalmazzák mindkét tényezőt, ezért könnyebben járható útnak tűnik az infláció hatásainak kiszűrése. Amennyiben ezt nem teszik meg, az időpreferenciát alkalmazó számítások eredménye torzul. Elméletileg a kamatláb vagy diszkonttényező évenkénti növelésével az árszínvonal változás hatása kiszűrhető lenne, de az ilyen számítások módszertana még nem eléggé kidolgozott.

### *Az amortizációs költségek kérdése*

A működési költség tervezése során az a módszer a helyes, amely az amortizációs költségeket nem sorolja a beruházás tényleges működési költségei közé, így a gazdaságossági számításokban nem terheli a beruházási tervváltozatot egy olyan költség, amely valójában nem kerül elvonásra a vállalatról. Az értékcsökkenési leírás tervezése mégis szükséges, hiszen a számviteli törvény alapján ez a költség adóalap csökkentő tétel, és így a vállalkozás adózott jövedelmének kiszámításához feltétlenül szükséges.

Az amortizáció alapvető funkciója az újratermelés feltételeinek megteremtése, tehát az értékátvitel biztosítása. Az értékcsökkenési leírás gazdasági tartalma a hatékonyságtól független kategória, amelynek nagyságát az állóeszközök tulajdonságai és különböző hatásági rendelkezések határozzák meg. Költségnek sem igazán tekinthető, hiszen nem von el pénzt a vállalkozástól, hiszen újra befektethető, felhasználható. Ezért a beruházások gazdaságossági elemzésekor sem a beruházási, sem az éves üzemelési költségek között nem vehető számításba. Emiatt a beruházási döntés-előkészítés során számított éves jövedelem nagysága eltér a valóságban jelentkező mérleg szerinti eredménytől. Ez a befektető szempontjából elfogadható, hiszen a kimutatott jövedelem jelenlegi értékre számított nagysága így is reális alapja a döntéshozatalnak.

### *A kalkulatív kamatláb meghatározása*

A kalkulatív kamatláb az idő pénzértékét fejezi ki. A kalkulatív kamatláb meghatározásakor a legtöbb vállalati szakember mindig az aktuális banki hitelkamatlábát alkalmazza a számításokban, azonban annak kialakítására több lehetséges válasz is adható:

- Az előző felfogást támasztja alá az a nézet, mely szerint az alkalmazott kalkulatív kamatláb nagysága legyen azonos a fejlesztési hitelek kamatával. Így biztosítható a befektetett tőke minimális elvárt hozadéka. Ez a számítási mód egyszerű, de nem garantálja a pénzeszközök hatékony felhasználását, az eredmények reális értékelését, mivel csak alapvető követelményeket támaszt.
- Más álláspont szerint a vállalkozás teljes állóeszköz-lekötésére jutó tényleges nyereség legyen a számításokban alkalmazott kalkulatív kamatláb alapja. Ez is tulajdonképpen a minimál kamat, amely csupán azt fejezi ki, hogy a tervezett beruházás legalább a jelenlegi eszközparkkal azonos eszközarányos nyereséget adjon (amely összességében biztos, hogy nem optimális hatékonyságú).

A szakmailag helyes válasz az, hogy maximális jövedelem elérése legyen a számításokban alkalmazott kalkulatív kamatláb alapja.

A kalkulatív kamatláb nagyságát a legjobb beruházási, befektetési lehetőség egységnyi lekötött eszközértékére számított jövedelemszintje alapján kell meghatározni.

Ez a maximális jövedelmezőségre törekvő módszer a tervváltozatok egy részét túlzottan leértékelheti, gazdaságtalannak mutathatja. A szigorú értékelésnek azonban nagyobb biztonságú tervezés az eredménye.

### *Az időpreferencia a számításokban*

Az időpreferencia figyelembevételével és az anélkül készült elemzések, számítási eljárások alapvetően eltérő eredményt adnak. Ennek oka, hogy a statikus számításban a dolog

természetéből adódóan az időben később jelentkező pénzüsszegeket a maiakkal azonos súllyal értékelik. A különböző időpontokban jelentkező pénzüsszegek (kiadások és bevételek) közvetlenül nem hasonlíthatók össze ezért időbeni súlyozás szükséges, amely során az azonos időpontra számított pénzüsszegek (jelenlegi vagy jövőbeni értékek) összevethetők, belőlük mutatószámok képezhetők. Tehát a folyó áron történő értékelés önmagában nem értelmezhető.

Sokan elkövetik azt a hibát a számítások során, hogy leegyszerűsítik a problémát és a befektetett tőke megtérülési idejét a következőképpen kalkulálják:

**1. Táblázat:** Adatok a megtérülési idő számításához (adatok ezer Forintban):

Évek	0.	1.	2.	3.	4.	5.	6.
Befektetés	-100	0	0	0	0	0	0
Hozamok	0	20	20	20	20	20	20

*Forrás: saját feldolgozás*

Hibás számítás:

A 0. évben tehát most 100 egységnyi tőkét (adózott jövedelemből) befektetünk a következő öt év (adózott) hozama éppen 100 egységnyi, így a befektetett tőke öt év alatt megtérül.

Az ilyen következtetésre jutó befektető ott követi el a hibát, hogy nem veszi figyelembe az idő pénzértékét, így a befektetett tőke elmaradó hasznát. A befektetett tőke a legegyszerűbb esetben, bankban lekötve vagy más vállalkozásba fektetve hozadékot eredményezne. Ugyanígy nem termel eredményt az időben később – hozamként – jelentkező pénzüsszeg sem.

Helyes számítás:

Az időben jelentkező pénzüsszegeket azonos időpontra, általában jelen értékre számítjuk át. A számítások során a következő összefüggést alkalmazhatjuk:

$$P_0 = \sum_{k=1}^n P_k * \frac{1}{(1+i)^k}$$

ahol  $P_0$  = a pénzügyi idősor jelenlegi értéke  
 $P_k$  = az adott időszakban esedékes pénzüsszeg  
 $k$  = az adott időszak száma  
 $n$  = az időszakok száma  
 $i$  = kalkulatív kamatláb

A számításban szereplő  $\frac{1}{(1+i)^k}$  tagot diszkonttényezőnek nevezzük. Az összefüggés vizsgálatakor belátható, hogy ha a kalkulatív kamatláb értéke ( $i$ ), vagy az időszakok száma ( $k$ ) nő, akkor a diszkonttényező értéke egyre kisebb 0 és 1 közötti szám lesz. Az adott időszakban esedékes pénzüsszeget meg szorozva ezzel az 1-nél kisebb számmal önmagánál kisebb jelenlegi értéket kapunk. Így valósul meg a diszkontálást jelentő "leértékelés".

A számítások elvégzése után a következő eredményt kapjuk:

**2. Táblázat:** Megtérülési idő számítása jelenlegi értékek alapján (adatok ezer Forintban)

Évek	0.	1.	2.	3.	4.	5.	6.
Beruházási költség	-100	0	0	0	0	0	0
Beruházási költség jelenértéke	-100	0	0	0	0	0	0
Hozamok	0	20	20	20	20	20	20
Hozamok jelenértéke	0	17,39	15,12	13,15	11,44	9,94	8,65

*Forrás: saját feldolgozás*

A kalkulatív kamatláb értékét jelen esetben 15%-ban, azaz 0,15-ban határoztuk meg. A befektetés jelenlegi értéke -100 egység, a hozamok jelenlegi értéke 75,69 egység, ebből következően a befektetett tőke nem térül meg az előző statikus számítás eredményeképpen kapott öt éves időszak alatt. A fenti példa alapján megítélhető, hogy milyen mértékű tévedés lehetőségét rejt magában az időtényező figyelmen kívül hagyása a számításokban.

### **Érzékenységvizsgálatok**

Az érzékenységvizsgálatok<sup>2</sup> célja annak megállapítása, hogy a tervezés pontatlansága, a bekövetkező változások milyen mértékben befolyásolják a beruházás gazdaságossági számítások eredményeit.

Az érzékenységvizsgálatok segítségével meghatározható a beruházási tervváltozat stabilitása. A módszer segítségével három alap paraméter változásának az eredményre gyakorolt hatása vizsgálható.

- A beruházási költség,
- a várható működési költségek és a
- prognosztizált árbevétel.

Az érzékenységvizsgálat nem más, mint a beruházás-gazdaságossági mutatók sorozatos számítása majd táblázatba rendezése.

Ezek alapján a következő táblázat-párok készülhetnek:

- árbevétel - működési költség,
- árbevétel - beruházási költség és
- működési költség - beruházási költség.

A táblázat első sorában az árbevételek, az első oszlopban pedig a működési költségek változásának százalékos mértéke került feltüntetésre. Megfigyelhető, hogy a táblázat úgy készült, hogy az eredmények szempontjából a bal felső sarok a "kedvezőtlen" (ebben az irányban nőnek a költségek és csökkennek a bevételek), a jobb alsó pedig a "kedvező" sarok.

Megállapítható a számított mutatószámok alapján egy "elfogadhatósági-nem elfogadhatósági" határvonal a táblázatokban. Minél távolabb esik ez a határ az eredeti tervszámokból származó eredményektől (a táblázatok középpontja), annál rugalmasabb illetve kevésbé érzékeny a vállalkozás a gazdasági körülmények kedvezőtlen irányú változására.

<sup>2</sup> Az érzékenységvizsgálatok lehetséges megjelenési formája a következő fejezetben található számítási példa részeként látható



Más oldalról a tervezőnek az érzékenységvizsgálatok alapján lehetősége van megvizsgálni a tervek hibátűrését. Ha a vizsgálatok azt mutatják, hogy az eredetileg tervezett alapadatok 5-15%-os eltérése megkérdőjelezi a vállalkozás gazdaságosságát, úgy a befektetőnek mérlegelnie kell, hogy a rendelkezésre álló ismeretek alapján tervezhetők-e ilyen pontossággal az adatok.

### A gazdasági számítások a gyakorlati kivitelezése

A következőkben az egyszerűsége törekedve modellszámításokon mutatjuk be a beruházások tervezésére használható gyakorlati eljárásokat. A számítások könnyebb elvégzése céljából közöljük a kalkulációkban alkalmazott Excel-függvényeket is.

### A hosszú távú tervezés a gazdaságossági számításokhoz

A hosszú távú terveket általában éves bontásban készítjük el. A cél az egyes években jelentkező beruházási költségek, valamint az árbevételek és a működési költségek alapján az éves osztalékfizetés alapját képező adózott eredmény meghatározása.

A vizsgálatok időhorizontjaként a reálisnak tekinthető időtávlatok tűzhetők ki. Általános szabályként elfogadható, hogy a beruházás élettartama, de legalább a fejlesztési hitelek futamideje legyen a beruházás-gazdaságossági vizsgálatok tervezési időtávja.

Három tartalmában különböző, de formájában azonos alapadat táblázat elkészítése szükséges. Az első a beruházási költségek, a második az árbevételek, a harmadik pedig a működési költségek számára. A táblázatok első oszlopa a jelentkező pénzügyi tételek részletes bontását teszi lehetővé. Ennek segítségével, lehet az árajánlatokat, a piacfelmérés adatait, az eddigi tapasztalatokat beépíteni a tervekbe. Az oszlopokban az egyes időszakok – példánkban a termelési évek – pénzügyi adatai kerülnek tervezésre. A táblázatok összesítő sora tartalmazza az adott időszak összes költségét, illetve árbevételet.

A következő egyszerűsített modell – a társasági nyereségadó rendszer alapján – a számítások megértéséhez, elkészítéséhez nyújt gyakorlati segítséget. (A következő táblázatok adatai forintban vagy ezer forintban kerülnek meghatározásra.)

### 3. Táblázat: Az adatgyűjtéshez használható táblázat-minta (adatok ezer Forintban)

Beruházási költségek

Megnevezés	0. év	1. év	2. év	3. év	4. év	5. év	6. év
- "A" bevétel	100						
- "B" bevétel	100	100					
- "C" bevétel	50						
<b>Összesen:</b>	<b>250</b>	<b>100</b>					

Árbevételek

Megnevezés	0. év	1. év	2. év	3. év	4. év	5. év	6. év
- "a" bevétel		300	300	350	300	500	500
- "b" bevétel		100	50	0	0	0	0
- "c" bevétel		200	300	350	400	300	300
<b>Összesen:</b>		<b>600</b>	<b>650</b>	<b>700</b>	<b>700</b>	<b>800</b>	<b>800</b>

## Működési költségek

Megnevezés	0. év	1. év	2. év	3. év	4. év	5. év	6. év
- "x" költség		200	200	250	250	250	250
- "y" költség		100	50	50	50	50	50
- "z" költség		50	100	100	100	120	120
<b>Összesen:</b>		<b>350</b>	<b>350</b>	<b>400</b>	<b>400</b>	<b>420</b>	<b>420</b>

Az adóalap számításához szükséges amortizációs- valamint hitel tőke- és kamatköltségek

Amortizációs ktg.		20	20	20	10	10	10
Tőketörlesztés		0	100	100			
Kamatfizetés		58	58	29			

*Forrás: saját feldolgozás*

Az eddig összegyűjtött, megtervezett adatok képezik a beruházás-gazdaságossági vizsgálatok alapadatait. Az ezt követő számítások az alapadatokat "feldolgozását" jelentik.

#### 4. Táblázat: Az eredményszámítás (adatok ezer Forintban)

Megnevezés	0. év	1. év	2. év	3. év	4. év	5. év	6. év
Gazdasági/üzemi eredmény		250	250	300	300	380	380
Adóalapot csökkentő tételek		78	78	49	10	10	
Adó (16%)		31	31	45	52	67	10
Adózott eredmény		219	219	255	248	313	67
Beruházás - tőketörlesztés - tartalékképzés	250	100					313
Osztalékadó alap		119	219	155	248	313	
<b>Osztalékadó</b>		<b>27</b>	<b>50</b>	<b>36</b>	<b>57</b>	<b>72</b>	<b>313</b>
<b>Osztalék</b>		<b>92</b>	<b>169</b>	<b>119</b>	<b>191</b>	<b>241</b>	<b>72</b>
Cash flow <sup>3</sup>	<b>-250</b>	<b>92</b>	<b>169</b>	<b>119</b>	<b>191</b>	<b>241</b>	<b>241</b>

*Forrás: saját feldolgozás*

A fenti a táblázatban a tervezési időhorizonra várható adózási feltételeket kell prognosztizálni, amely a dolog jellegéből adódóan meg lehetőséget teremt a tervezési pontatlanságokra, ezáltal kockázatokat rejt.

A beruházás-gazdaságossági mutatók számításának alapja az a nettó pénzáramlási idősor (net cash flow), amely a kezdeti – előzőleg adózott jövedelemből származó – investíciót és a vállalkozás működése során jelentkező osztalékokat egyesíti.

A számítások eredményeként – 15%-os kalkulatív kamatlábbal számolva – a következő értékeket kapjuk:

$$\begin{aligned} \text{Nettó jövedelem jelenlegi értéke (NPV)} &= 369 \text{ eFt} \\ \text{Belső kamatláb (IRR)} &= 52\% \end{aligned}$$

A megtérülési idő számításához további segéd táblázatra van szükség:

<sup>3</sup> Cash flow: a pénzbevételek és a pénzkifizetések egyenlege.

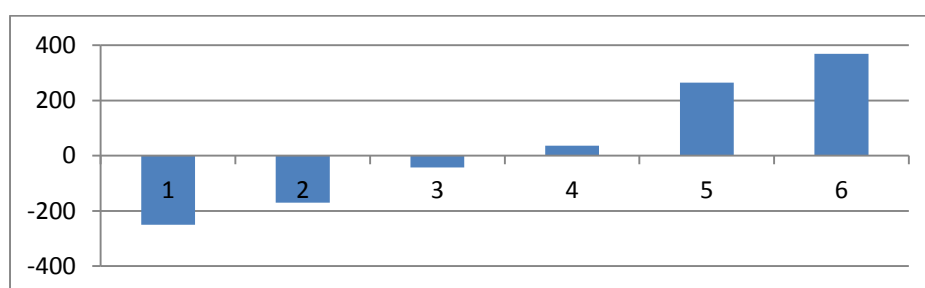
**5. Táblázat:** A megtérülési idő számításához szükséges táblázat (adatok ezer Forintban)

Megnevezés	0. év	1. év	2. év	3. év	4. év	5. év	6. év
Cash flow jelenlegi értéke	-250	80	128	78	109	120	104
Szakaszosan halmozott cash flow jelenértékek	-250	-170	-43	36	145	265	369

*Forrás: saját feldolgozás*

A fenti táblázat második sorát vizsgálva határozható meg a megtérülési idő. Abban az éven térül meg a befektetett tőke, ahol ez az érték először pozitív. Esetünkben ez a 3. év utáni időszak. Csak egész értéket szabad meghatározni – tehát nincs értelme 2,56 éves megtérülési időről beszélni, mivel a mutató tájékoztató jellegű, és az adózott eredmények – így az osztalékok is az adóév végén jelentkeznek.

A megtérülési idő célszerűen egy oszlopdiaagramon ábrázolható, ahol – a fenti táblázat alapján – az évenkénti szakaszosan halmozott cash flow jelenértékek kerülnek ábrázolásra.



**1. ábra:** A megtérülési idő ábrázolása (adatok ezer Forintban)

*Forrás: saját feldolgozás*

A számítások befejezéseként az érzékenységvizsgálatok elvégzése marad hátra. A következőkben annak egy lehetséges megjelenési formája látható. A táblázat első sorában az árbevételek, az első oszlopban pedig a működési költségek változásának százalékos mértéke került feltüntetésre.

**6. Táblázat:** Az érzékenységvizsgálatok egy lehetséges megjelenési formája (adatok ezer Forintban)

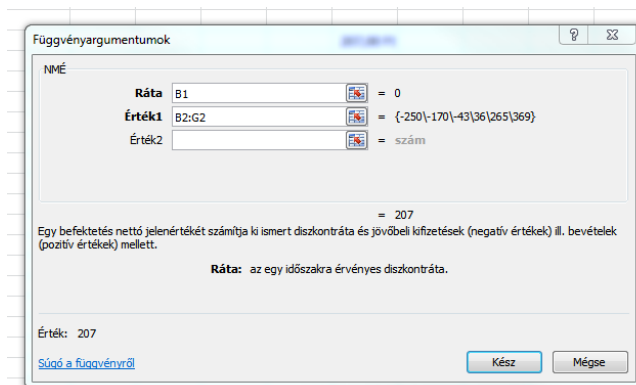
NPV	-50%	-40%	-30%	-20%	-10%	0%	10%	20%	30%	40%	50%
50%	-1.079	-878	-676	-475	-285	-104	64	230	395	560	725
40%	-965	-763	-562	-366	-181	-7	158	324	489	654	819
30%	-850	-649	-448	-259	-79	87	252	418	583	748	913
20%	-736	-534	-338	-156	16	181	346	512	677	842	1.007
10%	-621	-420	-232	-55	110	275	440	606	771	936	1.101
0%	-506	-312	-130	39	204	369	534	700	865	1.030	1.195
-10%	-393	-207	-33	133	298	463	628	794	959	1.124	1.289
-20%	-285	-105	61	227	392	557	722	888	1.053	1.218	1.383
-30%	-181	-10	155	321	486	651	816	982	1.147	1.312	1.477
-40%	-81	84	249	415	580	745	910	1.076	1.241	1.406	1.571
-50%	13	178	343	509	674	839	1.004	1.170	1.335	1.500	1.666

*Forrás: saját feldolgozás*

*A számítások elvégzésére alkalmazható táblázatkezelő függvények*

Míg a polgári-közgazdaságtan közel 100 éve alkalmazza a cikkben eddig tárgyalt fogalmakat a fenti megnevezéseken, addig a legelterjedtebb táblázatkezelő szoftver magyar nyelvű verzióiban következetesen lefordításra kerültek ezek a függvénynevek.

A Nettó jövedelem jelenlegi értéke (NPV - Net Present Value) például NMÉ nevet kapott, melyről azt írja a szoftver rövid magyarázata, hogy „Egy befektetés nettó jelenértékét számítja ki ismert diszkontráta és jövőbeni kifizetések (negatív értékek) ill. bevételek (pozitív értékek) mellett.

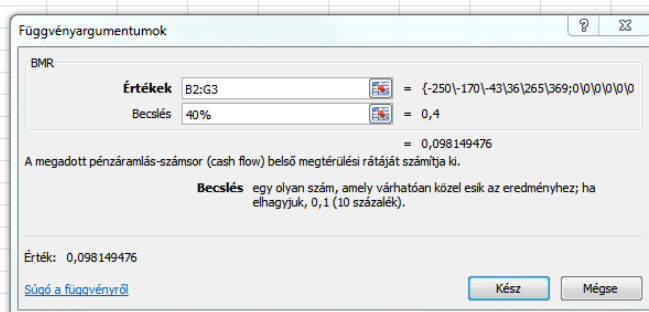


2. ábra: A táblázatkezelő NMÉ függvénye

Forrás: saját feldolgozás

A függvény paramétereiben a „Ráta” a kalkulatív kamatlábat tartalmazó cellahivatkozást jelenti, míg az „Érték1” mezőben a nettó pénzáram hivatkozás adható meg. A NMÉ függvény alkalmazásakor fel kell hívni a figyelmet arra, hogy a nettó pénzáram első értékét az adott első időszak végi értéknek tekinti, ezért az már diszkontálja.

A Belső kamatláb (IRR) vagy Belső megtérülési ráta magyar fordításban már egy kicsit szerencsésebb nevet kapott BMR-ként szerepel a szoftver függvényei között. A számításhoz ebben az esetben is a nettó pénzáram, valamint – becslésként egy kiinduló érték szükséges – amely a számítás módszertani alapját képező iteráció kezdőértékét adja meg.



3. ábra: A táblázatkezelő BMR függvénye

Forrás: saját feldolgozás

### A likviditási terv

A gazdasági számítások mindenképpen fel kell hívni a figyelmet a likviditás-tervezés fontosságára. Számtalan beruházás került nehéz helyzetbe azért, hogy míg több évre előremutató beruházás-gazdaságosági számításokat gondosan elvégezték, elmaradtak vagy elnagyoltak voltak a működtetés éven belüli finanszírozásának tevei.

A likviditási tervekben a pénzügyi befolyó pénzmennyiségek és a kifizetések szembeállítása történik. A tervezési időszakok itt éven belüliek, általában hónapok, de kritikusnak tűnő időszakokban heti- vagy dekád szintű tervezés is elképzelhető.

A fenti pénzáramokat fogalmilag el kell különítenünk az árbevételektől és a költségektől, amelyeket természetesen magukban foglalnak, de annál többet jelentenek. A befolyó

pénzmenyiségekbe az árbevételen kívül beleszámít például a visszatérített Általános forgalmi adó (Áfa) vagy a pénzintézetektől kapott hitel is, míg a kifizetések a költségeken túlmenően tartalmazhatják a kifizetett Áfa-t vagy a fizetett kamatösszegeket.

A likviditási tervek tipikus formáját a következő egyszerűsített példán láthatjuk.

### 7. Táblázat: likviditási terv minta (adatok ezer Forintban)

Induló pénzkészlet	100
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Bevételek megnevezése	január	február	március	április	május	június	...
- "A" bevétel	0	80	0	100	0	0	
- "B" bevétel	10	100	50		100	100	
- "C" bevétel	50	0	0	0	100	50	
<b>Összesen:</b>	<b>60</b>	<b>180</b>	<b>50</b>	<b>100</b>	<b>200</b>	<b>150</b>	

Kiadások megnevezése	január	február	március	április	május	június	...
- "X" kifizetés	0	60	0	100	0	0	
- "Y" kifizetés	10	0	200	50	100	100	
- "Z" kifizetés	30	60	0	0	0	0	
<b>Összesen:</b>	<b>40</b>	<b>120</b>	<b>200</b>	<b>150</b>	<b>100</b>	<b>100</b>	

	január	február	március	április	május	június	...
Havi likviditási egyenleg	120	60	-150	-50	100	50	
Halmazott likviditási egyenleg	120	180	30	-20	80	130	

*Forrás: saját feldolgozás*

A likviditás tervezésénél a halmazott likviditási egyenleg számítása szükséges. A fenti példából látható, hogy a tervezési időszak elején rendelkezésre álló un. induló pénzkészlet hozzáadódik az első időszakban jelentkező bevételekhez. A havi likviditási egyenleg az időszakonként befolyó és a kifizetésre kerülő pénzeszközök állományának különbözete, amely lehet pozitív, nulla vagy negatív. A finanszírozhatóságról a halmazott likviditási egyenleg tájékoztat. Amennyiben ez az idősor negatív értéket vesz fel, úgy abban az időszakban likviditási probléma merül fel, ekkor az egyes tételek átütetéseivel vagy hitelfelvétellel oldható fel az ellentmondás. A tervezés során nem ajánlatos az adott időszak halmazott egyenlegét nullára vagy ahhoz nagyon közeli értékre tervezni, hagyni kell némi tartalékot a bekövetkező változások esetleges kedvezőtlen hatásának kivédésére.

A likviditási terveket gördülő tervként minden időszak tényállapotának ismeretekor aktualizálni kell, így biztosítható a működés folyamatos kontrollja.

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## USING OF LEAN TOOLS IN REVERSE LOGISTICS (LEANVERSE LOGISTICS?)

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### **Abstract**

Lots of manufacturer base their process planning on lean principles. A straight way of supply chain could use lean tools efficiently. What about reverse orientation of supply chains? Reverse logistics is one of the most remarkable pivot of reverse way supply chains. To form best and useable practices we may have should use proper lean tools. If it realizable at all...

In my paper I ask for those conditions, elements, parts which are responsible for a well working reverse supply chain based on lean tool using systems. Which are the future effects if we use the proper lean tools? What are the consequences of a reverse supply chain works without lean tools.

**Keywords:** *leanverse logistics, reverse supply chain, bottleneck effect, waste management, sustainable waste management.*

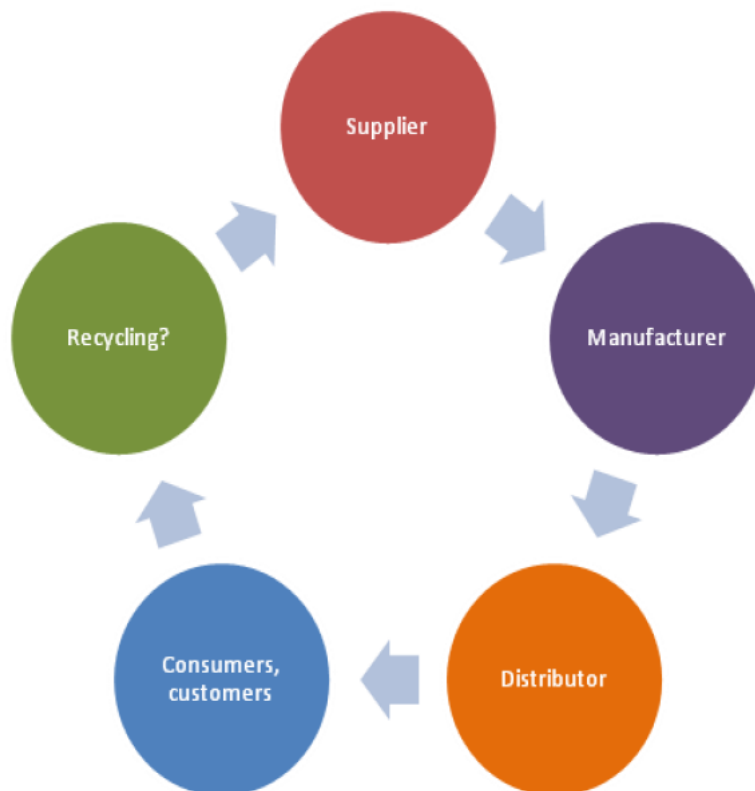
### **Introduction:**

All of consumer search for perfect products. So, products have huge challenge to match every other consumers demands. To match most of demans products need to be procedure by much principles. By these principles products could match more demands of consumers. Efficient use of these principles is much harder than we thought.

Straight way of supply chains are ruled and determined. A manufacturer create product from different materials, components, parts by adding extra work and knowledge. Product heads to the next step. It might be different ways. Products could be reshared by retailers or distributors to consumers or customers.

The logistics activities are the base chain links between the main components. We couldn't exist without these activities. Supply chain components could not communicate orconnect each others without logistics activities. To make a complete supply chain we need to handle one more components. Recycling is the last part of the chain but the promising to develop in (Pónusz, 2013).

According to the first graphic, recycling able to connect to consumers and suppliers. By several logistics activities recycling should connect to other elements of supply chains to prove its reliability.



**Fig. 1. : Straight way of Supply chains**

*source: made by own*

## Methods

In my opinion the recycling element of supply chain not the best way to express itself. If there are some of customers who deal with the sustainable waste management that doesn't mean they do recycling. The better expressions we could pick from hierarchy of waste management. It's been presented on the second graph.

So, there are much more way to get connect between consumers and suppliers. There are reuse, recyle and recover. In my opinion these are the three option where reverse logistics activities could help the improvements of supply chain. Both ends of pyramid are too extreme for logistics.

There is a hard way to reduce the sources which are used for consumer products. It is not a goal for logistics area. We should start this think way earlier. And it is too philosophical. We are living a society which is mostly based on consumption. There are nothing to do against it. We have to live with this fact. We need to accept that variation of logistics acativities can not reduce the mount of consumpt.



**Fig. 2. : Pyramid of waste management**

Source: <http://releases.jhu.edu/wp-content/uploads/2011/09/pyramid-royce-low-res-1024x629.jpg> downloaded: april 15., 2015. search engine: google.com, keywords: waste management

The other end of pyramid is the disposition. It is the least preferable option to treat a used product. It is just a last option. There are kinds of materials which contains that kind of materials, components which could threat the environment. These products contains dangerous or hazardous substances like below (RoHS Directive 2002/95/EC): lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyl, polybrominated diphenyl ether.

One of the options remove hazardous substances and prepare products to reuse or recycling. If it even possible. The other option split the substances then we just need to dispose those which was infected or contaminated. At these options logistics activities can only support not to change the way those work or make huge attraction on them. These may could be like: transporting, forwarding, collecting, commissioning, storing.

Logistics services at these case could only work as a slave function. I have this opinion because the logistics services just an adaptive area not the determinative one. We use sources and create waste and logistics services just a follower. It can not become a master or leader factor.

At the case of reuse, recycle or recover logistics services could appear in another role. First of all there is lot of way to use logistics services to change the awarding of reuse, recycle and recover. Rest of my paper I mean reuse, recycle, recover as one unit and I call them RRR ways. The RRR ways are the main areas where logistics activities need to focus on. What kind of logistics services we can talk about: collecting, separating, forwarding.

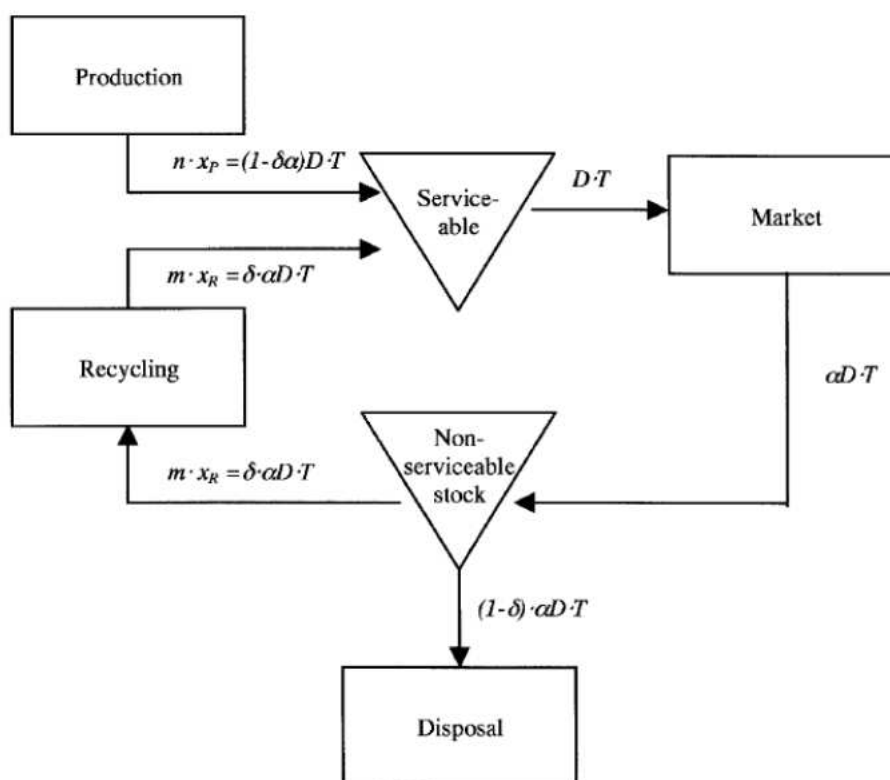
These logistics services can get more influences on RRR ways. These could change the way how people handle waste management. If logistics activities get easier to use or apply for their



lifet then reuse, recycle and recover of junk, trash, unused products, used products could work more efficiently (Fleischmann, 2000).

People enjoy easy life. Collecting and separating used products is not an easy act. So, most of them doesn't apply for their life. They consider it as an extra act what doesn't earn what is costs. Because it need much more energy and attention to do this in a proper way. So they just put the whole thing sideway. If would be an easier to do ways they probably use those. There is a possibility for logistics services to improve.

In my thesis I deal with the modelling of transporting at EEE (eletronic- and electrical equipments) products. There is a figure by Imre Dobos who create a modell of recycling in a sealed circle. I represent on the third figure.



**Fig. 3.: The material flow in the model in a production and recycling cycle.**

source: <http://edok.lib.uni-corvinus.hu/27/1/Dobos3.pdf> downloaded: april 16., 2015. search engine: google.com, keywords: Dobos, model, Richter

As we can see ont he third figure Dobos (Dobos, 2006) handle the material flow in a sealed way. This means the used materials/products have two options. If it serviceable then get ahead of market. If it not serviceable then it get disposal. It is works in a sealed way because the serviceable parts are get back to the manufaturers. At case of EEE there is another outcome. EEE contains too much components, materials to get back all of them to the original equipment manufacturers to reuse (Rubio, Jiménez-Parra, 2014). At the case of EEE there is a 3rd party unit who get involve. They may prepare used products to reusing or the recycling in another ways. Reusing used product could end in two outcomes. They can create energy by calcination or can create raw materials to other products.

To reach the goal which is the sustainable waste management the transporting, collecting, separating of EEE should be well served. To get well served status reverse logistics could use lean principles.

Lean principles get well known in manufacturing areas. The past goal was to reach a lean or leaner producing or manufacturing method.

Gyenge et al. (2015) conclude „that the applicability of Lean is determined by the character of the process and not by the industry. ... The improvement can be successful in any sector although the tools should be adapted to the special features of the industry and the organization, and the thinking methodology described above should be integrated into the organizational culture. To the success and maintenance of Lean transformations there is a need for an organizational culture ready to accept the new approach.”

In my opinion other areas of supply chains could apply those principles. Let me present a couple of those.

### **Results & Discussion**

The reverse logistics is the last link between consumers and suppliers. So the optimal point of the logistics system depends on the optimal point of reverse logistics system. So the question is how we can apply lean tools in reverse logistics ?

It is not an easy task. Let's create a version using ECRS (eliminate, create, rearrange, simplify) tool. We could eliminate the unnecessary transports, duplicity in forwarding, amount of unloaded runs. We could combine the collecting of matching used products, energy retrieval from different products, locations of collector lots. We could rearrange reallocation of made energy, storing of retrieved materials, reuse of retrieved materials. We could simplify recording of communal wastage, transmitting of wastage, tendency of waste management in population.

The other lean tool what I mention is the bottleneck effect. A supply chain could be as wide as the tightest element of its. So bottleneck effect could affect the whole logistics system. If the bottleneck effect shows at reverse logistics then it needs to solve the problem there. First of all we have to identify those spots in the process. What could be these spots? It is hard to define the common ones. Because every other process has different parameters. But I tried to name a few ones. Those might be the vehicles which depends on their capacity, the capacity of used product shredders, collecting tendency of people, the unintegrated waste management, the disposal of used products, the storing of retrieved energy, the resharing of retrieved energy, the rebuild-in of inhomogeneous materials to products.

### **Conclusion**

To conclusion there is a hard way to apply lean tools just for reverse logistics. If we really want to use lean tools efficiently we just have to apply the entire length of supply chain because it is the only way to avoid bottleneck effects or system desoptimisations.

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**FINANCING SMES – PROSPECTS IN HUNGARY****(<sup>1</sup>) Mester Éva, (<sup>2</sup>) Tóth Róbert**

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**Abstract**

After joining the EU, micro, small and medium enterprises came to the focus of attention in Hungary for their grandiose role in both employment and producing added value. Due to their flexibility, creativity and adaptability SMEs find new market opportunities easier. Also, SMEs can find their way and seize appearing opportunities more quickly under rapidly changing, insecure and high-risk circumstances.

When analysing the sector, besides the investigation of the external environment, it is also important to focus on internal factors. The success of businesses is not only influenced by their access to financial resources, but also by their internal organisational structure and the standard of their organisational culture. In the present phase of world economy, when transports are delayed, credits are harder to obtain and companies downsize, leaders have to make careful and considerate management and operational decisions. Thus financial decisions have considerable short and long-term effects on the success of business operation.

This research paper aims at a comprehensive study of the present situation of the Hungarian SME sector, some of its financing opportunities, as well as factors that hinder its development. Another purpose of the present writing is to lay the theoretical foundations for questionnaire primary research exploring the financing characteristics of SMEs in Hungary.

**Keywords:** *small and medium enterprise, competitiveness, financing*

**JEL classification:** *G3*

**Introduction, the timeliness and complexity of the topic**

In Hungary the concept of small and medium enterprises (SMEs) is defined by the Act XXXIV of 2004. Thereby those enterprises belong to this category, where the number of employees is maximum 249, the annual net sales revenue does not exceed 50 million euros, or the balance sheet total does not exceed 43 million euros, and the capital or voting rights share the state or any local self-government holds, either directly or indirectly and either solely or jointly, does not exceed 25% (Szerb, 2008). The statistical limits are based on headcount categorisation. Pursuant to this categorisation, entities with a number of employees no more than 49 qualify as small enterprises – within this category are micro enterprises with a headcount of less than 10 -, whereas enterprises with a headcount of 50-249 are regarded as medium-size. In Hungary the enterprise sector is dominated by micro, small and medium-size enterprises, the micro enterprise prevailing. The economic status of SMEs has increased, which is mainly caused by corporations outsourcing tasks in order to cut costs. The majority of suppliers are smaller and more flexible enterprises. These companies can identify market opportunities quickly and are quick to react to changes. For doing so there is a need for enhanced efficiency and the development of an adequate strategy, i.e. their success requires an existing management (Gyenge, Buresch and Kozma, 2013). Although SMEs started out in the local economy, more

precisely in the retail service sector, recently they have appeared in the field of innovative business services. These are mainly network-based enterprises entering the global market. The SME sector plays an important role in the production of the state's income, in foreign working capital, in investment, and, from a social point of view, in job creation and employment.

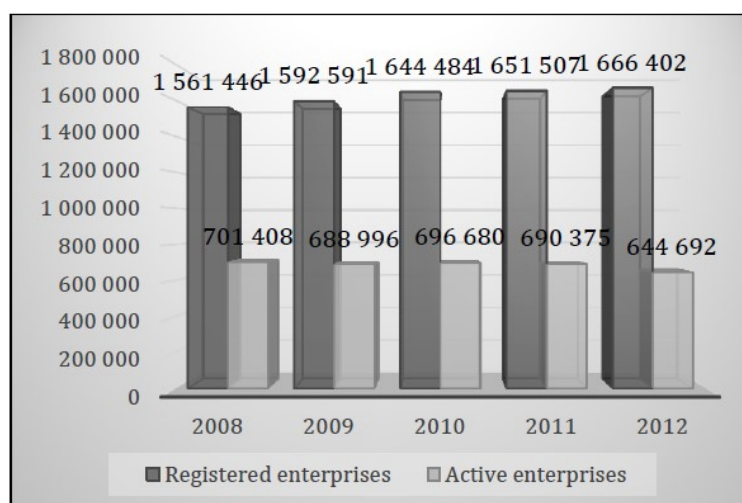
### Material and Methods

The aim of this study is to show, based on secondary sources, the role small and medium companies play in Hungary's economy and socio-political target system at present. The study includes a thorough analysis of academic sources, through which practical processes are examined. This study is the first step in an ongoing research project, serving as a basis for a primary research whose aim is to explore the current financing situation and problems of micro, small and medium enterprises in Hungary.

### SMEs in Hungary

In Hungary SMEs constitute the bulk – 99.8% – of active enterprises. The SME sector plays an important economic role in the production of the state's income, in foreign working capital, in investment, and, from a social point of view, in job creation and employment. Following the Recession of 2008 the Hungarian SME sector could not gain strength. From 2009 to the end of 2012 the branch was lacking in force, however, since 2013 there has been a slight growth. The SME sector was hit worse by the recession than large enterprises. The headcounts in the SME sector is about level with the 2008 numbers. SMEs provide jobs for about 2 million Hungarians, amounting to 73% of overall employment. The number of staff employed in the sector had seen a dynamic increase in the 1990s, after the millennium this tendency slowed down and in fact it halted, thus SMEs could not exert a stabilising effect on employment.

Figure 1. shows the change in the number of registered and active enterprises in Hungary between 2008 and 2012. It is apparent that active enterprises account for the half of actually registered enterprises. Numerically, it means that in 2005 1.208.780, whereas in 2013 1.688.169 enterprises were registered in Hungary, which translates to 40% increase. However, the number of actually active enterprises was 707.756 in 2005 and 656.458 in 2012. After the year following the Great Recession figures show a decreasing tendency. Thus, there is significant difference between the two categories, as shown in the figures below.



**Figure 1. The number of registered and active enterprises**

Source: [http://www.ksh.hu/docs/hun/xstadat/xstadat\\_eves/i\\_qpg001.html](http://www.ksh.hu/docs/hun/xstadat/xstadat_eves/i_qpg001.html) [2 April 2015]

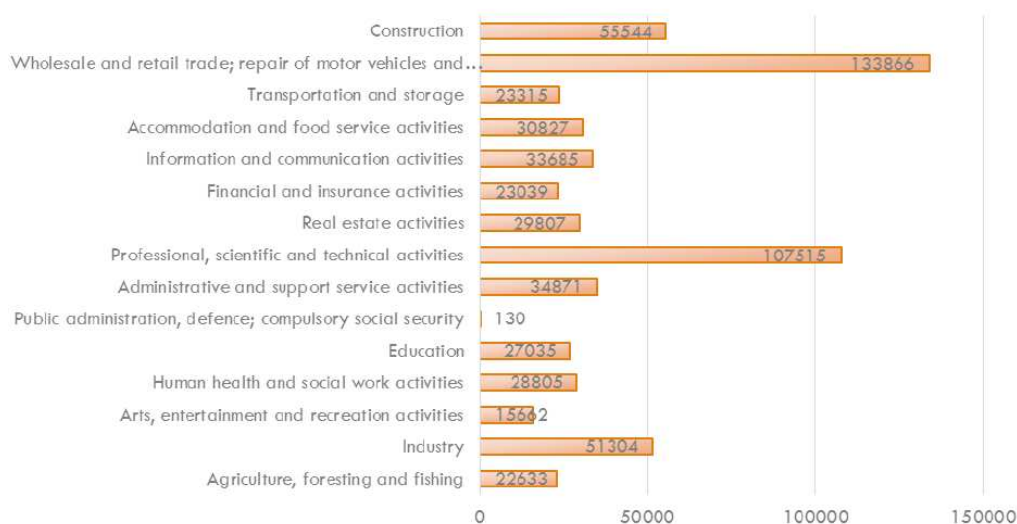
**Table 1. The number of active enterprises per region**

	2005	2006	2007	2008	2009	2010	2011	2012
<b>Central Hungary</b>	273 283	271 965	270 786	277 680	274 673	279 430	279 916	264 486
<b>Central Transdanubia</b>	73 886	72 161	71 177	71 403	69 703	70 153	69 077	63 504
<b>Western Transdanubia</b>	70 597	69 592	68 820	69 457	68 409	69 034	68 111	62 221
<b>Southern Transdanubia</b>	61 686	60 432	58 878	59 825	58 644	59 352	58 077	53 558
<b>Northern Hungary</b>	63 306	61 696	60 703	61 091	59 461	59 280	58 234	54 081
<b>Northern Great Plain</b>	82 696	81 515	78 942	81 170	79 446	80 067	78 868	73 760
<b>Southern Great Plain</b>	82 302	80 785	78 752	80 782	78 660	79 364	78 092	73 082
<b>Total</b>	<b>707 756</b>	<b>698 146</b>	<b>688 058</b>	<b>701 408</b>	<b>688 996</b>	<b>696 680</b>	<b>690 375</b>	<b>644 692</b>

Source: [https://www.ksh.hu/docs/hun/xstadat/xstadat\\_eves/i\\_qvd004b.html](https://www.ksh.hu/docs/hun/xstadat/xstadat_eves/i_qvd004b.html) [2 April 2015]

Table 1. shows the distribution of active enterprises between 2005 and 2012 in Hungarian regions. The sector is substantially determined by regional concentration as shown by the fact that 41% of active SMEs – 4 out of 10 – is concentrated in Central Hungary. The other regions contribute at similar rates.

Figure 2. shows the distribution of active enterprises in different branches of economy. The SME sector in Hungary is dominated by the service industry (approximately 80%) . Most of them – 133.866, making up 21% of all enterprises – operate in trade.

**Figure 2. The number of active enterprises per economic branches (2012)**

Source: [http://www.ksh.hu/docs/hun/xstadat/xstadat\\_eves/i\\_qpg008.html](http://www.ksh.hu/docs/hun/xstadat/xstadat_eves/i_qpg008.html) [02 April 2015]

Under the heading Industry I categorised manufacturing, food, mining, pharmaceutical industry, chemical industry, textile, wearing apparel, leather, and leather goods industry, making up altogether 8% of active enterprises. Construction is highlighted as a separate heading, since it operated 55.544 enterprises in 2012, surpassing the aforementioned 'industry'. Together they account for 16.6% of the total number. Enterprises engaged in professional,

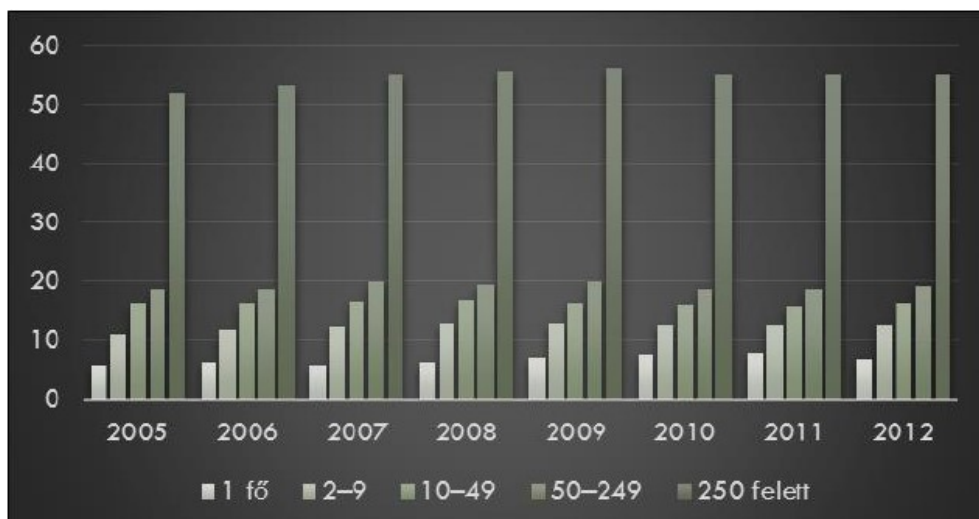
scientific and technical activities are also worth mentioning, for, in 2012, more than 107 thousand enterprises were operated in these areas. These enterprises pursue their activities based on substantial knowledge, moreover, they are the ones capable of undertaking innovative activities. Innovation plays (should play) an important role in national economy since at present those countries are able to grow which compete with their innovation, research and development, ultimately, using knowledge. In Hungary this trend is not prevailing (Kállay, Kissné, Kőhegyi and Maszlag, 2005). Hungary can be regarded as an ‘assembler’ country due to the operation of car factories, which cannot serve as a basis for permanent growth and long-term competitiveness.

### ***The role of SMEs in employment and economy***

SMEs’ significance in economic policy is mainly due to their importance in employment. It is highlighted by the fact that they contribute considerably to employment: 71.4% of Hungarian employees work for SMEs [NEMZETGAZDASÁGI MINISZTERIUM,]. This fact is underlined by the idea appearing in multiple articles of Organisation for Economic Co-operation and Development (OECD) saying “small enterprises are the most important sources of innovation, growth and job creation” (OECD Economic Surveys Hungary, 2014). Therefore, a heavier emphasis should be placed on the enterprise sector, and more specifically on SMEs as major job creating forces (Kállay, 2012). Measures undertaken by the government are needed as results can only be attained by the co-operation of the 3Ks, the government, the central bank and the SMEs (the 3 ‘Ks’ refer to the Hungarian name for the three partners). The classification of enterprises is usually based on headcounts (Béza and Csubák, 2005). In Hungary the number of enterprises in the size-categories between 2006 and 2012 was as follows.

Each size-category based on headcounts is dominated by micro enterprises employing maximum 9 people in every region. The ratio of bigger companies only reaches 5% in Central Hungary and the Southern Great Plain. SMEs mainly provide services, which has an influence on their efficiency, and their capacities in investment and employment. In 2012 there were altogether 28 thousand SMEs operating on foreign capital in Hungary. Regional concentration is even more significant among them: 70% of them work in Central Hungary, and two thirds of foreign capital investment is also concentrated here.

The SME sector is one of the most important contributors of Hungarian economy. As can be seen from the previous section, they play a vital part in employment, besides, have a major role in economic performance. It is underlined by data from the Hungarian Central Statistical Office (HCSO) showing that SMEs produced 54% of GDP in 2007, 55% in 2009 and 56% in 2011. Therefore, it can be seen that SMEs produce the half of the GDP with micro, small and medium enterprises contributing in the same proportion. According to 2014 November data from the HCSO, in 2012 SMEs produced almost 45 billion HUF turnover, which is 58% of the output in the whole of the entrepreneurial sector. Compared with 2011 data, SMEs’ income increased in every region, with the exception of Northern Hungary and Southern Transdanubia. Enterprises produced 70 million HUF on average, which increased in direct proportion with their size. Although their turnover exceeded the 2011 results, they spent less on investment. In 2012 the scale of investments reached 1450 billion HUF, which accounts for 46% of investments in the enterprise sector. Except for Central Hungary, SMEs centred their investments in three branches: industry, agriculture and trade.



**Figure 3.: GDP contribution per size-category**

Source: *A kis- és középvállalkozások helyzete Magyarországon, KKV Évkönyv 2012, Budapest, 2012*

Figure 3. shows GDP contribution per size-category. It is established that in the time interval in question there was no significant change in the production of gross value added (GVA). GDP contribution also rises in proportion with the increase in company size. SMEs' GDP contribution has not decreased since the recession, a minimal increase can be realised. Even a stagnant contribution could be viewed as exceptional under such turbulent economic conditions. However, the situation dramatically changes if we consider that more than 70% of the employment is concentrated in this sector. Based on branch distribution 60% of the GDP was produced in the service sector. Trade plays a less dominant role with only 18-20% of SMEs' economic performance in 2012. SMEs share in enterprise generated revenues surpassed 60% between 2001 and 2010, with the exception of two years. Since 2011 this value has slightly decreased, in 2012 the total turnover produced by small and medium companies being just above 58%. When discussing SMEs' economic power their role in export has to be taken into consideration as well: they make up one third of export (Walter, 2014).

### ***Hungarian SMEs in international comparison***

SMEs play an important role not only in Hungary, but also in the European economy. More than 20 million SMEs are operated in the EU employing 87 million people. It has to be emphasised that in certain branches, such as construction, textile and furniture industries, and today logistics have to be included as well, employment rate reaches or even exceeds 80% [EUROPEAN COMMISSION, 2014]. In 28 EU countries the majority - 93% - of enterprises is a micro company, making up 30% of employment and producing 17% of turnover (Table 2.). In contrast, large companies represent only 0.2% of enterprises, with 33% in employment and 44% in turnover. In 2011, in every EU member state, a significant number of companies belonged to micro-sized enterprises. Small and medium-sized companies were represented at the highest rate in Germany (18%), Romania, Luxemburg (13%) and Austria (12%), whereas the fewest number were in Slovakia (4%). Large companies make up at about 0.5% in each member state. SMEs contributed 5% on average to the gross value added at factor cost produced by European enterprises, which is 4 percentage point more than in Hungary. In terms of employment we can talk about a reverse process, in Europe SMEs averaging at 67%, while the number being above seven-tenth in Hungary.



**Table 2. Distribution of small and medium enterprises based on categories**

	Micro enterprise	Small enterprise	Medium enterprise	$\Sigma$ SMEs	Large enterprise	$\Sigma$ Enterprises
<b>Number of enterprises (units)</b>	19,969,338	1,378,374	223,648	21,571,360	43,517	21,614,908
<b>Rate of enterprises (%)</b>	92.4%	6.4%	1.0%	99.8%	0.2%	100%
<b>Number of employees (capita)</b>	38,629,012	27,353,660	22,860,792	88,843,464	44,053,576	132,897,040
<b>Rate of employment (%)</b>	29.1%	20.6%	17.2%	66.9%	33.1%	100%
<b>GDP (%)</b>	21.6%	18.2%	18.3%	58.1%	41.9%	100%

Source: Eurostat, National Statistical Offices and DIW Econ [02 April 2015]

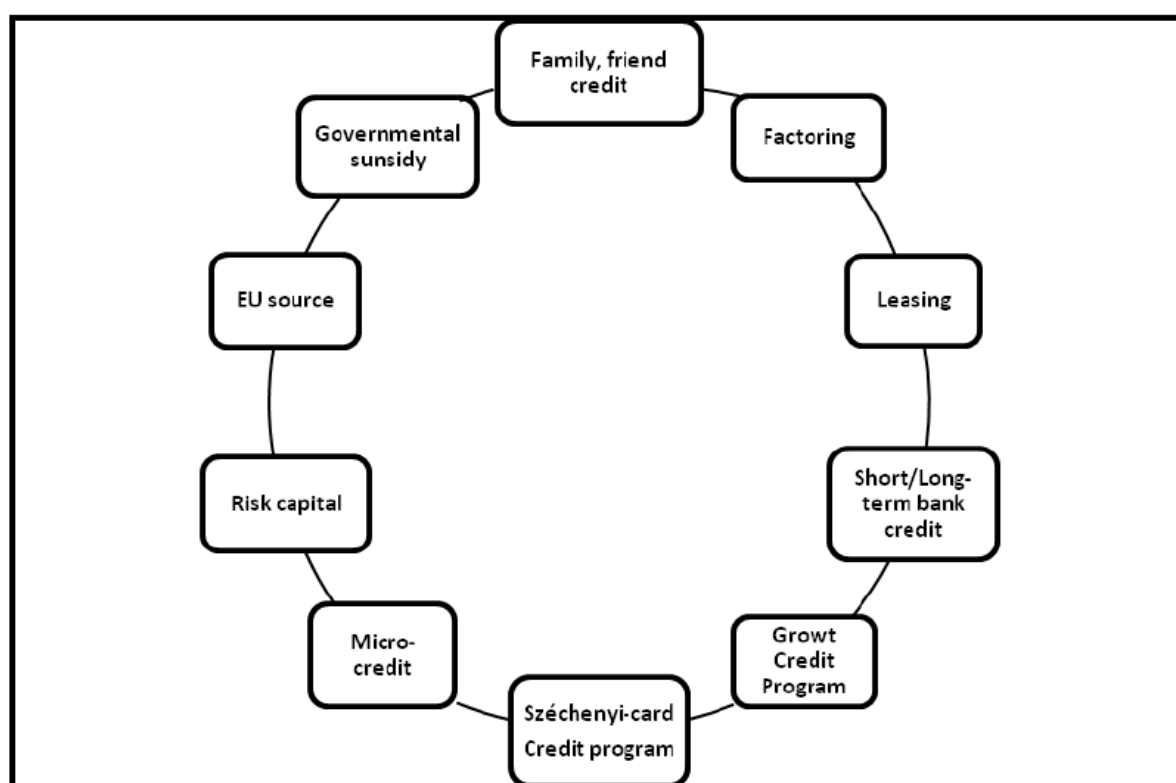
Taking turnover, gross added value and employment into consideration, small and medium enterprises play the biggest role in Estonia, while their significance is the lowest in the UK - comparing countries that have reported data. If we compare Hungary with neighbouring countries, SMEs' contribution to GVA is higher in four of them. Considering employment, SMEs play at about the same or even more important role in Slovakia and Slovenia, but much less in Romania.

In 2011, the majority of SMEs were micro companies employing maximum 9 people in all member states in question, the number of companies with minimum 10 people approached or exceeded 10% in 7 countries (the three Baltic countries, Austria, the UK, Luxemburg and Romania). The latter number was 5.1% in Hungary, which was the 5th least among reporting countries and significantly less than the EU-28 average, 7.3%.

To sum up, the management of Hungarian SMEs is characterised by high employment but low capital-intensity, but the greatest problem is effectiveness. In Hungary employment is significantly higher in micro enterprises, whereas it is smaller in large companies. In EU-27 countries SMEs contribute more to GVA, while large companies contribute the same amount less. The biggest difference appears in productivity: in EU-27 countries average productivity is three times higher than in Hungary. Productivity gap is the highest for micro enterprises and the lowest for large enterprises. Similar to the international trend, in the Hungarian SME sector, the size of businesses is positively correlated to every major indicator of competitiveness, large businesses have a higher capital-intensity, their employees and leaders are more highly qualified, they generate innovation more often, spend more on research-development, have better access to sources of financing and show better specific result indicators. Therefore, the future development of the Hungarian SME sector requires the transformation of the size-structure and the growth of average business size. Given a stable regulatory environment, an effective application of direct investment and employment incentive, the chances for growth are the highest in the SME sector if businesses are subsidised by both capital market and bank financing schemes with adequate state participation in an adequate regulatory environment.

### ***Main financing source for the small and medium-sized enterprises***

In spite of the fact that the small and medium-sized enterprises play important role in every national economy, they must face several hardships. The most serious problems are the lack of capital and the access to financing sources. In this chapter of our study we analyse these problems and turn the attention to some possible solutions. Our paper is forerunner of an actual research work presenting some expectable results. Following a group of questions concerning the basic data of the company (size, branch, economical data, structure of ownership, etc), the primary survey research discovering the financial characteristics of the Hungarian small and medium-size enterprises gathers data from the companies concerning the financing experiences and touches upon the objective and subjective assessment of the Growth Credit Program from the point of view of the companies as well. The external sources are grouped into forms shown in Figure 4.

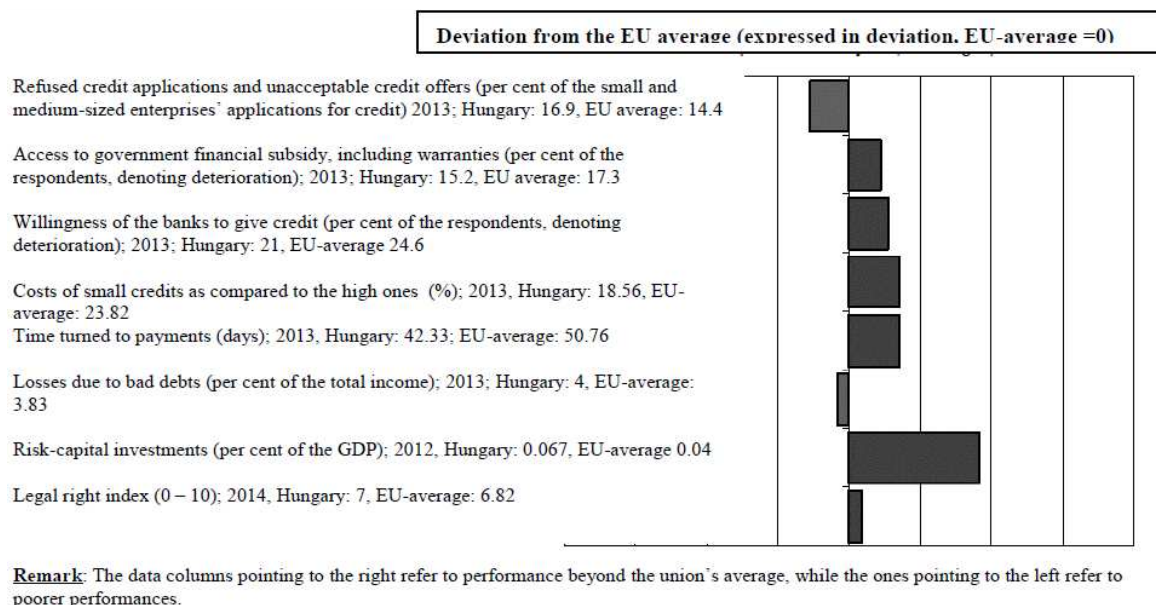


**Figure 4. Grouping the external financial sources**

*Source: own edition, 2015*

From among the external sources, the small and medium-sized enterprises may obtain government supported external subsidies in the form of non-reimbursable subsidies, credits and – in certain cases – warranties. We do not want to forecast the results of the survey, but it seems to be reasonable that among the external sources the dominance of the bank-credits in the analyses of the respondents will not change, if the goal is the enhancement of efficiency. The finance related decisions shall aim at the finding of sources required to the maintenance of the continuous liquidity and solvency to minimise the company's weighted capital costs and the harmonisation of the maturity structures of the assets and sources, i. e. short-term liabilities should face short-term sources and the long-term investments should be implemented from long-term sources. Among others, the obtainable balance sheet earnings, the company's ability to pay dividend, the capital structure, the need of foreign sourcing, the often paid corporation

tax and the probability of bankruptcy depend on the company’s financial policy [Csubák K, 2003]. The chapter of the SBA-information bulletin (2014) dealing with the access of the Hungarian small and medium-sized enterprises to financial sources paints an interesting picture. Concerning the access to financial sources by small and medium-sized enterprises, Hungary’s performance corresponds to the union’s average (Figure 5.). However, concerning the majority of the individual parameters, Hungary failed to make improvements. The relatively better position beyond the union’s average is only due to the significant deterioration of the financing in the other member states and partly to the concrete constructions of financing initiated by the bank of issue. The availability of the Széchenyi Card Program and the risk-capital supporting the financing of the small and medium-sized enterprises had a stimulating effect as well. In spite of this fact, the financial position of the most small and medium-sized enterprises is wrong in the future too. As in many member states of the union, the access to financial sources depends always on the specific manner of financing. The access to bank-credits was improved gradually, but it became more expensive at the same time. While the difference between the interest rates between the small credits – below EUR 1 million - intended mainly for the small and medium-sized enterprises and the higher ones is lower than in other member states, this overcharge was increased from 12% in 2007 to almost 19% in 2013. Furthermore, the lower credit overcharge involves advantages for the small and medium-sized enterprises being able to access to credits only. The rate of the refused credit applications, however, is higher in Hungary than in other member states in spite of the fact that it was decreased from 26% in 2012 to 17% in 2013. 28% of the Hungarian small and medium-sized enterprises have reported lower willingness of the banks to credit (in case of the EU this rate was 28%). A forceful intervention of the government has alleviated this problem to some degree. Thanks to the government’s move, at the beginning of the crisis, the proportion of the small and medium-sized enterprises experiencing difficult access to publicly financed subsidies, among others to warranties, was decreased from 31% in 2008 to 21% in 2013. The other parameters remained more or less unchanged. The Hungarian enterprises receive payments earlier than their counterparts in the union (42 days as compared to 50 days), while the proportion of the overdue payments (4%) almost equals to the union’s average. In fact, concerning the cash-flow, the position of the Hungarian small and medium-sized enterprises is much worse than the counterparts’ situation in the union.



**Figure 5. Access to financial sources**

Source : [http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/performance-review/files/countries-sheets/2014/hungary\\_hu.pdf](http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/performance-review/files/countries-sheets/2014/hungary_hu.pdf) (date of downloading: 02. 04. 2015)

The gradual growth of the GDP-proportional risk-capital is a positive development in the past few years. Similarly to the other member states, there are only a few small and medium-sized enterprises having access to risk-capital, but the general conditions are something better in Hungary. The JEREMIE I and II programs may have improved the conditions (Joint European sources supporting micro, small and medium-sized enterprises) in the recent past that would have improved the situation in spite of the doubt about the efficiency of the execution (e. g. concerning the selection of the small and medium-sized enterprises).

In 2013 and the first quarter of 2014, some moderate results were achieved in this field by means of various interventions. First of all, a new credit program applying preferential interests was introduced. In the framework of the Growth Credit Program, the Hungarian National Bank grants funds to the commercial banks providing subsidised supports for the companies to facilitate the enhancement of their research and development and innovation capacities and the development their business environment. Secondly, in the framework of financing programs provided by EXIM Bank, by a newly introduced limit of credit, the small and medium-sized enterprises may obtain financial support to buy production equipment at preferential interest rates (EUR 600 million) to increase export.

### ***Growth Credit Program***

Since 2008, the volume of crediting of the small and medium-sized enterprises (exchange rate effects filtered out), although with some swings, was decreased gradually. The preferential conditions of the Growth Credit Program (the greatest advantages are the fixed interest rate and the long-term option) have been able to influence the willingness to credit and borrow significantly. Before the introduction of the Growth Credit Program, the small and medium-sized enterprise sector was in a more adverse position as compared to the ventures of other member states of the European Union.

The willingness of crediting and risk taking by the banks might depend on the conditions, how the redemption burden of the potential debtor will be formed in the future depending on the interest rate, the interest risk and possibly the exchange rate risks. This hypothesis presumes that the credits accessible under better conditions will stimulate the demand for credit on the side of the borrowers as well. Considering the fact that the Growth Credit Program offers long-term, fixed and low interest rate credits (interest rate 2.5% and maximum duration of 10 years) instead of the short-term market credits of higher and variable interest rates, it can be used to survey the real demand for credit and client risks as well [MNB- Növekedési Hitelprogram bemutatása, 2013].

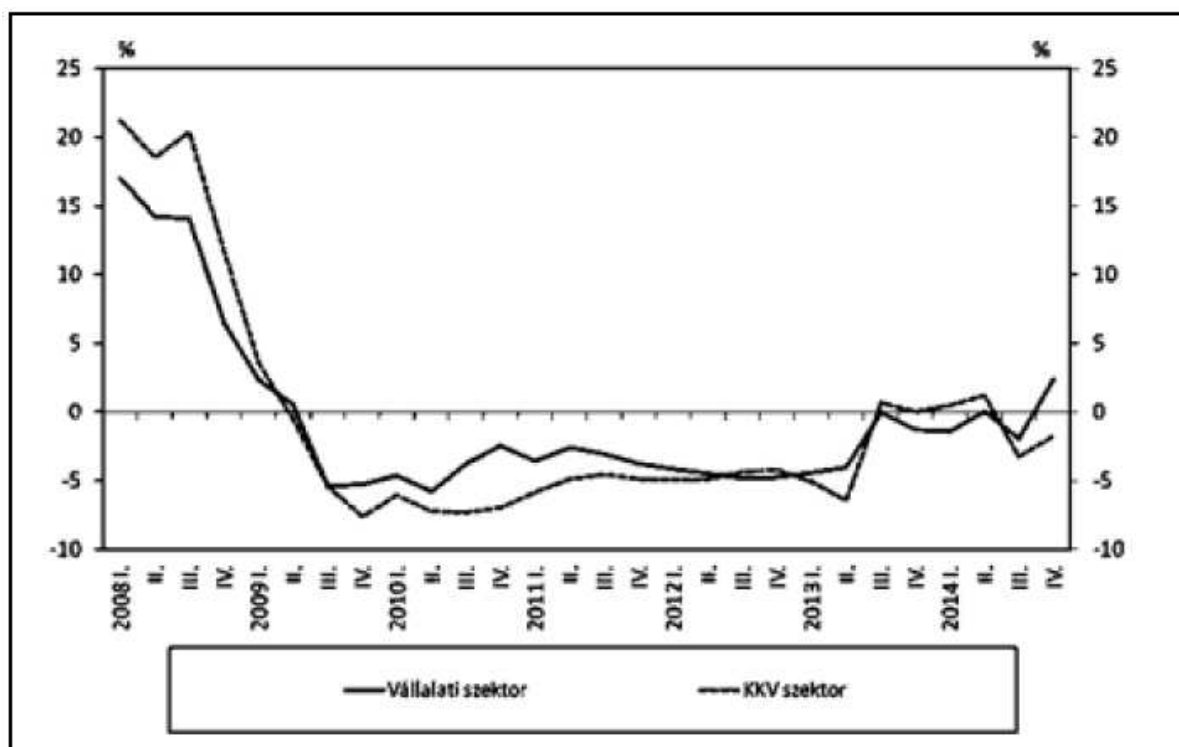
The Growth Credit Program has brought decisive changes in the practice of crediting of the small and medium-sized enterprises (Figure 6.).



**Figure 6. 12-month rolling net amount of company HUF and foreign currency credits laid out (HUF billion)**

*Source: MNB – Growth Credit Program information - portfolio.hu (date of downloading: 29. 04. 2013)*

Pursuant to statistical data, trend-breaking took place in the crediting of companies, particularly the small and medium-sized enterprises. While earlier the assets shrunk by 4-6% a year, it stagnates since the third quarter of 2013 thanks mainly to the positive effects of the Growth Credit Program. Several company surveys proves that the stimulation of the crediting emerge on the side of the demand as well: a significant part of the companies participating in the credit program would not have taken credits on market basis or, if yes, in smaller amounts. The first pillar of the Growth Credit Program started in 2013 has produced a positive effect in the credit asset of the small and medium-sized enterprises in a very short time (3 – 5 months). Thanks to this program, the net changes in the company credit asset in the entire crediting sector has approximated the amount of HUF 600 billion (Figure 7.)



**Figure 7. Rate of growth of the credit assets in the entire company and the small and medium-sized enterprise sectors**

Source: <http://www.mnb.hu/Kiadvanyok/hitelezesi-folyamatok/hitelezesi-folyamatok-2015-marcius> (date of downloading: 02. 04. 2015)

In the primary questionnaire, we would like to highlight whether the fixed low interest rates did cause anchoring effect concerning the interest rates of the market credits and the properly long duration or did it improve the dialogue between the financing banks and the clients. It is important to emphasise that the goal of the Growth Credit Program is to stimulate the process of crediting in an interim period instead of replacing the market irrecoverably. The financial mediator system shall overtake control, the market crediting may become active in medium-term and the growth of the economy may facilitate the demand for crediting.

### Challenges to be faced by the players of market financing

The Hungarian credit market for the small and medium-sized enterprises is unbalanced for many years. Until 2008 it lived its golden age thanks to the low source costs, decreasing risk related costs and low expectations for yield. The activity of the capital market grew [Élő halott a hitelezés, 2013]. The structural problems arising in the 2000's were hidden behind the growth: the insufficiencies in the size-structure, capital intensity and innovative potentials. The uncertainties generated by the rapidly changing legal and accounting environments were less apparent yet. This trend was broken in 2008-2009, the credit/GDP rate fell dramatically and the downhill ride, disregarding some small variations, might be stopped today. The demand has returned partially, but the market offers on the side of the banks still lag behind. Following the shocks caused by the losses suffered and due to new kinds of uncertainties the costs of the market financing did not return yet to the low level experienced before the crisis. The bank sector struggles with the problems and makes various analyses (Table 3.) to satisfy the demands for yield of the owners and the markets; however, it is not sure whether the banks will be able to deliver the savings to the borrowers in the previous effective form [DIETZ, M. partner, 2012].

**Table 3. Analysis of the market players by particular points**

	<b>Finance institutions</b>	<b>KKV-enterprises</b>	<b>State</b>
<b>UNDERSTANDING/TRUST</b>	<ul style="list-style-type: none"> <li>• Exact analysis of the KKV structures</li> <li>• Understanding the KKV life cycle</li> <li>• Exact categorisation</li> </ul>	<ul style="list-style-type: none"> <li>• Transparency</li> <li>• Responsibility</li> <li>• Collaboration</li> </ul>	<ul style="list-style-type: none"> <li>• Assuming responsibility mutually by agreement</li> </ul>
<b>DIVERSIFICATION</b>	<ul style="list-style-type: none"> <li>• Finding partners in the international markets</li> <li>• Creating new, custom-made financing models</li> </ul>	<ul style="list-style-type: none"> <li>• Direct access to foreign financial sources</li> <li>• Redistribution of the capital inside the region</li> <li>• Mutual capital allocation</li> </ul>	<ul style="list-style-type: none"> <li>• Combined methods, proper combination of effective source and capital allocation tools</li> </ul>
<b>INNOVATION</b>	<ul style="list-style-type: none"> <li>• Actual costs and operation</li> <li>• Focusing on risk correspondence</li> <li>• Introducing dynamic pricing</li> </ul>	<ul style="list-style-type: none"> <li>• Organisational innovation</li> <li>• Proportional cash-flow and capital management</li> </ul>	<ul style="list-style-type: none"> <li>• Constructive regulation</li> <li>• Marker stimulating solutions</li> <li>• Effective warranty system</li> </ul>

Source: own edition, 2015

### Summary, Conclusion possible answers to the challenges

The intent of our paper was to analyse the actual economic position of and financing possibilities for the Hungarian micro, small and medium-sized enterprises. The consequences of the primary survey may provide answer to the question, what combination of the assumptions is operational and in what proportion could they result in the formation of more effective structures.

Solutions to abolish the unbalance in the crediting can be found inside and outside the bank sector, but the different problems discover different interdependencies. There are a huge differences between the possible individual outcomes:

- the capital can not reach the economy, the growth will sink,
- the state increases its economic activity, but such a capital or source allocation is much less effective than the market driven one, for this reason, it can stimulate the crediting provisionally,
- the shadow banking system tries to fill the gap (shadow banking),
- not the banks, but the individual investors finance each other (crow funding).

What the banks can do: execution of significant expansion in the traditional credit and investment markets, offering innovative, low price alternatives applying new and reliable assurances. They must significantly reduce the ROE and COE costs, execute additional consolidations and network reduction and look for external markets. Most of all, the banking

market must be more innovative, the most important market must be recognised and the career demands must be satisfied. Furthermore, the fact that the real growth in the demand for credit can be reached, if the trust in the market will be restored and a stable economic vision will be shown to the enterprises by the banks, shall be considered as a central issue.

What the state can do: the effective bank capital allocation and the constructive regulatory tools shall optimally be combined in the system of stimulation: positive taxation system for the banks facilitating the crediting, effective system of institutions and warranties by means of interest rate balancing methods. Market stimulation systems to be provided directly for the banks or the banks and clients in combination shall be sought and applied in the required volume. Inspect the legal and accounting environment concerning the small and medium-sized enterprise sector and modify it as required by the stimulation of the economy.

What the small and medium-sized enterprise sector can do: beside the proportional cash flow and capital management, the most important factor is the improvement of transparency, responsibility and cooperation to be completed with the intensive development of the organisational innovation. However, the ventures are able to introduce innovations, if they are in possession of human capital as well. This can be done, if – beside governmental interventions – the economic organisation encourages the continuous training of their employees.

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## APPLICATION OF LEAN METHODS IN A LIFE OF A PHARMACEUTICAL COMPANY

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### Abstract

Nowadays the very changeable pharmaceutical trends, the political, economical and global effects, the appearance of new -mainly chinese and indian- competitors and companies established and/or stopped throughout fusions and acquisitions want to get more and more share from the global cake of pharmaceutical industry, in this way securing their stable subsistence. How can be a Hungarian subsidiary attractive for a French multinational company? The answer for the question in our case: with the help of Lean. To meet the very variable customer's demand we need to find the optimum point of the total value stream. It is very important to eliminating, re-thinking and standardizing all the activities, flow steps and bad habits which not contributing to added value of the product or service from the customer point of view. The reduction of production, logistics and quality control costs have a stressed role in the company strategy. To reach these goals we have to decrease the followings: the production lead time, the changeover times, charging the environment, the plant cycle time, the inventories and the number of quality control tests. Production in pull system, applying the Kanban and supermarket methods can also help to get the point.

The aim of my study – based on my own data collection - is to define the scope of the VSM cycle time sessions, compare and analyse the results of the present and future state of the observed product family from different aspects such as: Will the total plant cycle time decrease by (at least) 30%? Will the ratio of value added activities reach the industrial average of 10%?

**Keywords:** *pharmaceutical industry, Lean, value stream, added value, cost reduction*

**JEL classification:** *L650*

### Introduction

Lean is a Japanese term and thinking method. The meaning refers to the content i.e. rationalization of processes and eliminating all the unnecessary activities.

During the economic crisis many companies turn to the Lean. There are numerous examples for the reason for existence of the application of it in the Western world. It helps for seeking the way out of the crisis for certain companies.

Let's see the Lean from other point of view. If we investigating the economic processes and its moving springs from helicopter view, firstly we need to focus on Hungary. Often says that there is a cheap and well-educated workforce in the Eastern-Central European countries, and businesses can operate beside relatively low costs.

Sometimes multinational companies decide that they will not launch subsidiary in Hungary just after the finalization of the feasibility study. The reason of this in one hand is the EU membership. Companies cannot influencing these outer circumstances, in this way they need to adapt to the given situation in order to remaining in the market competition.

I would like to emphasize the actuality and importance of Lean application, because those companies which can react the fastest and most flexible way and can be cost effective win the competition for the customers.

The pursuit of perfection and request for the perfection by the customers do not contains solely the product, but they expect the perfect operation of the company. Lean is a tool for these kind of requests.

How can a Hungarian subsidiary be attractive for a French multinational company? The answer for the question is also Lean in our case. With this thinking method our company can reacts flexible for the changings.

It has proved that the analysed – more than 50 years old – product's technology , processes have additional opportunities which will be exploit with the following Lean tools: 5S (Seiri: choosing and separating, Seiton: Tidying up, Seiso: to clean up, Seiketsu: to standardize, Shitsuke: to sustain), SMED (Single Minutes Exchange of Die), Kanban, VSM (Value Stream Mapping) and VMI (Vendor Managed Inventories).

### **Material and methods**

In my study I am going to investigate that will the plant cycle time decreasing (at least) by 30% of the observed product family and will the ratio of the value added activities reach the industrial average of 10%?

I collected actual data between 2012-2014 and based on this period I made a comparative analysis with the present and future state of the value stream mapping regarding the whole routes of material flowing. During the study I calculated with the average values of the period. Because the campaign production the collected data needed to clean, in this way the extreme values were eliminated. With the 'door-to-door' probe, the results of every flow steps were commented, this securing the transparency and distinctness of the whole process.

The aim of my study is the data level definition of the individual process steps of VSM cycle times based on my data collection, the comparison and evaluation of the results of the two analysed periods and finally taking suggestions for further development possibilities.

### **Professional literature fundamentals**

Lean is often used in the company language. It can be describe in Hungarian as the usage of common sense.

Of course numerous professionals have written their point of view in connection with Lean. In this part of the study I am going to present some of them.

According to Mary and Tom Poppendieck 'Lean is a mindset – a mental model of how the world works. We start with two fundamental questions: What is the purpose of the business?

What kind of work systems are best for accomplishing that purpose?' (Poppendieck-Poppendieck, 2013.)

In an other approach it is need to define firstly what is the value for the customer? A long as we do not identify this the company produces or provides vainly. If they do not produce the requested quantity and/or quality etc. the perfection and precision does not matter, they produce waste.

The definition of waste (in Japanese: muda) is the following: '... every human activity that using resources, but does not generate value: defects need to repair, production of articles remaining on stock, unnecessary processing steps, aimless moving of people and goods, delays because of waiting for the finalization of the previous process step and goods and/or services that do not meet the customers requests.' (Womack – Jones, 2009.) In one word every process which consumes costs, but there is no added value for the customer.

Andrea Chiarini devided the types of wastes for the following categories:

- 3 'MU' (Muda: more capacity than workload, Mura: capacity that swings around the fixed target, Muri: more workload than capacity)
- 4M (Man, Material, Machine, Method of work), which is a traditional Japanese TQM (Total Quality Management) approach, often referring to Ishikawa or Fishbone graph.
- 7 wastes in the Toyota Production System: overproduction, inventory, defectiveness, transportation, overprocessing, motion and waiting.

Martichenko (2013) compares the Lean journey to his daughter's first day in the elementary school. In his opinion the key element of the Lean is simplicity. Plan! Do! Check! Act! He is considering to mention that Lean is not a tool but method of thinking. Despite of this in case of lot of companies there is not enough time to pick it up. As a result of this they cannot thinking deeply about how can they operate, or how do their activities, processes better and more effective? They much more focus on How? instead of Why?. Martichenko (2013) considers the sustainability of Lean questioning this two questions in the appropriate time.

According to Taichii Ohno – one of the 'father' of Toyota – Lean gives the opportunity for the better results which need less and less human-, material- and machine resources in between maximizing the customer service and satisfaction.

William M. Feld in his Lean Manufacturing book gives the following definition for the holistic view of Lean. 'The concept of holistic is meant to imply the interconnectivity and dependence among a set of five key elements. Each individual element is critical and necessary for the succesful deployment of a lean manufacturing program, but no element can stand alone and be expected to achieve the performance level of all five elements combined.' (Feld, 2001.)

Hereinafter I would like to briefly mention the professional definitions of the value, the value stream and the value stream mapping.

Beside reducing the wastes it is important to define what is the value for the customer. 'Only the final user can decide what is count for value and it is essential to talking about value if a certain product (good or service or often the mix of them) can meet the customer demand in the appropriate time and price. The value is creating by the manufacturer.' (Womack – Jones, 2009.)

To put the process approach thinking forward it is necessary to create the value stream. 'The value stream contains all the operations that necessary for driving the given product (goods and/or services of often the mix of them) throughout the three most important leadership tasks of a company: from the idea to the detailed shape- and technical design, from starting the production to the problem solving and the phisical process from the raw material to the final product that can marketable to the customer. The next step of Lean thinking is the identification of the value stream of each products (in certain cases all production families).' (Womack – Jones, 2009.)

With the help of preparing the value stream map we can get a clear present state vision not only about the workflow steps one by one, but globally for the whole product family. With VSM we can optimizing the processes, which tracking the product from the supplying of raw materials to the delivery of final product to the customers. VSM also secures the traceability of the material and information flows and helps to create the future state map.

'It is more effective than such kind of quantitative methods regarding non value added steps, lead times, distance of delivery and inventory. The value stream mapping is such a qualitative method which helps to define the detailed conditions of the operation driven by process method. Numbers are useful to create the feeling of pressure and good for the before-after type of measures, but the value stream mapping helps to define exactly how can affect these numbers. (Rother – Shook, 2012.)

Gyenge at al. (2015) wanted to show that not only the classic mass production companies follow the example of Lean management but also small manufacturing and service companies. The reason for Lean's 'popularity' is that its adaption improves several dimensions of creating customer value at the same time. The introduction of Lean management is about more than applying Lean tools or even concepts; it improves the entire organization, regardless whether the given result is called Lean or not.

## **Results and discussion**

### ***Present state of API\_1 product family***

The aim of the study was the analysis of the total plant cycle time of API\_1 product family and the minimization of PCT in the future state in order to the fastest customer service. The most exact drawing of the present state is necessary for the reliable future state.

The scope of data collection and the observation were the cycle times (electronic data, plant capacity data, Batch Record data), the relaunch time, the inventories, the QC analitical lead time and the number of IPC (In Process Controll) samples. I used data primary from our ERP (Enterprise Resource Planning) and QC systems and beside these I randomly selected n number of Batch Records which contains all the controlled parameters. In this way I tried to eliminate the gap between the reality and electronic systems. These gaps come from technical problems, execution of special technical operations and some extreme parameters take into the system intentionally.

In the 1st table I would like to present all the logical steps of API\_1 product family from the production to the delivery with the help of the own collected and evaluated data. For the better understanding of data I applied the following definitions for the different process steps:

- I calculated the production lead time based on the period from the first material tracking by BCR (Bar Code Reader) or manually to the first completion transaction date of the batch.
- The administrative time is the distinction of the first completion transaction date and the date of sample taking.
- The quality leadtime contains the period from sample taking to the releasing date of the batch. (Here necessary to mention that the QC works in one shift and there is no dedicated equipment for every product.)
- The logistical time practically represents the time spending on stock of a given batch from the quality releasing to the CEP (Central European Platform – SAP module) transfer, or (in case of intermediates) the date of first consumption by the next production step. In case of IPC analysis the logistical period contains the first completion transaction date of the batch to the first consumption by the next production step.
- The CEP time means the date of first CEP transaction to the date of accounting of the delivered batches.

As self-controll I randomly selected n=20 Batch Records in order to compare the electronic data to the actual data recorded by colleagues in the plant.

**1. table API 1 VSM highlight 2012-2013.**

Description	Production leadtime	Administrative time	Quality leadtime	Logistical time	CEP time	Key-raw material on stock	Σ 2012-2013.
API 1	2,4	0,5	13,6	28,5	5,0		50,0
INT 5	1,7			4,3			6,0
INT 4	3,7	0,9	3,8	19,8			28,2
INT 3	4,0			1,9			5,9
INT 2	4,5			61,0			65,5
INT 1	3,3			5,7			9,0
Key-raw material 1						84,4	84,4
<b>Total (days)</b>	<b>19,6</b>	<b>1,5</b>	<b>17,4</b>	<b>121,2</b>	<b>5,0</b>	<b>84,4</b>	<b>249,1</b>

Source: own table, 2015.

It is evidence from the table that the total plant cycle time of the present state takes 249,1 days from receiving the key-raw material to the delivery of the product. From this total time our value added time was 21,6 days which is 8,7%.

In order to fully evaluate these results we need to know the following productional specialities, such as:

- the production line is used by an other product family (API\_2) which contains two steps,
- both API produced in campaigns,
- certain production steps do not occupy the whole production line in the same time, in this way overlapping is enable,
- from technological and economical point of view both API and its intermediates produced in continuous shifts,
- API\_1 has approximately 10 different domestic and foreign customers and it is sold quantities from ~100 kgs to 10 tons weekly frequency,

- API\_2 has one intercompany customer so the ordered quantity and its calendarization (4-5 orders per year) is reliable (this is the pole of the yearly scheduling of this production line),
- the CSL (Customer Service Level)  $\geq 98,5\%$  is defined centrally by the company.

After that, we designed the future state which contains all the goals, achievable and developable opportunities and suggestions.

### ***Future state of API\_1 product family***

In the previous part of the study the team gave ideas for elimination of wastes, presented suggestions and new ideas. As a result of these the future state was created which aim was such kind of value stream in which:

- beside the opportunities pull system will be introduced,
- minimizing the inventory level taking into account the customer service level and campaign production, applying Kanban and supermarket for securing API supply,
- decreasing the setup and changeover times with the application of SMED,
- reduction of physical moving of raw materials and intermediates,
- -beside regulatory and analytical directions we study the opportunity of decreasing the number of specific tests and take into account the possibility of follow-up tests.

Over these general goals, the team wanted to reach the following changes as a result of the simplified future state:

- decreasing the quality lead time of INT\_2 from 3,1 days to 1 day, and lightening the inventory level of it from 61 days to 5 days;
- easing down the quality lead time of INT\_3 from 3,8 days to 0,1 day and introducing the Kanban;
- cutting down INT\_4 quality lead time also to 0,1 day instead of 3,4 days, regarding its inventory also introducing Kanban (it means -19 days stock), at the most 1 day inventory is enable;
- introducing Kanban in case of INT\_5, which means -4,3 days of stock,
- reducing the quality lead time of API\_1 to 5 days and minimizing the inventories (3 days) with application of VMI;
- achieving the following changeover times (API\_1  $\rightarrow$  API\_2 from 240 hours to 60 hours, API\_2  $\rightarrow$  API\_1 from 139 hours to 8 hours);
- cutting the purchasing lead time of the key-raw material and studying the possibility of supplying from other source as well as boosting up the production of INT\_2 with the enlargement of a production equipment (-8 hours lead time);
- common workshop with the two other Hungarian subsidiaries in connection with VMI introduction;
- defining the total plant cycle time of the future state (105 days).

In the 2nd table you can see the results of 2014 after the developing and realization of action plans.

2. table API 1 VSM highlight 2014.

Description	Production leadtime	Administrative time	Quality leadtime	Logistical time	CEP time	Key-raw material on stock	Σ 2014.	Σ 2012-2013.	diff
API_1	1,4	-0,2	13,6	26,6	4,3		45,7	50,0	-4,3
INT_5	1,8						1,8	6,0	-4,2
INT_4	4,1	-1,1	3,9	5,7			12,6	28,2	-15,6
INT_3	1,8			3,0			4,9	5,9	-1,1
INT_2	4,5			64,4			68,9	65,5	3,4
INT_1	1,4			9,8			11,3	9,0	2,3
Key-raw material_1						51,7	51,7	84,4	-32,7
<i>Total (days)</i>	<b>15,0</b>	<b>-1,3</b>	<b>17,5</b>	<b>100,6</b>	<b>4,3</b>	<b>51,7</b>	<b>196,8</b>	<b>200,0</b>	<b>-52,2</b>

Source: own table, 2015.

The most craggy change is the dropping of the total lead time by 52 days. Forthcoming I would like to present the contents of the approximately two months of decrease.

The total production lead time of the production line is less by nearly 5 days, which thanks to the result of the technical and technological developments. From my point of view – as a production planner – always has a key role such kind of results, because faster production gives the opportunity to reduce the imbalancing of our human and machine capacities, by the way in case of growing customer demand we can rise our activities in exchange for our free capacities.

Thanks to SMED workshops we reached the awaiting drop of changeover times regarding the two APIs and its intermediates on the same production line. This results also significant decreasing between the changeover time of the products.

The negative values of the administrative time means that the sample taking was just earlier than the completion of the working order. In case of API\_1 the two occasions were almost at the same time, while in case of INT\_4 the sample taking was one day earlier than completion of WO. This process is not important neither in the present nor in the future state.

There were not changes in quality lead times. In case of API\_1 the 5 working days mean that in case of urgency the material can controlled within this time, but beside the controll of all other active product ingredients and intermediates it takes an average of 13,6 days. From this 13,6 days the QC produces added value (the effective manual work by QC analitical assistant) only on 2 days.

The logistical time reduced by ~12 days in case of INT\_5 and INT\_4 thanks to the implementation of Kanban, in other hand in case of INT\_2 there was a slight increase of days on stock. There was not a radical rising, because the logistical time of the whole production family was reduced, but it is visible that we have not reached the aimed inventory cutting so far. API\_1 time of inventory did not decreased so much and the reason of this that VMI introduction was in Sept 2014, after the analysed period. So the actual effect for the logistical time will be known by us only after the next follow up workshop.

Although there is no results of VMI in connection with the logistical time, but we have obtained the most valuable achievement with this tool. This was the inventory decreasing one-off by ~320 million HUF. This was also the gaining of creation of API\_1 value stream and application of VMI in case of our two main domestic customers.

The biggest saving came from the stock keeping time of the key-raw material. We ordered both from the US and the Hungarian supplier, in this way we managed to eliminate the mono supplier situation in 2014. The raw material cycle time reduced by almost one month thanks to the more exact scheduling of our demand.



These factors together contributed the drop of the total plant cycle time of API\_1 product family by 52 days. We created added value on 17 days from 197 days, this means 8,6% VAT ratio. My hypothesis failed from the point of view of cycle time reduction which was only 21% despite of the introduced changes, developments in Sept 2014. In comparison with the 2013-2014 data the value added time of the whole process was 8,6% and 8,7% which did not reach the requested 10%.

## **Conclusion**

The implementation of action plans regarding quality are in progress, and some of them already have come true. These contain the reduction of number of IPC samples and want to decrease the quality lead time. Taking into account that the Quality Control working in one shift, I think that the realization of these goals will contribute the reduction of their human resource overloading.

The elimination of wastes origin from the unnecessary physical moving of materials in the areas of warehouse and chemical plants implied the re-thinking and revising of the material handling, serving and consuming flows and processes. As a result of these we saved ~1500-1600 unnecessary movements, container cleanings, drum and container transportations during a year. As I mentioned in the professional part of the study one of the seven wastes is the redundant moving. This immediately procures another which is the waiting. Waiting during the time while the consumable material arriving at the plant. I suggest the implementation of Kanban warehouse in the chemical plants (firstly in case of packaging materials) in order to solving this problem.

With the help of technological parameters the production lead time can be reduced and saving energy, manufacturing and destruction costs.

Some of the listed action plans concerning the regulatory dossiers, so – as I mentioned before – the realization of these take a little more time. The technological innovations including the increase of productivity, gaining more human- and machine resources. In my opinion all these factors and action plans – over their positive effects on the competitiveness – boost us to reach new activities and suitable for the expansion of our present manufacturing possibilities.

Past the mentioned action plans and the knowledge of the results of the implemented ideas, I take the following suggestions in order to reach more and more progress:

- Reduction the average quality leadtime of API\_1 from 13,6 days to 7 days.
- It is need to secure the key raw material supplying not only from the US source, but from the Hungarian too, in order to decrease the 3-4 months of purchasing leadtime.
- Key raw material supplying in VMI system by the Hungarian manufacturer.
- Better cohesion between data of ERP system and data of Batch Records. The starting point of the production scheduling is the reliable data regarding the production- and overlapping lead times which can decrease the danger of over, or under scheduling.
- Real online material tracking which can drop the discrepancies concerning inventories. In this way it can be eliminating that the raw material scheduling based on false inventory data.
- Fine scheduling of INT\_2 in order to slack the 60 days stock keeping time. To reach the requested result it is need to cooperate closely with the Value Stream managers and with the Plant leaders, because the plant human resource is the bottle neck of the production scheduling.

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**CRM FEJLESZTÉSE A GYAKORLATBAN, ÜGYFÉLKAPCSOLATI  
MENEDZSMENT INNOVÁCIÓ  
CRM DEVELOPMENT IN PRACTICE, CUSTOMER RELATIONSHIP  
MANAGEMENT INNOVATION**

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### **Összefoglalás:**

A tanulmányban egy olyan ügyfélkapcsolati modellt mutatunk be, amely nem csak innovatív elemeket visz be egy konkrét szolgáltató ügyfélkapcsolat menedzsmentjébe (Customer Relationship Management - CRM), hanem újraszervezi az ügyfélszolgálati folyamatot is. A modell elsődleges célja, hogy növelje az ügyfelek elégedettségét, ezzel összhangban csökkentse a távozó ügyfelek, a lemorzsolódás arányát és elősegítse új ügyfelek szerzését. A modell legfontosabb eredményei az ügyfelenkénti lojalitás-mérés, ami közvetlenül meghatározhatja az ügyfélkapcsolatot, továbbá a magyarázó változók becslt paramétereinek vizsgálata által képet kapunk a különböző kedvezmények, CRM elemek és CRM csatornák hatékonyságáról.

### **Abstract:**

This research shows a customer relationship model, which does not only implement innovative elements into a specific supplier's customer relationship management (CRM), but also reorganizes the customer service's procedure. The primary aim of the model is to increase customer satisfaction, and to decrease the number of leaving customers, and furthermore to win new customers. The most important results of the model is the customer loyalty measure, which directly determines the customer relationship. Furthermore the efficiency of the different promotions, CRM elements and CRM channels, is shown by the analysis of the estimated explanatory variable's parameters.

**Keywords:** *Customer relationship, predicting model, CRM*

### **Introduction**

In this paper a customer relationship model is shown, which does not only implement innovative elements into a specific supplier's, the TIGÁZ LTD, customer relationship management (CRM), but also reorganizes the customer service's procedure.

The primary aim of the model is to increase customer satisfaction, and with this to decrease the number of leaving customers, and furthermore to help win new customers.

Model description:

Analytical and predictive: The analytical CRM does not only control and synchronies the customer relationship procedures, but also adds customer related values with the use of mathematical methods. Some of these are also suitable for predictive functions, thus the model can predict the behaviour of the customer and the probability of dropout, based on historical data.

Dynamic: the model changes according to the newly collected data. This dynamic property means continuity at the data recording level, but at the CRM model level it means that model specification is performed at predefined intervals or ad-hoc. The model is not only dynamic from the method point of view, but in functionality also. The output continuously improves the customer service activity.

Integrated: The model integrates all information coming from the customer relationship channels (form personal, telephone, online, mail sources) and from the customer relationships (inspection, error corrections, etc.). Then loops the results back using differential method.

Customisable according to segments: after the CRM data base, data structure and model specifications problems are solved and done, an analogue CRM model can be created cost efficiently along the customer segments. This type of macro-segmentation results from the model functionality, as there are separate models determining the most attracting promotions for the potential customers, the factors increasing satisfactions and decreasing attrition among the current customers. Furthermore there is possibility to apply techniques, which result a range of more accurate segmentations.

### **Customer relationship characteristics – research results**

The model aiming customer relationship innovation is based on the revealed results from the empirical primer research done by the “GfK Hunária”. The results describing the detailed process of the customer relationships, where obtained from a wide range mystery shopping, and are grouped separately for potential and current customers according to the model specification requirements. In the following, those customer relationship characters are determined, which help to reach the CRM model’s aims and can be appropriately quantified for the model specification aims.

#### ***Current customers, the factors influencing satisfaction***

An important lesson learned from the research, is that an uniform argument system is necessary, which is used by the customer service managers to convince the unsatisfied customers to stay. The few reasons mentioned during the mystery shopping, can be categorised as ad-hoc.

During the personal administration “the administrators at TIGÁZ tried very rarely to convince the unsatisfied customers to stay in contract with the supplier. In the few cases they did dry to keep a customer, the following reasons were mentioned.”

The experience from the mystery shopping over telephone, is that mostly the administrators at TIGÁZ and FÖGÁZ “fought” for their customers. The most often mentioned convincing reasons were:

- The infrastructure is owned by the current supplier, the new supplier would only do the billing, thus it surely won’t be any cheaper.
- Neither will the quality be higher nor will the price be lower. It’s not worth it.
- The price is the magisterial price controlled by the ministry; it must be applied by everyone.
- The technical administration with the new supplier will be more difficult and circumstantial.
- Premium card, Remote billing.”

During the testing of the Back Office, half of the customers who were planning to break contract with Tigáz received a mail, which tried to convince them to stay. One third of these letters were successful according to the customers.

From these observations the following requirement, functions need to be fulfilled by the CRM model:

From the integrated customer relationship database the model makes predictions for every customer about the probability of attrition and determines the factors influencing this probability for the whole database. Such explanatory variables can be data referring to customers (age, gender, address), data referring to the service (size of the bill, length of the service being used, reporting faults due to low heat value, etc.) monitoring frequency. Exogenous data referring to prices, marketing activity of competitors can also be implemented into the model.

The customer service staff needs to be motivated, they need to feel the control. Even the best CRM model cannot work efficiently, if the staff has no interest in the application. From this point of view the CRM model is a control tool, it also represents the technology generating the awareness of control.

Offer the most attractive offer for the customer. Based on the model's analytical properties and integration the most efficient promotions can be determined. Using segmenting tools further distinction can be made between the promotions. The model quantifies and arranges the following promotions in order according to its customer keeping effect: Bill-angel, Remote-bill, telephone/online customer service, Agip-TigázPremio card. This list of course may be changed.

In case of braking contract ask about the reason. During the mystery shopping "none of the administrators (not only at TIGÁZ, but also at the competitors), tried to find out the reason for leaving, breaking up with the supplier." Determining the reason for attrition is a key element for the model to make predictions, it is a question whether is it technically feasible.

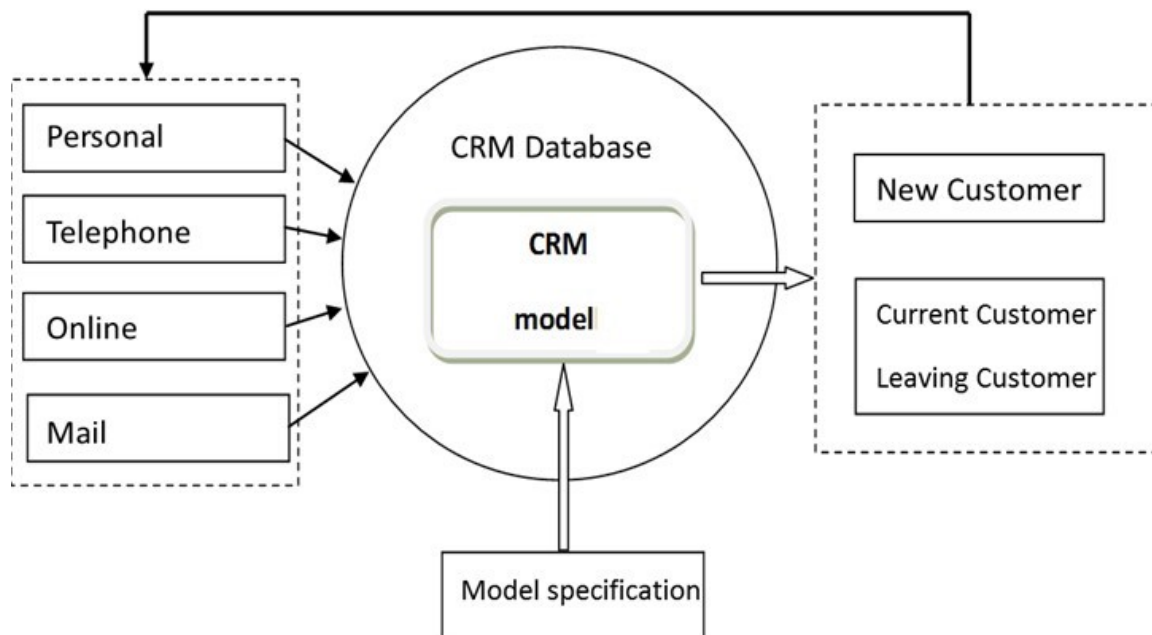
### ***Customer acquisition***

For customer acquisition a new model is required, which is separately specified, despite that it is similar in many points to the previous model. In this case the output of the model is, whether a potential customer will become a real customer or not. The potential customers are tried to be convinced for changing supplier using the following promotions:

- "complementary, comfort" services
- guaranteed gift
- Agip-TigázPremio card or Tigáz voucher
- gift voucher
- take over the administration with the omitted supplier. As the competitors only provide partial information about administration for the supplier-switch, it is assumed to be a strong reason for those who decided to switch supplier. In case of the telephone customer service this only occurred for 71% of the cases. "The administrators at TIGÁZ could be more helpful in this area"

If the customer explains the reason for changing supplier, it can be an important explanatory variable of the model. This type of information needs to be recorded both at personal and at telephone customer service. "The administrators are practically not interested, why the new arriving customers want to switch supplier."

The overview of the suggested solution's model is shown on the following figure :



**Figure 1.** The flow chart diagram of the analytic CRM model

Source: The author

The customer relationship process starts by arranging the information, obtained from the personal, telephone, online and using mail service customer contacts, into the uniform database. This database, which absolutely follows the customer relationship activity and provides the broadest information about the customers, is the base of the CRM model. The model that fulfils the previously described properties and aims is created from the specifications made regularly (monthly, quarter yearly) or ad-hoc (marketing campaign). The CRM model is practically 2 models, because the two aims, customer acquisition and the probability that the current customers stay or leave, use the same method but require different model specifications. The model outputs are looped back to the clients, this way the customer relationship management can be dynamically adjusted according to the requirements.

### **Analytic CRM model**

#### ***Customer attrition predicting model***

One from the two models, the customer attrition predicting model is detailed, as it requires more complex model specification due to the detailed customer information, than the model estimating the probability of customer acquisition.

The customer attrition predicting model estimates the probability of attrition for the current customers with the help of a predictive mathematical model using data from the previously leaving and staying customers.

### ***The possible solutions of the customer attrition predicting model***

Oravec (2007) suggests the following typology for the predictive models.

- I. Conventional methods:
  - Linear probability model
  - probit and logit models
  - discrimination analysis
  - classification tree (recursive partitioning algorithm)
  - linear programming
  - k-th “nearest neighbour” –method
- II. Artificial intelligence methods
  - neural networks
  - expert systems
  - genetic algorithms

Another type of grouping can be according to the statistical (econometric) oriented typology, the parametric and nonparametric models. The difference, from the point of view of measuring the customer service efficiency, is that the nonparametric models predict the outcome usually more precisely as the parametric models. However the parametric models also predict the factors influencing the output. The most commonly used methods for customer attrition predictions are: classification or decision trees, logistical regression model and from the neural networks the parametric logistical regression model.

The classification or decision trees, in other words the Recursive Partitioning Algorithm-RPA, are easy to understand, can be programmed, therefore usually they part of many kinds of business intelligence solutions. The centre node and branches of the classification tree, make a structure which arranges the observation units into homogeneous groups according to the available information. To partition the branches several mechanisms can be used, the models based on the chi-square statistics CHAID (Chi-square Automatic Interaction Detector) are getting more and more widespread.

The neural networks try to reproduce the property of the human brain, according to which the connection strength between the neurons can be varied flexible (Fajsz-Cser, 2004). These changes represent the base of the intelligent learning process. There are several inputs and one target variable, between them are one or several mid layers can be found, which represent activation functions. The algorithm is an iterative process, which changes the parameters of the input variables until the target variables error decreases to possible minimal. To complete this optimization, first a known set of data needs to be selected form the database, where the input variables and corresponding target variables values are known. The input values are multiplied by the weight of the connections, then summed to create the value of the next neuron. The value of the neurons on the output layer gives the estimated value of the target variable. If the target error does not satisfy the requirements, the iterative, learning procedure restarts, so that the weight if the connections are changed by a so called back propagation algorithm.

In this research a customer attrition model based on logistic regression (logit model) was developed. Why is the logistic regression model suggested from the possible mathematical, econometrical models?

These models are widely used for credit rating, bad debit or predicting applications, for a reason. From the method point of view the customer attrition is very similar to the credit rating problem.

“Today the logit model is the most widely used classification process in the credit scoring area. The main reason for this: easily to interpretable, high performance, not only does it classify, but also estimated the probability of default on loans (Bázel II. specification), furthermore the method does not require the explanatory variables to have a normal distribution, this way the category explanatory variables can be easily implemented.” (Oravec, 2007). Keeping the aims of the analysis in mind, several advantageous features can be listed of the logistic regression based model:

1. Parametric method, thus compared to the neural network the different independent variables effects can be used, with the help of the parameters in the logistic regression equation. This way in the changing market environment, effects of several factors-implemented in the model –can be investigated “ what happens, if...?” using simulations. The predicting capability of the parametric method is slightly weaker than the neural network’s, because of its internal character. Despite this, the parametric model does not only produce the final out, the probability attrition, but it also gives important information about which factor with what weight is responsible for the attrition.
2. The required statistical preconditions are less strict, than other parametric methods, such as the linear regression model, the linear probability model or the discriminant analysis.
3. Compared to the decision tree or neural network the result is a continuous probability value, from which a dichotomous classification (eq. loyal customer, leaving) can be made. This continuous probability variable can be used in numerous ways, the customers can be classified into more than two groups, the rate of errors resulting from incorrectly classified customers can also be optimised with respect to their expenses, it can be the base of a customer rating indicator.
4. The fourth advantage is not methodical. Due to the relatively easy specification, easy understanding and fast learning properties, it is relatively cheap.

## Logistic regression model

### *Base equation of the logistic regression model*

In the business intelligence one for the most popular model version, from the Categorical and Limited Dependent Variables (CLDV) models, is the binominal logistic regressive or known as the logit model. Using research methodological definitions, the logistic is such a regression model, in which the dependent variable is a bivalued categorical (dichotomus) variable and the independent variables can be any type: interval, ordinal, nominal. This “technical advantages” has large significance in empirical researches and in variety of applications.

The logistic regression can be considered as the generalization of the lineal regression by extending its limits. One of this important property of the model, is that the target variables value does not exceed the [0-1] interval, produces a probability which is easy to evaluate. The probability of customer attrition can be described with the following logistic regressive equation:

$$P(Y = 1) = \frac{e^{b_0 + b_1x_1 + \dots + b_kx_k}}{1 + e^{b_0 + b_1x_1 + \dots + b_kx_k}},$$

Where, the independent variables ( $x_i$ ) are the properties of the product and customers, and  $b_i$  is the corresponding parameter.



### ***Estimation of the parameters***

To estimate the parameters ( $b_i$ ) of the logistic regression equation, the maximum likelihood (MLE) method is used most commonly. Compared to the ordinary least squares (OLS) method used for the linear regression analysis, where the aim is to minimise the summed square distances between the observed and estimated value, the parameter estimation of the logistic regression maximises a probability function which is the likelihood function. The likelihood function is the probability which estimates a dependent variables value based on the values of the independent variables. The likelihood function of the discrete dependent variable, it can vary between 0 and 1. The logarithmic version of this function, the log likelihood function can vary between minus infinite and 0.

The maximum likelihood is an iterative algorithm which starts with a random estimation of the logistic equation's parameter, then the direction and magnitude for changing the log likelihood function is determined. After the initial estimation of the function the residues are tested, then the function is estimated again and the process is repeated for about 5 to 8 times until the increment of the function is no longer significant. The initial function of the model is given:

$$LL = -2\{(n_{Y=1})\ln[P(Y=1)] + (n_{Y=0})\ln[P(Y=0)]\},$$

where,  $n_{Y=1}$  is the frequency of the event occurrence;  $P(Y=1)$  is the probability that the event occurs; Multiplying with -2 is required, because this way the function's distribution will be close to the chi-square distribution and makes it possible to investigate whether the involvement of new explanatory variables significantly increases the value of the likelihood function or not. The testing of the effect is done a chi-square test, which is similar to the linear regression's F-test. The estimation of the parameters is continued till the likelihood functions increment is significant. Amemiya (1985, pp. 110) formally proved, that the log likelihood is globally concave, which means, that according to the Newton-Raphson method whatever value of the initial has it will converge to appropriate maximum and that the ML estimation function is consistent, has asymptotically normal distribution and is asymptotically effective.

All widely spread econometric computer software use the maximum likelihood method for parameter estimation, but there are also two other methods that can be used: weighted non iterative ordinary least squares method and the discriminate function (Hosmer-Lemeshow, 2000.).

### ***Indicators related to the model specification***

The predicting property of the attrition-predicting model has high importance, an incorrectly built (specified) model makes false predictions which can result in serious expenses. Therefore in the following the model specification indicators are investigated in detail, in other words the indicators of "model goodness".

The  $R^2$ , which shows the explanatory power of the linear regression model cannot be calculated, as the logistic regression model's dependent variable's deviation depends from the variable's distribution also. Greene (2003.) says that the essential difference is that, at the ordinary least squares method the criteria of the b parameter estimation is the maximisation of  $R^2$ , whereas during the estimation of the maximum likelihood, not all fitting criteria's maximisation is aimed. Despite this or because of this several indicators were created which are related to the model fitting goodness. Fromm these indicators the ones relevant for the practice, are selected.

These indicators can be classified into two groups: indicators based on the likelihood function's value and the indicators that are based on the models prediction accuracy.

*The indicators related to the likelihood function's value*

The process of the maximum likelihood's estimation does not have such a clear indicator for the efficiency of parameter estimations, as  $R^2$  is for the ordinary least squares method (Chatterjee-Hadi, 2006.). However several indicators are based on the comparison of the likelihood function's initial and final value.

The quasi or pseudo  $R^2$  formula defined by McFadden:

$$R^2 = 1 - \frac{L_0}{L_1}$$

The Cox-Snell and the Nagelkerke indicator. The Cox-Shell indicator compares the likelihood function's initial a final values, so that the indicator varies between 0 and 1. The problem is, that it never reaches 1, thus the accurate evaluation is not possible

$$R^2 = 1 - \left(\frac{L_0}{L_1}\right)^{2/n}$$

Nagelkerke solved this problem by dividing the Cox-Snell indicator with the maximal value of the sample.

$$R^2 = \frac{1 - \left(\frac{L_0}{L_1}\right)^{2/n}}{1 - (L_0)^{2/n}}$$

The  $R^2$  developed by McKelvey and Zavoina (1975) differs from the others, it does not calculate based on the Likelihood function, rather calculates the residues similarly to the linear regression  $R^2$ . Its advantage is that, it can be used if the dependent variable has more than to values, e.g. for multinomial logit or for probit models.

$$R^2 = \frac{\sum_{i=1}^N (\hat{y}_i^* - \bar{y}_i^*)^2}{\sum_{i=1}^N (\hat{y}_i^* - \bar{y}_i^*)^2 + N\sigma^2}$$

where,  $\bar{y}_i^*$  is the average of  $\hat{y}_i^*$  the estimated values. The value of  $\sigma^2$  for the logit models are  $\sigma^2 = 1/3\pi^2$ , and for the probit models  $\sigma^2 = 1$ . Windmeijer in his analysis (Franses-Paap, 2001.) compared several specification indicators and found the most appropriate indicators are the MCFaddel and the McKelvey-Zavoina, because they do not depend on the sample size  $y_i=1$  as much as other indicators.

The informational criterion of Akaike and Bayes. The Akaike Information Criterion (AIC) and the Bayes Information Criterion (BIC) provides information for selection between several models. The two indicators can be calculated the following way:

$$AIC = \frac{1}{N} (-2l(\hat{\beta}) + 2n)$$

$$BIC = \frac{1}{N} (-2l(\hat{\beta}) + n \ln N)$$

Where,  $n$  is the number of parameters,  $N$  is the sample number and  $l(\beta)$  is the maximum of the  $\beta$  parameters likelihood function. The alternative indicators differing  $\beta$  parameters result different informational criteria values. The indicators on their own have no significance, but when comparing different models, the smaller the AIC and BIC value is, the better the model specification is.

*Indicators related to the goodness of the model fitting*

The goodness of the model fitting can be defined, by the model’s ability to model the dependent variable (Hosmer-Lemeshow, 2000.). The indicators of the fitting’s goodness, are all based on the comparison of the dependent variable’s real value and the value estimated by the model, therefore they are also called the indicators based on the predictions accuracy.

Classification table. Another indicator of the goodness of the logistic regression model’s fitting, is the “classification table”, which compares the dependent variable’s estimated and actual values. This indicator is very popular in practice, due to easy availability. As it is used very often it is necessary to analyse in detail the pros and cons for its usage.

Based on the model’s estimated probabilities, one of the two outputs of the dependent variable is associated to all cases. For this a threshold value ( $k$ ) needs to be defined, if the probability value is above the threshold product purchase is expected, if the probability value is below the threshold the rejection of the purchase is expected. Let’s say that the  $\hat{y}_i$  estimated dependent variable’s two values are:

$$\hat{y}_i = \begin{cases} 0 & \text{ha } \hat{P}(y = 1) \leq k \\ 1 & \text{ha } \hat{P}(y = 1) > k, \end{cases}$$

Where,  $\hat{P}(y = 1)$  is the estimated probability based on the model. The  $k$  threshold is usually 0.5, but the computer software containing the logistic regression analysis allow this value to be changed. The general form of the classification table:

**Table 1. Classification Table**

<b>Classification Table</b>				
		Prediction		Percent Correct %
		0 - no	1 - yes	
Actual	0 - no	$n_{11}$	$n_{12}$	$n_{1.}$
	1- no	$n_{21}$	$n_{22}$	$n_{2.}$
Total		$n_{.1}$	$n_{.2}$	$n$

*Source: The author*

The rate of the correct predictions can be defined with one value, it is called the classification  $R_k^2$ :

$$R_k^2 = \frac{(n_{11} + n_{22})}{n}$$

Where,  $n$  is the sample size,  $n_{11}$  and  $n_{22}$  is the frequency of the two types of correct predictions.

Greene (2003.) writes about his reservations about the indicators, it is highlighted, that in case of uneven samples, when the ratio of the ones or zeros are far greater than the category's, the method isn't reliable. The classifications can be modified, by changing the threshold, but while one type of error is reduced the other type increases.

However this problem had been already corrected earlier. Long (1997.) introduces the adjusted classification indicator, which corrects the previous indicator using the category with the largest frequency.

$$R_{ak}^2 = \frac{(n_{11} + n_{22}) - \max_r}{n - \max_r(n_r)}$$

Where,  $n_r$  is the row total of tables row  $r$ , the frequency of the dependent variable's. The adjusted classification  $R^2$  can be described, as by how much percentage is the error of the prediction reduced if the independent variables are known, compared to when only the boundary probabilities, that is the estimation would be based only on the probabilities  $P(y = 0)$  and  $P(y = 1)$  known from the dependent variables distribution. This indicator is equal to the Goodman and Kurskal  $\lambda$  (Long, 1997.)

An important argument against the usage of the indicators originated from the classification table, is that they are highly determined by the dependent variable's distribution in the sample. Similarly to Greene (2003.) Hosmer and Lemeshow (2000.) also emphasises that the classification indicator's value is influenced by relative ratio of the dependent variable's two values. They discovered, that the group with the larger element number will always have better prediction. This is an aspect, which isn't related to the model's fitting goodness. The classification reduces the continuous result variable probability model to a dichotomous result variable model, which is also considered as a disadvantage. It is shown that there is little difference between the estimated probabilities of 0.48 and 0.52, however the use of the 0.5 threshold value divides the two cases into different (opposing) groups. Against this argument is, that the initial model, the observed dependent variable is also dichotomous, thus it is an acceptable expectation, that the estimated dependent variable should also be dichotomous. For example a products demand can be described with a dichotomous variable, the continuous probability variable is latent, it is "only" a partial results required for the calculations. For the threshold value determinations there are several- partial- practical solutions, for example the exclusion of the estimated probabilities near the 0,5 threshold value, or the adjustment of the threshold according to an optimisation aspect. The threshold adjustment will be detailed later on.

Indeed, in case of a model with two different dependent variables, or in case of differing sample the classification indicators cannot be used, because the difference of the two model rather depend on the distribution of the dependent variables, than referring to the "quality" of the models. However this does not excludes the possibility to compare the models to each other using different model-tests, where the dependent variable's distribution is constant. My opinion is that in practice the classification table cannot be neglected for an investigation. Beside the mythological aspects, it must be taken into account that this is an easy to understand quality indicator of the model.

## The customer attrition prediction model based on the logistic regression model

### *Model specification*

The aim is to specify a logistic regression model, which determines the probability of customer attrition:

$$P(Y = 1) = \frac{e^{b_0 + b_1x_1 + \dots + b_kx_k}}{1 + e^{b_0 + b_1x_1 + \dots + b_kx_k}}$$

Where,  $Y=1$  is the event of customer attrition, and  $P(Y=1)$  is the probability of this event. The model specification is done by selecting the independent, explanatory variable  $x_i$ , so that the model's prediction capability is as high as possible.

### *The model's possible inputs*

From the model layout it can be seen that the explanatory variables can come from several data sources: from personal, telephone, online and mail customer service. As mentioned earlier these data can be:

- Data about the customers: age, gender, type of house (that influences the possibility of substitute products), Address ( indicators corresponding to financial conditions can be generated from this).
- Data about the supplier: size of the bill, length of the service being used, reporting faults due to low heat value, frequency of inspection.
- Exogenous data referring to prices, marketing activity of competitors can also be implemented into the model.

The logistic regression model makes it possible to try out all explanatory variables available in the CRM database. The significance of these variables are determined during the model specification.

### *Methodological-technical suggestions for the model specification*

During the specification of binominal logistic regression models, practical statements and suggestions are made, which can only be found in econometrical books very rarely, but may be important for practicing researchers:

1. The model with the best rate of correct results, have many explanatory variables which have no significant effect on the dependent variable, but by keeping them under control and eliminating their indirect effects increases the model's explanatory power. During the model specification every single non significant variable's involvement was investigated, in the final model only those were included which increased the rate of correct results. This question points the attention to method of explanatory variables selection. The statistical, econometrical software, such as SPSS, offer several procedures for the method of involving the explanatory variable into the regression model. Seven such different possibility is given in the SPSS, which –mainly in case of the linear regression model- often results the same model, but in our case the model selection process has significance. One of the differences between them, is that the ENTER method also leaves the non significant variables in the model, whereas the other six method offered by SPSS do not. During the comparison of the model selection methods, it was found that the ENTER method results the best model, but it has its price;



The abscissa corresponds to the predicted probability with the interval [0-1], The ordinate corresponds to the frequency of the event giving the current value. It can be seen that the model reached high accuracy, only a few cases are listed into the not appropriate domain. The ratio of the two different type of error can be modified by changing the classification threshold from 0,5 .

The most important results of the model is the customer loyalty measure, which directly determines the customer relationship, and furthermore the efficiency of the different promotions, CRM elements and CRM channels, is shown by the analysis of the estimated explanatory variable's parameters. According to this, the customer relationship management can be optimized and reviewed periodically.

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## THE IMPLEMENTATION OF SMART MEASUREMENT FROM THE VIEWPOINT OF THE CONSUMERS

Vivien Szunyog

### Abstract

“Electricity suppliers, in accordance with the appropriation of the European Union, the Hungarian government, and the Hungarian Energy and Public Utility Regulatory Authority, have begun the preparations for implementing the so-called smart measurement system.” – That is how those consumers who were planned to receive a smart meter in their household were notified.

The new meter was planned to have been set up within a month by the company’s employed mechanics.

These are the reasons why I have chosen to examine the installment of smart meters from the viewpoint of the consumers. What benefits would this change bring to them? How can they save money by using smart meters? How can they influence their consumption? Are they willing to change their consumption habits? In my work, the starting point will be a sociodemographic attitude research that has already been carried out.

Besides all this, I am going to describe the disadvantages of smart meters as well. I am going to present what other inventions suppliers are planning after the installment of smart meters by performing some calculations with the smart web portal’s smart tariff calculator. Finally, I am going to summarize the most important thoughts and conclusions.

**Keywords:** *Smart metering, smart tariff, consumer advantages and disadvantages, smart web portal*

**JEL classification:** *Z – Other special topics*

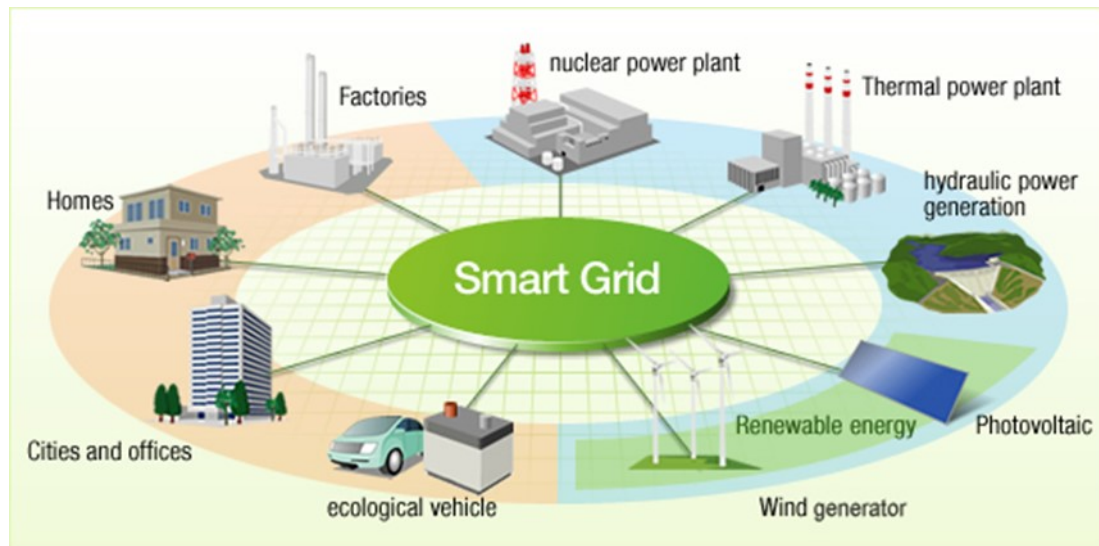
### Nowadays, everything is “smart”

Recently, we have been hearing the word “smart” more and more often in different situations and contexts. Let us for instance take the term “smartphone”, which is an expression learnt by children just as easily as the word “car”, and as a “smart TV” becomes one of the most basic objects of a household. Whether we like it or not, youth nowadays is surrounded by “smart” technology from birth.

The word “smart” in the energy industry is basically present everywhere. It began a few years ago, barely noticeably, with the term “smart meter”. Concepts such as “smart home”, “smart grid”, and then “smart city” and “smart area”, appeared only later.

(As an interesting fact, I would like to mention that Győr is now to the forefront of the world’s smart cities.)





**1st figure – Smart grid**

Within the energy industry, the area of distribution networks was one of the first to use the term “smart”, in relation to smart machines and solutions. The definition in the dictionary perfectly matches the “smart” technologies and systems of the distribution networks.

The wide-range development that took place at the turn of the 21st century, such as the miniaturization of electronic systems and computer technologies, laid down the basis for the application of artificial intelligence in areas where it was hardly conceivable before. The distribution of energy is one of these areas.

For more than a hundred years, there was only one simple mechanical solution which only meant that the energy was delivered directly from central sources to the end users. Distribution channels, electric wires and pipes were manually manageable, and the system was not too complicated. The consumption of end users was measured by simple mechanical or electromechanical tools, which were read by mechanics.

Computers, which were starting to gain popularity in the second part of the 20th century, contributed to the more efficient management and maintenance of distribution enterprises, as well as they allowed the gradual improvement of customer service. Later, computers facilitated the digitalization and partly the management of distribution network data, but that was all they could offer.

The 21st century brought about a giant boom in the use of new natural electrical resources, especially sun and wind power plants, which were connected to distribution networks in large numbers. It resulted in the need to review and reconsider the existing way of managing distribution networks as these new, rather unstable resources brought dynamic elements into the electrical system. At the point of switching such resources into the electrical system, the electric power was, for instance because of the weather, either too much or not enough. This can change even in a few minutes which means that distribution companies have to face the challenge of providing electric power to their clients in a reliable and high quality way. Given the fact that until now, no one has managed to invent an efficient, cheap, and feasible way to store superfluous energy, there is only one possible way left – the dynamic management of consumption.

For the dynamic management of an electric network, the distributor needs a large amount of up-to-date data, with real-time processing. This does not only include the information of different measurement points of the network, but more importantly, it includes the information of the individual consumption points as well. The next step is based on the processing of the collected data, such as the direct or indirect management of different electric devices, in favor of creating the balance between the production and the consumption of electric energy. This, however, exceeds human capabilities. That is why it is necessary to create a network that is able to handle energy conditions by itself, with artificial intelligence based on “smart” components. As a matter of fact, we need to build a “smart” network in a “smart” area or “smart” city – in short, we need a “smart” utility network.

For all this discussed above, the first and smallest component is a “smart” consumption meter that my thesis is structured around.

## Introduction

“Electricity suppliers, in accordance with the appropriation of the European Union, the Hungarian government, and the Hungarian Energy and Public Utility Regulatory Authority, have begun the preparations for implementing the so-called smart measurement system.” – That is how those consumers who were planned to receive a smart meter in their household were notified. They also described that during the first phase, they would like to examine and evaluate the new functions and possibilities on locations chosen by mechanical and consumption-statistical perspectives.

According to the letter, this operation would not mean financial or any other inconveniences for the consumers, for us, and the mechanical standard of the service would as well remain unchanged. The new meter was planned to have been set up within a month by the company’s employed mechanics. That means we do not have much time to get informed. Elderly or less up-to-date persons were probably unable to decide whether this change would bring about better or worse conditions for them.

These are the reasons why I have chosen to examine the installment of smart meters from the viewpoint of the consumers. What benefits would this change bring to them? How can they save money by using smart meters? How can they influence their consumption? Are they willing to change their consumption habits? In my work, the starting point will be a research that has already been carried out. Sonda-Ipsos has conducted a sociodemographic attitude research in which I have participated as a representative of the electricity supplier (which I would not like to name here).

This supplier has the largest client base in Hungary regarding electricity.

Area	Number of Clients
Southern Transdanubia (power)	760 143
Northern Transdanubia (power)	1 000 953
“Tiszántúl” (power)	765 797

**1st chart – The number of Clients of the electricity supplier**

Besides all this, I am going to describe the disadvantages of smart meters as well. I am going to present what other inventions suppliers are planning after the installment of smart meters by performing some calculations with the smart web portal's smart tariff calculator. Finally, I am going to summarize the most important thoughts and conclusions.

### ***What makes a smart meter "smart"?***

Through wired or mobile connection, smart meters are connected to the measurement center so they regularly indicate and store the current consumption. They can be controlled from the measurement center (remotely), so they do not require personal reading, and they facilitate the billing of the exact amount of power consumed.

### ***The advantages of smart meters***

Smart meters make the consumers' life easier. Smart accounting replaces annual accounting, monthly dictation, and the invoice is raised based on the monthly consumed, remotely read data. Quarter measurement data can be found on the smart web portal (or on other displays: home display, mobile applications, etc.). There is an opportunity to apply multi-zone smart tariffs, so therefore, smart meters enhance conscious consumer behavior. By quarter measurement data, there is a possibility to alert and send notifications, and several utilities can publish their consuming data on one interface.

Another great advantage is cost-efficiency. Families that are unable to pay for a longer period of time might be cut off from power supplies. In this case, consumers undertake the high cost of reconnection. However, in the case of smart meters, only a part of this cost needs to be paid since one can cut down on the personal involvement of the mechanic.

### ***The results of the sociodemographic research***

The research conducted by Ipsos-Ariosz examined consumers from across the country by providing certain selection criteria (distorting factors had to be excluded).

The process contained a test and a control panel as well. They installed smart meters in both panels, but only test panel owners were notified of the smart meter installment, and about its advantages. Consumers in the control panel did not get a notification about the use of smart meter, only about the meter change.

The company's staff were examining the consumers, their property in the consuming area, and the electrical equipment within the property. They were also examining how much time consumers were spending at home, and what sorts of consuming activities they were having that required electricity.

I would like to highlight the most important results of the research.

Concerning the change in consumer habits, participants (in the test panel)...

- 56% is open to change their consuming activities
- 42% would not like to change their consuming activities

The vast majority of consumers (86%) would expect a monthly amount of 1000 HUF saving for implementing a change in their consumer habits. The largest proportion of household

activities to be changed concerns the use of washing machines, dishwashers, bread makers, and irons. In addition, panel owners showed significant flexibility in cutting down the charging of accumulator-based equipment.

In terms of attitude towards smart meters, 58% of the test panel owners were optimistic, 9% were pessimistic. 11% of the respondents could not form an opinion. 24% of the test panel owners was still contemplating as they could name an equal number of positive and negative attributes.

### ***The results of the consumer attitude research***

Consumers were categorized based on the following criteria:

- Innovativeness
- Conscious lifestyle
- Frugality
- Impulsivity
- Energy saving
- Environmental consciousness

The categories that were formed based on the above criteria are the following.

#### *Modern, willing to act:*

People of this group are rather innovative, environmentally conscious. They are usually frugal and aware of their power consumption.

They are usually medium- and big consumers. A bigger proportion of this group lives in Budapest and in other County Authorities. They are usually middle-aged. The number of educated and wealthy people in this group is above the average.

#### *Modern, observer:*

People of this group are innovative, their way of thinking is environmentally conscious. However, they take little action to protect the environment, they are typically wasteful of their income and their energy as well.

They are rather big consumers. A bigger proportion of this group lives in Budapest and in other County Authorities. The number of young and middle-aged people is above the average, so is the number of educated and wealthy group members.

#### *Traditional economizer:*

People in this group are mostly not innovative. Environmental consciousness is not really important to them. However, the proportion of economizers is the highest in this group, regarding both saving their income and their energy, though the reason behind it is not environmental consciousness.

Typically, they are small- and medium consumers. The number of women and village people is really significant. The proportion of less educated and less wealthy members is higher. Economizers have the fewest active members.

### *Consumption-oriented:*

People of this group have an ordinary skill for innovativeness. Concerning environmental consciousness, group members have a strongly negative attitude. Frugality (both with their income and with energy) is the least typical in this group but the positive attitude towards shopping is very high.

There is no typical category for consumption level. The number of people living in towns is slightly above the average. They are average citizens regarding their age, education, and financial background.

### **The disadvantages of smart meters**

To be honest, we cannot really speak about disadvantages in connection with smart meters. The advantages listed above can become disadvantages from the viewpoint of “bad consumers”. I would call them “bad” because they do not pay the actual amount consumed, namely smart meters can help discover electricity theft. If the suspicion is proved, the consumer can be immediately disconnected from the center, there is no need for dispatching (the personal involvement of the mechanic).

What is solicitous for me is that the price of reconnection decreases. Earlier on, some households were held back by the high price of reconnection, so they rather paid the bills on a regular basis, but from now on, they might end up hesitating more easily.

### **Smart tariff at the supplier**

It is a tariff on the competitive market which provides the followings:

- If the client rearranges a part of their consumption from the highest consumption period to the lowest one, the total will be lower.
- The aim is not to make smart tariff cheaper. It should only be cheaper if the rearrangement is made.

The lowest consumption period shall be the period between 8 pm and 6 am, the highest shall be between 6 am and 8 pm.

In my opinion, electricity suppliers could divide the highest period into three more periods regarding consumption. There could be an extra tariff added to the period between 6 am and 9 am, and to the one between 5 pm and 8 pm, so between 9 am and 5 pm, there would be a discounted rush hour tariff. That is how consumers would indeed rearrange their consumption.

### **Web portal**

Web portal helps consumers find their way around in smart measurement.

Here the consumer can see the measurement data by using an individual identification number. They need to register with an e-mail address, connecting either a production number for the consumer’s meter, a business partner ID, or an ID for the point of delivery to it. Of course, the consumer has to declare officially whether the e-mail address belongs to them. In case of a meter change, the installment and the uninstalment date define the continuity of the data.

Consumption data can be displayed in two ways:

- In a graphic form (line- or bar chart) – several measurement data can be shown at once
- In a tabular format – these can be imported to Excel

The consumer has to set the start date, and then set the measurement data (time period, which now can be 1 month maximum). Data density can be set as well:

- In a 15-minute breakdown
- In an hourly breakdown
- In a daily breakdown
- In a weekly breakdown

Users have the possibility to compare a specific database with an earlier one, for instance with the values of the past month of year.

One can display how much the consumption of the given period was, with different tariffs. This helps the consumer to calculate which price plan would be the most suitable for their consumption habits.

## **Results and discussion**

Smart accounting replaces annual accounting, monthly dictation, and the invoice is raised based on the monthly consumed, remotely read data. Quarter measurement data can be found on the smart web portal (or on other displays: home display, mobile applications, etc.). There is an opportunity to apply multi-zone smart tariffs, so therefore, smart meters enhance conscious consumer behavior. By quarter measurement data, there is a possibility to alert and send notifications, and several utilities can publish their consuming data on one interface.

Installing smart meters is beneficial for the consumers as well because they can save effort, and they make the consumers' life easier.

## **Conclusion**

Based on the attitude research, regarding tariff we can say that the current construction is not tempting for the consumers because of the Hungarian utility cost reduction. After launching the project at the energy supplier, maintaining the smart tariff would not be feasible. If there was no utility cost reduction, more people would choose the smart tariff.

It is possible that there is a need for elaborating a new tariff, which is tempting for the consumer and for the supplier as well. The receptive target can already be spotted based on the research. (However, it is not worth for the company to implement a tariff that is cheaper than the previously given one, so they need to wait until the utility cost reduction will be abolished).

In connection with the website, experience shows that both smart websites and smart tariffs received very little interest from the population.

In order to evoke more interest, either in the advantages of smart measurement, in the web-based consumption monitoring site, or in the smart tariff, the project would require more intensive and colorful ("marketable") communication; with that, it would also require more investment.

All in all, the installment of smart meters would make consumers' life easier, of course, only for those who pay their bills on a regular basis as the company would like to eliminate illegal service usage.

I am one of those consumers who would like to monitor their consumption on the web portal, and the smart tariff would be favorable for me. I would gladly experiment with changing my consumption habits, and I would be curious to see how I could maximize cost-efficiency. For me, splitting the smart tariff would result in saving more costs. I usually use the washing machine and the dishwasher between 21 pm and 12 am because of my routine. Unfortunately, sometimes we forget to dictate the meter reading at the end of the month with my flat mates because it is hard to follow who's the next in line.

If I were to advise anyone, I would kindly recommend the installment of a smart meter. Besides the advantages mentioned above, the disadvantages do not concern regularly paying customers.

I am truly waiting for the installment of these smart meters not just to measure electricity- and gas consumption, but also to measure water and district heating.

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## A VÁROSLAKÓK ÉS NEM VÁROSLAKÓK VÉLEMÉNYKÜLÖNBSÉGÉNEK VIZSGÁLATA A GYÖNGYÖSI KISTÉRSÉGBEN

### AN EXAMINATION OF THE OPINION OF URBAN AND NON-URBAN RESIDENTS IN THE MICRO REGION OF GYÖNGYÖS

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#### Összefoglalás

Jelen tanulmány a lakossági elégedettség és szokások vizsgálatára terjed ki a Gyöngyösi kistérség területén. A kérdőívezés célja a városiak és a nem városiak véleménykülönbség vizsgálata az elköltözési szándék, tájékozódási szokások és a kistérségi elégedettség témakörében. Az eredmények alapján elmondható, hogy a falu és városiak válaszolók közel azonos arányban tervezik településük elhagyását. A kistérségi elégedettség kérdéskörét vizsgálva 10-ből 8 esetben szignifikáns véleménykülönbség mutatkozik, mely igazolja a két településtípus eltérő kihívásait.

#### Abstract

This study is about an examination of the residential satisfaction and habits in territory of the micro region of Gyöngyös. The aim of the questionnaires is to examine the opinion of urban and non-urban residents in the theme of migration intention, the habits of getting information and the residential satisfaction. Based on the research, we concluded, that urban and non-urban are planning to move to another municipality at about the same proportion. There is a significant difference 8 out of 10 cases of opinion of the micro region satisfaction, which demonstrates different challenges in the two types of settlements.

**Kulcsszavak:** vidékfejlesztés, területfejlesztés, város-falu, Gyöngyösi kistérség

**JEL besorolás:** R10

#### Bevezetés

A vidéki térségek konkrét meghatározásáról nincs általános, hivatalos és végleges álláspont. Véleményem szerint fontos a vidéki területek gazdasági, ökológiai és társadalmi szempontból történő lehatárolása. Kovács (2012) szerint a vidék (vidéki terület) lehatárolása a települések jellege szerint (falusi, más szóval vidéki, illetve városi) történt. Vidéki (falusi) jellegű az a település, melynek népsűrűsége nem több mint 100 fő/km<sup>2</sup>. Az országnak a vidéki települések által lefedett részét tekintik vidéknek, mely alapján az Európai Unió területének 81%-a vidék. Sarudi (2003) a vidék alábbi jellemzőit írja le:

- alacsony népsűrűség és ellátási szint;
- mező-, rét-, legelő-, gyepek-, erdő- és vízterületek magas aránya;
- alacsony a jövedelemtermelő- és érdekérvényesítő képesség;
- az összes foglalkoztatottakon belül a mező- és erdőgazdasági foglalkoztatottság magas szintű;
- az életmód és a természeti környezet szorosan összefügg;
- megjelenik az üdülési, pihenési funkció.



Buckwell (1997) megfogalmazása szerint a vidéki környezet jelenti a természeti környezet minden aspektusát, vagyis a biodiverzitást, az élőhelyek és erőforrások védelmét, a táj védelmét, valamint a műtárgyak, népi építészeti emlékek, régészeti lelőhelyek és egyéb történelmi örökségek fenntartását. A vidékfejlesztés magába foglalja a helyi lakosságot, azok életformáját, foglalkoztatási helyzetét, jövedelemszerkezetét, szolgáltatások szintjét és a kulturális aspektusokat is, vagyis a hagyományos foglalkozásokat, az ételeket, a nyelvet, az öltözködést és szokásokat. Egyetértek Sarrish et al. (1999) véleményével, miszerint a vidékfejlesztés nemcsak a külső tényezőktől és a támogatottságtól függ, hanem azt jelentősen befolyásolja a helyben élők akarata és hozzáállása. Kulcsár (1998) a vidékfejlesztés középpontjába az embert, a vidéki közösséget helyezi, a fejlesztéseknek a helyi lakosok aktív részvétele révén kell megvalósulniuk. Véleményem szerint kulcsfontosságú azon személyek megléte, akik élethivatásuknak tekintik a lakóhelyük és környezetük életminőségének javítását. Farkas - Kassai (2013) vitaanyagában „helyi hősöknek” nevezik őket, azonban fontos kérdés, hogy az adott térség rendelkezik-e ilyen személyekkel, és helyben tudja-e tartani őket.

Kovács (2004, 2012) szerint egyre nő a falusi társadalomban a deklaszálódott rétegek aránya (pl. Dél-Dunántúlon, Észak-kelet Magyarországon). Ezek a rétegek egyre kilátástalanabbnak ítélik meg saját helyzetüket, jövőjüket. Ezt már leírja Androka (1999), aki szerint ezen rétegek számára valós veszély a „latin-amerikanizálódás”, vagyis hogy a felzárkózás esélyeit is elveszíthetik örökre.

A település a hagyományos megközelítés szerint az emberek egy csoportjának lakó- és munkahelyeinek térbeli egysége (Mendöl, 1970). Beluszky (2003) kiegészíti ezt, véleménye szerint a település lakó-, munka- és pihenőhelyek, illetve szolgáltatási intézmények térbeli együttese. Kovács (2007) megfogalmazása alapján a település olyan, az ember által ideiglenesen vagy állandóan lakott hely, amely lakó- és gazdasági célú épületekből, valamint a hozzájuk tartozó egyéb építményekből (pl. utak, hidak, közterek) áll.

Különböző országokban nagyon különböző módon határozzák meg a város fogalmát, az egyes országok teljesen önállóan döntenek arról, hogy mely településeket tekintik városnak és melyeket nem. Az országok egy részében a településhálózat nagyobb népességű településeit tekintik városnak, ezért egy bizonyos népességszám fölött minden település városi jogállású. Ezt nevezzük statisztikai városfogalomnak. Az országok egy másik csoportjában városnak azokat a településeket tekintik, amelyek központi funkciókkal rendelkeznek és saját lakosaik mellett a vonzáskörzetük településeinek lakóit is ellátják. Ez az úgynevezett funkcionális városfogalom, megállapításához komplex mutatót használnak. Egyes országokban a két városfogalmat együttesen alkalmazzák. Ebből következik, hogy nem a népesség száma határoolja el a falut a várostól, vagyis viszonylag kisebb népességszámú település is rendelkezhet olyan szintű és számú funkcióval, amely alapján városnak nevezhető (Tóth, 2002.).

A falvak pontos definiálása szintén nehéz feladat. A magyar Néprajzi Lexikon szerint egyszerű szerkezetű, korlátozott önállóságú, a városi központhoz vidékként tartozó, többnyire mezőgazdasági jellegű kis település. Általános ismérvként megfogalmazható, hogy a falvaknak általában kevés vagy egyáltalán nincs központi funkciója, lakóik számára csak az alapellátás biztosított. Vagyis a falvak a városokhoz kötődnek, azok vonzáskörzetében foglalnak helyet, azokkal szervesen együtt élnek. A történelmileg kialakult együttélés egyaránt előnyös mindkét fél számára: a város magasabb színvonalú szolgáltatásokkal és potenciális munkahelyekkel segíti a falvakat, míg a falvak a város élelmiszerellátásában vállalnak szerepet (Tóth, 2002.).

Véleményem szerint a városlakók és nem városlakók életét különböző előnyök és hátrányok határozzák meg, ezek különböztetik meg a város és a falu fogalmát. A városi lét mellett szóló érvek:

- magasabb jövedelem
- a közép- és felsőoktatás lehetőségei
- több munkalehetőség
- több kulturális, sportolási és szórakozási lehetőség
- kényelem és biztonság (könnyebb elérhetőség, nagyobb áruválaszték, megbízhatóbb egészségügyi szolgáltatások, kórházi ellátás megléte)

A városi lét hátrányai a következők:

- szennyezettebb környezet
- közlekedési dugók, tömeg
- zaj
- rosszabb közbiztonság
- magasabb ingatlanárak
- emberi kapcsolatok felszínessége

A falusi élet újfajta látásmódot igényel. A természet közelsége fokozza a környezetbarát szemléletmód kialakulását, azok elsajátítása takarékosagra ösztönzi a falulakót. A falusi élet lehetőséget biztosít új emberi kapcsolatok kialakítására, a helyi közösségi életbe történő bekapcsolódásra.

A városi és falusi élet különbözőségei eltérő problémákat, véleményeket feltételeznek az ott lakók körében. Jelen tanulmány ennek vizsgálatát célozta meg.

## **Anyag és módszertan**

### ***Kérdőíves felmérés***

A vizsgálati adatbázist kérdőívezésből nyert adatok képezik. A kérdőív összeállításánál arra törekedtem, hogy olyan kérdéseket fogalmazzak meg, amelyek megválaszolásával megismerhetem a településen élők véleményé, elégedettségük fokát, viszonyulásukat a hétköznapi problémáikhoz. A kvantitatív módszer eredményei számszerűsíthetők, az így nyert adatok jól elemezhetőek a különböző statisztikai módszerek alkalmazásával (Lehota, 2001).

A kérdőívezés 2013. július-december hónapjaiban történt, személyes interjúk alkalmazásával a Gyöngyösi kistérség 25 településén. A személyes interjú használatának oka elsősorban az esetleges félreértések elkerülése volt, ugyanis ez a módszer lehetőséget ad a kérdezőbiztosnak a kérdések pontosítására (Szűcs 2008).

A kérdőívezés során segítségemre voltak a települések önkormányzati dolgozói, hiszen ők ismerik leginkább az adott település lakosságának összetételét, napi kapcsolatot fenntartva az ott élőkkel. Emellett kiemelném a Károly Róbert Főiskola hallgatóit, akik a kérdőívezés céljáról, menetéről szóló konzultációt követően vállalták a kérdezőbiztos szerepkört, melyet eredményesen sikerült betölteniük.

A megkérdezett célcsoport a vizsgált kistérség 25 településének 18 év feletti lakossága. A lekérdezést próbakérdezés előzte meg, mely során ellenőrizhetővé vált a vizsgálathoz megfelelő kérdezési mód, kérdésfajta, a válaszvariációk illetve a helyes sorrend.

Az értékelhető kérdőívek száma összesen 1682 db. A nagyarányú visszaérkezés a kérdőívek visszajuttatását biztosító személyekkel való folyamatos kapcsolattartásnak, a vizsgált térség segítőkészségének és a téma iránti érdeklődésüknek tulajdonítható.

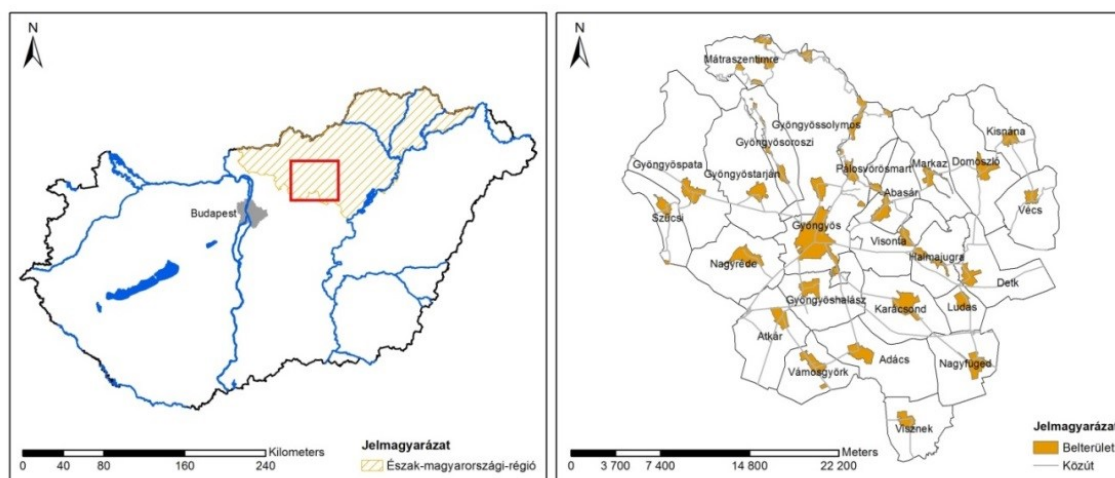
Az SPSS 20.0 program segítségével kerültek a válaszok feldolgozásra, így részletes elemzésre van lehetőség. A kapcsolat és különbségek vizsgálatára nem paraméteres eljárásokat alkalmaztam, mivel az adatokra nem jellemző a normális eloszlás. Az alkalmazott, Kruskal-Wallis próba esetében a normális eloszlás nem feltétel. Ezzel a módszerrel vizsgáltam tehát, hogy milyen szignifikáns véleménykülönbségek határozhatók meg a városlakók és a nem városlakók válaszaiban a kistérségi elégedettség, beruházások kérdésénél. Emellett kereszttábla módszerrel vizsgáltam, hogy van-e összefüggés a városi/falusi lét és az elköltözési szándék között.

### A vizsgált térség bemutatása

A kistérség a térségi önszerveződés legfontosabb színterévé vált, amely a komplexen értelmezett és alulról építkező területfejlesztési politika rendkívül fontos alapszintje (Csatári, 1996). Nemes Nagy (2003) szerint a kistérségeknek nem elsősorban statisztikai számbavételi funkciójuk a meghatározó, hanem az, hogy a területi folyamatok, a területi fejlődés elemzésének alapegységeiként szolgálhatnak. Magyarországon 2004. január 1-jétől 168 kistérséget számolhatunk.

A vizsgált térség 2004. január 1-jétől a Mátraaljai Kistérségi Területfejlesztési Önkormányzati Társulás és a Gyöngyös Körzete Kistérségi Területfejlesztési Társulás összeolvadásával jött létre. 2007-től Pálosvörösmart kivált Abasárból, így ma a kistérséget 25 település alkotja (1. ábra). Területi kiterjedése 750,78 km<sup>2</sup>, lakosainak száma 73610 fő a 2013-as KSH adatok alapján.

2013. január 1.-jétől a Gyöngyösi kistérség Gyöngyösi Járási területté alakult át, az ezt alkotó települések közigazgatási központja Gyöngyös lett. Azonban a járási kormányhivatalok nem váltották fel a többcélú kistérségi társulásokat, a változás nem érintette a települések körét. A térség települései természetföldrajzi, településszerkezeti szempontból is szerkezeti és funkcionális egységet képeznek. Gazdaságföldrajzi szempontból Gyöngyös város vonzáskörzetéhez tartoznak. A kistérséghez tartozik az ország legmagasabb pontja: Kékestető.



1. ábra: A Gyöngyösi kistérség elhelyezkedése

Forrás: saját szerkesztés, 2014.

A vizsgált kistérség legnépesebb. városi ranggal rendelkező települése Gyöngyös, mely a térség megkérdőjelezhetetlen szolgáltató központja. Azonban a Gyöngyösi kistérséget alkotó települések közül már nem Gyöngyös az egyedüli város, hiszen Gyöngyöspata – a kérdőíves lekérdezés kezdetén - 2013. július 15-i hatállyal városi címet kapott Ader János köztársasági elnöktől.

A TÉRPORT alapján gyakran használt megközelítés a népességszám szerinti város illetve falumeghatározás. A különböző településkategóriákat tartalmazza az 1. táblázat a hozzá tartozó népességszámmal együtt.

**1. táblázat: A népességszám alapján kialakított településhierarchia hazánkban**

Kategória	Népességszám
Metropolis	1.000.000 fő felett
Nagyváros	100.000 fő felett
Középváros	20.000 és 100.000 fő között
Kisváros	5.000 és 20.000 fő között
Község	5.000 fő alatt

Forrás: <http://www.terport.hu/telepulesek/telepulestipusok> alapján saját szerkesztés, 2015.

A 2. táblázatban látható az előzőekben bemutatott hierarchia alapján, hogy a Gyöngyösi kistérség települései népességszám alapján mely kategóriát képviselik a 2013-as KSH adatok alapján.

**2. táblázat: A Gyöngyösi kistérség településeinek kategóriája az állandó népességszám alapján, 2013**

Település	Állandó népesség (fő) 2013	Településkategória
Abasár	2477	község
Adács	2659	község
Atkár	1801	község
Detk	1165	község
Domoszló	2016	község
<b>Gyöngyös</b>	<b>30667</b>	<b>középváros</b>
Gyöngyöshalász	2600	község
Gyöngyösoroszi	1515	község
Gyöngyöspata	2600	község
Gyöngyössolymos	2999	község
Gyöngyöstarján	2384	község
Halmajugra	1312	község
Karácsond	3080	község
Kisnána	1021	község
Ludas	799	község
Markaz	1755	község
Mátraszentimre	509	község
Nagyfüged	1761	község
Nagyréde	3248	község
Pálosvörösmart	678	község
Szűcsi	1596	község
Vámosgyörk	1997	község
Vécs	661	község
Visonta	1210	község
Visznek	1100	község
Összesen:	73610	

Forrás: saját szerkesztés KSH adatbázis alapján, 2013.

A 2. táblázat szerint megállapítható, hogy népességszám alapján a vizsgált térség egyedüli városa Gyöngyös. Jelen tanulmányban ez alapján végeztem a vizsgálatokat, tehát annak ellenére, hogy Gyöngyöspata városi rangot kapott a vizsgálat kezdetén, nem városként szerepeltetem. Ezt a 2600 fő népességszám indokolja elsősorban, illetve az, hogy a lekérdezés időpontjában érdemi változás nem történt a településen a várossá nyilvánítással.

## Eredmények

### *A lekérdezettek bemutatása*

A vizsgálat eredményeinek értékelésénél ismernünk kell a válaszadók számát (ez kérdéscsoportonként kis mértékben változhat) és a válaszadók korát. Sajnos a kistérségben a lakosság elöregedése komoly gond, egyre kevesebb a fiatal. Az 1682 válaszadót életkor szerint három csoportba soroltam, 18-30 év közöttiek, 31-50 év közöttiek és 51 év feletti. A 18-30 év közöttiek a válaszadók 23%-át adják, az elöregedés itt is nyilvánvaló, hiszen az 51 év feletti aránya 29,4%. A legnépesebb csoport a 31-50 év közöttiek, arányuk 47,6%.

A válaszadók között férfiak és nők is szerepeltek, sok esetben helyzetüknél fogva eltérő válaszokat adtak. A nők aránya a válaszadók között nagyobb volt, az összes válaszadó 62,9%-a volt nő, míg 37,1%-uk férfi.

A vizsgálatban résztvevőket iskolai végzettség szerint is osztályoztam, három kategóriát állítottam fel, alapkötő, középötő és felsőötő végzettségükre soroltam be a válaszadókat. A megkérdezettek legnagyobb számban (921 fő) középötő végzettséggel rendelkeznek, 573 fő szerzett főiskolai vagy egyetemi diplomát és csupán 188 főnek alapkötő a legmagasabb iskolai végzettsége.

Az összes megkérdezett 73,5%-a nem városlakó, 26,5%-a pedig Gyöngyösön él.

**3. táblázat: Munkahelyek megoszlása a mintában**

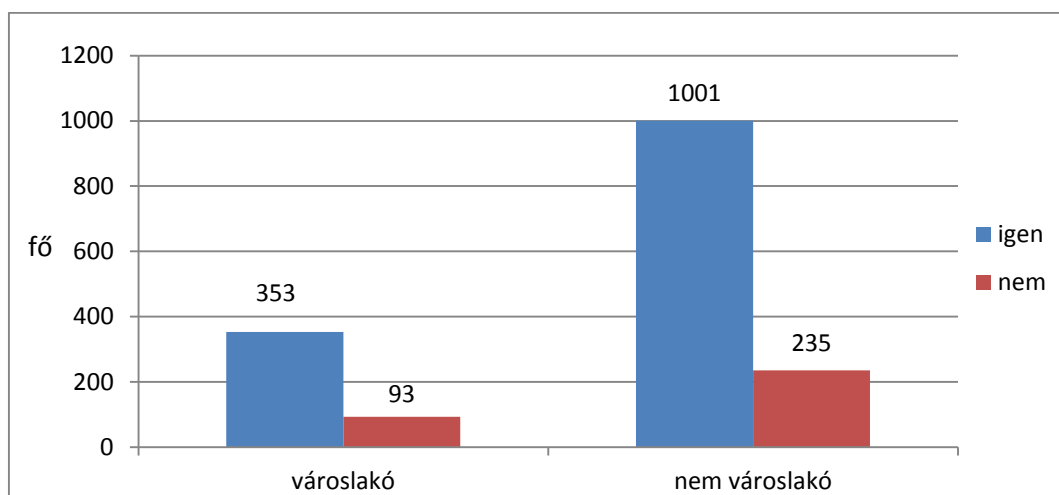
		Rendelkezik jelenleg munkahellyel?		összesen (%)
		nem (%)	igen (%)	
Lakóhely	városlakó	12,78	87,22	100
	nem városlakó	29,13	70,87	100

*Forrás: saját számítás, 2015.*

A 3. táblázat adatai jól mutatják, hogy a mintán belül a nem városlakó munkanélküliek aránya több mint kétszer annyi, mint a városiak csoportjában. A teljes mintát nézve elmondható, hogy a válaszolók  $\frac{1}{4}$ -e nem rendelkezett munkahellyel a megkérdezés időpontjában.

### *Elköltözési szándék*

Az elköltözési szándék és lakóhely vizsgálata esetén nem találtam szignifikáns összefüggést. Ugyanakkor a 2. ábra alapján megállapítható, hogy közel ugyanolyan arányban áll szándékában elhagynia települését a városlakó (26,34%-uk) és a nem városlakó (23,47%-uk) megkérdezetteknek is.



2. ábra: Elköltözési szándék

Forrás: saját számítás, 2015.

### Iskolai végzettség

Keresztábra módszerével vizsgáltam, hogy befolyásolja-e az iskolai végzettséget a lakóhely. A 4. táblázat alapján megállapítható, hogy alacsonyabb végzettséggel legnagyobb arányban (92%) a falusi válaszadók rendelkeznek. A gyöngyösi megkérdezettek legnagyobb számban (221 fő) felsőfokú képzésre tettek szert, a nem város lakók közül legtöbben (711 fő) középfokú iskolát végeztek. Összességében elmondható, hogy a falusi megkérdezetteket alacsonyabb, a városiakat magasabb iskolai végzettség jellemzi. A felsőfokú végzettségük tekintetében a város-falu közötti eltérés megjelenik, a városban több a kvalifikáltabb személy. Azonban nem elhanyagolható a vidéki válaszadók egyetemi/főiskolai tanulmányai sem, ugyanis 28,5%-uk rendelkezik diplomával.

4. táblázat: A lakóhely és az iskolai végzettség összefüggése

Lakóhely	város lakó	Esetek száma	A válaszadó legmagasabb iskolai végzettsége			Összesen
			alacsony	középfokú	felsőfokú	
		15	210	221	446	
		% Lakóhely	3,4%	47,1%	49,6%	100,0%
		% A válaszadó legmagasabb iskolai végzettsége	8,0%	22,8%	38,6%	26,5%
		% Összesen	,9%	12,5%	13,1%	26,5%
	nem város lakó	Esetek száma	173	711	352	1236
		% Lakóhely	14,0%	57,5%	28,5%	100,0%
		% A válaszadó legmagasabb iskolai végzettsége	92,0%	77,2%	61,4%	73,5%
		% Összesen	10,3%	42,3%	20,9%	73,5%
Összesen		Esetek száma	188	921	573	1682
		% Lakóhely	11,2%	54,8%	34,1%	100,0%
		% A válaszadó legmagasabb iskolai végzettsége	100,0%	100,0%	100,0%	100,0%
		% Összesen	11,2%	54,8%	34,1%	100,0%

Forrás: saját számítás, 2015.

A szignifikancia táblázat (5. táblázat) szerint a Khí-négyzet értéke 82,398, a hozzá tartozó szignifikancia szint értéke 0,000, tehát 95% biztonsággal – ehhez tartozó 5% hibaszinten – a nullhipotézis elvethető, így a két valószínűségi változó között statisztikailag igazolt összefüggés mutatkozik.

**5. táblázat: A lakóhely és az iskolai végzettség közötti kapcsolat vizsgálata**

	Érték	df	Kétoldali szignifikanciaszint
Pearson- féle Khí négyzet	82,398 <sup>a</sup>	2	,000
Valószínűségi arány	88,033	2	,000
Lineáris kapcsolatmutató	82,309	1	,000
Érvényes esetek száma	1682		

a. 0 cella (0,0%) várható értéke kevesebb mint 5. A minimálisan elvárt érték 49,85.

*Forrás: saját számítás, 2015.*

Az összefüggés létét a Cramer-féle V mutató is megerősíti (6. táblázat), az ehhez tartozó szignifikancia szint 0,000.

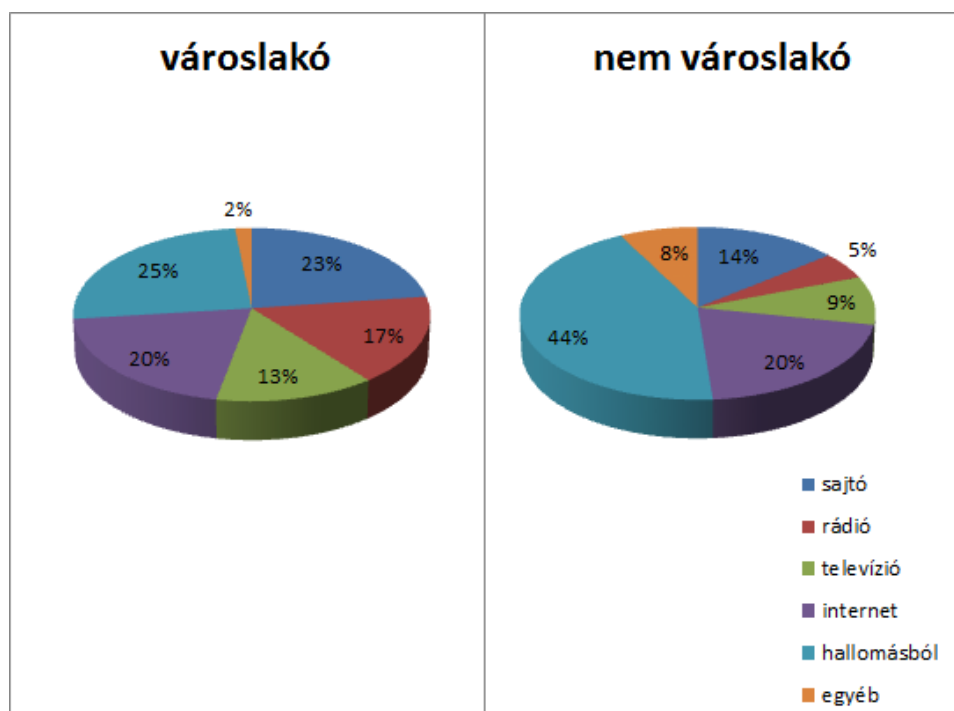
**6. táblázat: A lakóhely és az iskolai végzettség közötti kapcsolat vizsgálata Cramer próbával**

	Érték	Approx. Sig.
Névleges Phi	,221	,000
Cramer- féle V	,221	,000
Érvényes esetek száma	1682	

*Forrás: saját számítás, 2015.*

### **Tájékozódási szokások**

Kérdőíves kutatásom részét képezte, hogy ismereteket szerezzek arról, mik a Gyöngyösi kistérség lakosainak tájékozódási forrásai a helyi ügyekről. A vizsgált kérdés esetében szignifikáns különbség nincs a városiak és a falusiak válaszaiban tájékozódási szokásait illetően. A 3. ábra alapján azonban megállapítható, hogy a megkérdezett gyöngyösieknél negyede és falusiak közel fele (44%) hallomás alapján értesülnek a saját életüket közvetlenül befolyásoló helyi eseményekről. Emellett ma már meghatározó információforrás az internet is, melyet a városiak és nem városiak válaszadók azonos arányban (20-20%) részesítenek előnyben, mely lehetőséget ad számukra a gyors és kényelmes hírszerzésre. Meglepő, hogy a falusi megkérdezettek csupán 5%-a használja a rádiót hírszerzésre, azonban a gyöngyösieknél nagyobb arányban (8%) jelölték be az egyéb kategóriát, mely minden esetben a hangos hírdőzt jelenti. Ennek az eszköznek a mindennapi információközlésen túl az esetlegesen felmerülő vészhelyzetekben is jelentős szerepe van, mivel a települések idősebb lakosait szinte csak ilyen formában lehet hatékonyan és gyorsan elérni.



**3. ábra: A válaszadók tájékozódási szokásai**

*Forrás: saját számítás, 2015.*

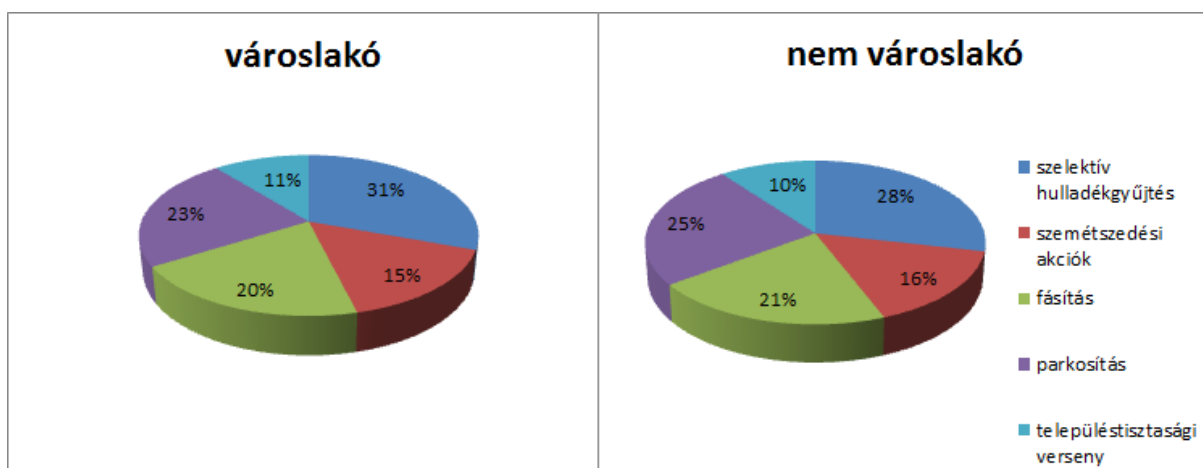
Véleményem szerint a kisebb közösségi programok (kulturális rendezvények, sportesemények stb.) meglétén túl fontos, hogy az arról szóló tájékoztatás is megfelelő módon történjen. Hiszen az ilyen fajta események nagy érdeklődéssel történő megvalósítása hozzájárul a helyi társadalom kohéziójának erősítéséhez, elősegíti a helyi kulturális hagyományok megőrzését

### **Környezet**

A települések tisztaságával összefüggő meglévő helyi közszolgáltatások mellett fontos, hogy a lakosok is elősegítsék a köztisztaság biztosítását, az épített és természeti környezet védelmét. A kulturált, esztétikus településkép kialakítása hozzájárul a lakosság jó közérzetének, a település jó hírének és látogatottságának növeléséhez. Ez indokolta, hogy kérdőíves felmérésem során kitérjek arra a kérdésre, hogy „Milyen tevékenységben vállalna feladatot a környezete szebbé tétele érdekében?” A válaszokból kapott eredmény értékelése lehetőséget ad arra, hogy képet kapjak a Gyöngyösi kistérség lakosainak közösség és környezetük érdekében vállalt felelősségük erősségéről.

A 4. ábrából kitűnik, hogy minden tevékenységben magas szintű aktivitás mutatkozik, azok aránya a vizsgált két csoportban közel azonosan oszlik meg. A megkérdezettek leginkább a szelektív hulladékgyűjtésben vállalnának feladatot, ami a teljes minta 56%-át jelenti. Emellett a parkosítással (791 fő) és fásítással (667 fő) is sokan hozzájárulnának az igényes településkép kialakításához. Legkevésbé a településtisztasági versenyt részesítik előnyben a válaszadók, ebben csupán 338 fő vállalna szerepet. Kérdésemmel lehetőséget biztosítottam a megkérdezettek számára arra vonatkozóan is, hogy a felsorolt tevékenységek mellett milyen egyéb munkát végeznének környezetük gondozottabbá tételében, azonban erre csekély elképzelés született, emiatt nem jelenítettem meg.





4. ábra: Aktivitás megoszlása a környezet szebbé tétele érdekében

Forrás: saját számítás, 2015.

### Kistérségi elégedettség

A kistérségi elégedettség kérdéscsoport Kruskal-Wallis teszttel történő vizsgálatánál, a válaszadók lakóhelyétől függően, jelentős különbségeket regisztrálhatunk (7. táblázat). A válaszok 1-5-ig terjedő skálát fogtak át. Szignifikáns az eltérés az 1. (könnyen megközelíthető), a 2. (sikeres és gazdag), a 3. (fejlődőképes), a 4. (lehetőségeket biztosító), az 5. (beruházók által kedvelt), a 6. (turisták által kedvelt), a 9. (szakképzettség helyzete) és a 10. (egészséges, rendezett, tiszta környezet) kérdéseknél.

7. táblázat: Kistérségi elégedettség vizsgálat a válaszadó lakóhelye szerint

Teszt statisztika <sup>a,b</sup>										
Mennyire elégedett a kistérségben										
Megnevezés	könnyen megközelíthető	sikeres és gazdag	fejlődőképes	lehetőségeket biztosító	beruházók által kedvelt	turisták által kedvelt	kommunális infrastruktúra fejlettsége	népességi helyzet	szakképzettség helyzete	egészséges, rendezett, tiszta környezet
Khí-négyzet	54,357	9,885	7,794	11,654	9,801	31,639	,036	2,936	21,800	44,435
df	1	1	1	1	1	1	1	1	1	1
Asymp. Sig.	,000	,002	,005	,001	,002	,000	,849	,087	,000	,000

a. Kruskal Wallis Teszt b. Csoportosító változó: Lakóhely

Forrás: saját számítás, 2015.

A kistérség megközelíthetőségével a városiak elégedettebbek, a falusiak számára nagyobb gondot okoz otthonunk elérése. Azonban a nem városiak megkérdezettek a térséget sokkal inkább sikeresnek és gazdagnak, fejlődőképesnek és lehetőségeket biztosítónak látják, mint a városiak. Az eredmények azt is mutatják, hogy a gyöngyösi sokkal inkább ítélik vonzóknak a beruházók illetve turisták számára, mint a falusi válaszolók. A szakképzettség helyzetét szintén a városiak tartják szignifikánsan jobbnak, annak helyzetét a vidéki megkérdezettek kívánják

megváltoztatni. Az egészséges, rendezett és tiszta környezet kérdését mindkét vizsgált csoport viszonylag magas pontértékkel ismeri el, de a falvakok elégedettsége kifejezőbb. A kommunális infrastruktúra fejlettségének megítélésénél nincs különbség a lakóhelyet tekintve a vélemények között. A rangsort átlag mindkét csoportnál 760 körüli, más változóknál ez magasabb. Ez azt jelenti, hogy a két csoportban erősen megoszlik a kommunális infrastruktúra fejlettségével való elégedettség. A népességi helyzet értékelése is ehhez hasonló, itt sem regisztrálhatunk szignifikáns véleménykülönbséget.

### **Következtetések**

A városok és a falvak problémái eltérőek, az ott lakók más-más napi kihívásokkal szembesülnek. A Gyöngyösi kistérségben végzett kérdőíves felmérés eredményei ugyanakkor nem mutatnak nagy eltéréseket a város és nem városiak szokásait illetően. Az elköltözési szándékot sem befolyásolja a településtípus, mind Gyöngyösön, mind a környező falvakban a megkérdezettek  $\frac{1}{4}$ -ének áll szándékában elhagynia jelenlegi lakóhelyét. A tájékozódási szokásokat illetően szintén nem beszélhetünk nagy különbségekről. Csupán kétféle szokás érdemel megemlítést: falun kétszer annyira gyakori hallomásból értesülni a helyi ügyekről, mint városban; a nem városiak számára meghatározóbb a hangos hírmondó, mint a gyöngyösi megkérdezetteknek. Az esztétikus településkép kialakítása mind a városiaknak mind a falusi embereknek fontos, azonos arányú aktivitás mutatkozik környezetük szebbé tételére irányuló tevékenységben. Az iskolázottság tekintetében elmondható, hogy városban több kvalifikált személy mutatkozik, azonban a térség falvaiban a megkérdezettek jelentős része (28,5%) rendelkezik diplomával. Feltehetően ebben fontos szerepe van a térség főiskolájának, mely széles képzési lehetőségeket biztosít a továbbtanulást megcélzó helyi lakosok számára is. A kisebb településeken mutatkozik a munkanélküliség nagyobb aránya. A falun élők sokkal kiszolgáltatottabbak a munkáltatóknak végzettségük és a kevés munkalehetőség miatt. Tovább rontja helyzetüket, hogy a munkáltató sokszor választ kevésbé képzett városi munkaerőt az útiköltség többlete miatt. A kistérségi elégedettség kérdéscsoport eredményei már mutatják az eltérő problémákat. A vizsgált kérdésnél 10-ből 8 esetben szignifikáns véleménykülönbség regisztrálható. A falusiak térség megközelítési gondjai a kisebb települések gyengébb infrastruktúrájához köthető, a meglévő utak rossz állapota kihívás elé állítja az ott lakókat. Ugyanakkor pozitívként megállapítható, hogy az infrastruktúra többi területén nem bizonyított a falusi és városi megkérdezettek véleménykülönbsége, közel azonos mértékben elégedettek a vízi közművel, valamint az elektromos- és gázhálózatokkal. Igényelt a szakképzettség helyzetének javítása, a megkérdezett falvakok elégedetlenségüket fejezték ki ebben a kérdésben a városiakkal szemben. Az iskolai végzettség település szerint is alapvetően befolyásolja a munkaerő-piac helyzetét, a város vonzásában lévő falvakban sokkal indokoltabb a szakképzett munkaerő megléte.

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## THE VALUE CREATING RELATION BETWEEN E-COMMERCE AND E-LOGISTICS

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### Abstract

One of the greatest challenges of our days in the field of logistics is the effect of E-logistics and E-commerce on each other, and the discovery of possibilities deriving from their relationship. In parallel with occurring internet in our daily life, the habits and expectations of customers have fundamentally changed. Traditional forms of commerce gradually lose their former roles, and as an effect of a modified/ changed technical environment it is getting more and more difficult to address the customers through conventional channels. Nowadays only those companies are able to produce real value-added products which know the needs of customers and are able to immediately react/ adapt to the modified needs and the challenges of changing economic environment as well. In order to know the expectations of customers it is important to 'map' the needs and categorize the customers themselves. The efficient relation between E-commerce and E-logistics give proper answer on this as well. The results in my field of research support the fact that companies do not pay enough attention on the value-added processes of E-logistics because they think that the competing parties will fall behind. Nevertheless this false comfort zone may endanger their position.

**Keywords:** *E-logistics, E-commerce, Supply chain management*

### Applied methodology

This study used technology-based evaluation for answering the raised question. In this study I deal with the defining moments of the relationship between E-commerce and E-logistics in details, and with their value creating relations. Using this study I wish to draw those conclusions that may help logisticians today to prepare for the future, giving answers for actual questions in the field of logistics.

### *The e-commerce*

Nowadays e-commerce has become one of the most dynamically growing forms of commerce worldwide which had, has and will have a significant role in the development of e-logistics. e-commerce means the trade, procurement and change of goods and services through the internet or IT channels. One of the most specific forms of e-commerce is the webshop which is established basically for selling goods and giving information on them. One of the important features of the system is that the maintenance costs are low because there is no need to spend on expensive advertisements. Moreover it is easier to address more people that can become target customers. This process helps value-added capability.

I have spent 15 years in sale and my experience is that people don't like when somebody wants to sell them something.....on the other hand they like shopping. The greatest challenge of E-

logistics is to support the process that establish the demand on the basis of customers' needs, and at the same time offer is converted into need and demand.

'Today the need to rise up to the customers' expectations also stands in the focus of quality and logistics ...' and factors defining competitiveness of products and services became equal factors, too (price, quantity, delivery accuracy, assortment, additional services connectde to the product, marketing functions, customer satisfaction)...' (GYENGE-KOZMA, 2005).

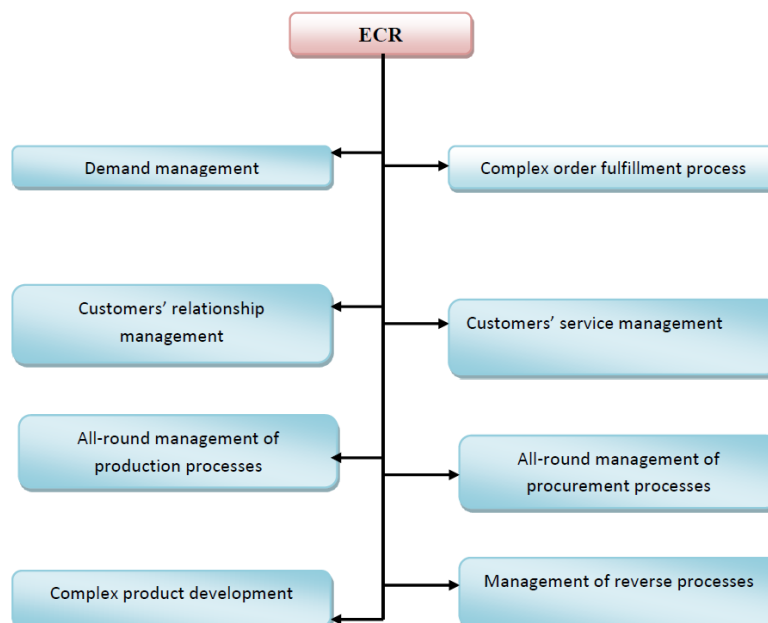
### *The IT background of e-commerce*

EDI in other words Electronic Data Interchange is the supporting frame system of E-commerce. It involves the exchange of messages without human intervention and is strictly regulated between computer networks.

### *ECR, the efficient solution in the service of value-added process*

The translation of ECR abbreviation: efficient answer for the customer which basically involves a supply chain management technique. Its aim: value creation for customers. In the supply chain applying ECR the common aims of the cooperating companies must be indicated from the aspect of value creation (Nagy J. 2008).

In the ECR Lambert és Cooper (2000, cites Gelei, 2008) identifies the following processes in the supply chain, the ECR is able to manage these processes:



### **E-logistics**

E-logistics is the totality of those activities that support the information flow in connection with commerce and logistic activity between the players of supply chain. The activity on the other hand is done for the sake of facilitating logistic processes with the help of internet IT background (Körmendi-Pucsek, 2008). E-logistics fulfills the role of electronic intermediary for E-commerce and E-business using the internet and IT background, controlling the flow of products, services and information, and supporting the value creating processes.

While previously the practise was that products and companies were competing with each other, today fierce competition takes place among many distribution channels. That is why a serious need occurred from the part of the companies to use updated data provided by modern logistic systems, and to establish their own distribution channels. International and domestic researches support the fact that by using E-logistics companies may achieve significant cost reduction. Moreover the quality of service may intensely improve which has a significant effect on strengthening the competitive advantage of the companies. Satisfaction of the customers' needs is realized when a product or service meets the customer in time and space. E-logistics can provide efficient solution for managing processes interrupted in time and space, so it provides the end users with the desired product then and there, and in the quality and quantity when it means value for them (Földesi P. 2006). The task of e-logistics to support the value creating processes and managing the supply chains overarch the companies, supply chains, countries, and ultimately between the continents.

### **Problem of the last mile**

E-commerce activity raises a specific problem, which is the problem of the last mile. This term comes from the fact that the transporting activity connected to the commercial activity forms a significant proportion of costs. While in the traditional retail system the customer can be perceived as a 'logistic worker' having a role in the process unintentionally (Duma, Nemeslaki 2004), in the e-commerce it can not be solved. The task of e-logistics will be in the future to be an intermediary between the virtual and real world. A survey by E-tailing Group (2004) describes it well that as an average only 3,67 minutes and 4,6 clicks are needed to order a product online, and it takes 4,4 days until the customer receives the same product. It means a heavy extra cost for the participants of the chain because the cost can not be devolved to only one participant, let's say the customer. The IT systems of E-logistics could give an efficient solution for this problem, which serves the value creation for the specific supply chain in the long run.

### ***The Logistics Information System, the LIS***

The LIS (Logistics Information System) are the logistics information systems which support the logistics company processes and serve the supply chain from the aspect of information technology in favor of reaching the customer satisfaction. The system provides retrievable and up to date information from various data, so it has significant value while making the right strategic and operational decisions for leaders who want to find the optimal combination of logistics cost and customer service standards (Szegedi-Prezenszki, 2003).

The value creating processes could not be established without the modern logistics information systems since the flow of information could not be resolved efficiently between the members of supply chain. While using e-logistics such additional added values appear like promoting the whitening of the economy as a result of the IT system can store the transitions and all of the processes in the related companies. All of this has significant impact regarding the taxing moral.

### ***The effect of e-logistics on the processes of storage and delivery***

As a result of storage examination the e-logistics mean solution in the following fields, contributes to the value creating processes:

- higher picking accuracy
- higher picking productivity

- accurate inventory data
- less administration
- less storage size needed

The problem of last mile mentioned before means a particular problem which adds up to significant part of the entire costs, so e-commerce activity is also causes significant costs for companies in the field of transportation because the transportation activity can be economical only in case of transportation large items (Duma L. 2002). The solutions of e-logistics provide support during the planning the free-capacity means of transport according the order areas which helps the economic planning of delivery. Owing to the forecast of the arrived items the delivery can be planned more accurately, which corrects the efficiency and the utilization level of the means of transport.

### ***Tracking of items***

The modern RFID tools which are responsible for electronic identification are able to provide information from items ordered by customers. Using RFID technology the companies can oversee the produced items, so they can provide accurate data from the ordering sections of the items during the whole day throughout the value creation processes. In my opinion it can be the added value in the process because of the decreased uncertainty.

### ***E-inverse logistics***

The e-inverse logistics is the part of the key company processes and at the same time one of the most important tool in order to keep the competitiveness of the company. The e-inverse logistics monitors the parts all of the supply chain processes, the evolution of the certain product, the feedbacks of the customers, and helping to prepare the decision making which is responsible for the value creation process.

Owing to the activity of e-logistics the companies can gain important information from the experiences in connection with the products which can be the following:

- reason of reverting (aging, guarantee, tired of product, etc.)
- status of the product when reverting
- point of sale of the product, place of origin
- manufacturer of the product
- time of reverting
- name of the returnee
- remarks of the returnee
- suggestions, advices, experiences of the user of the product
- age of the product
- type of the product

Further effect of e-inverse logistics reflected in the improvement of environmental efficiency and I think that in the future many new development will appear in connection with this field.

### ***The e-supply chain management, the e-SCM***

The e-SCM means managing all of the value creating processes which are supported with IT systems technology between the participants of the value creating chain. The cooperation of the

value creating chain members can be achieved with digital technology and taking advantage of the internet given possibilities in favor of common advantages. The solutions of e-logistics causes increased incomes regarding the taxes, road fees, and business taxes since the spread of electronic systems can improve the whitening of the economy.

### ***The improving efficiency of surveying the customers' needs by e-logistics***

E-logistics occurs – as a further effect – for the satisfaction of customers since by simplification of the ordering processes they spare time and money, and they can continuously track the way of the ordered product until the point of delivery. It is very easy to handle the electronic feedback received after ordering because clients can not lose it, it is always at disposal. Further argument on the side of e-logistics is that it has positive impact on inverse logistic processes since previous data can be retrievable at any time, and re-ordering can also be solved in a few moments.

My experiences support the fact that at the end of a life cycle of a product the customers – in case of re-purchase - don't even know where they bought the previous product so as a result of it they don't even know where to procure the next/ new one. How can we expect from our clients to remember us when we do not do our best to make our satisfied buyers loyal clients in the long run? My researches support that the processes of e-logistics contribute to the value creating processes more than the traditional logistic systems, or any other process of the activity of a company.

Nowadays those companies can satisfy the customers' needs in the most efficient way which are familiar with their needs and are able to immediately react on the immediately occurring demands/ needs, and the changing economic environment too. However in order to get to know better the expectations of the customers the needs have to be discovered and the customers have to be categorized by the company offering modern, e-logistic services (Olach Z. 1996).

The data provided by the IT system used by the members of the supply chain are capable of giving exact image on customers' needs after analysis. After discovering the customers' needs the members of the supply chain have the possibility to jointly analyze those possibilities that will be used in favor of the common aim. This will mean the satisfaction of the client which will contribute to the competitive advantage for the whole chain in the long run. Without the presence of e-logistics it will not be possible to operate the system effectively because there will be a lack of those capabilities that manage the chain processes.

E-logistics can influence the ordering processes of the companies in a way that the IT systems of the companies included in supply chain provide those pieces of information in cooperation that can be important for customers. They can be the following:

- stockpile
- delivery time
- availability of replacement items
- delivery tracking

Previous informations were not available in methodized format, customers did not get precise information, but with the appearance of e-logistics everything has changed. The internet based services are needed in full length of value chain which provides real time overview from delivery time, so we can easily plan the warehouse processes. The real time overview support the quick service which is the way towards the satisfied customers (Duma L, 2002).



## Suggestions, conclusion

The conclusion of my research, is that the e-logistics and e-commerce is the efficient way towards the value creating processes and the success of the whole supply chain. The apply of e-logistics can provide solution in the following areas:

- improvement of distribution processes
- accurate determination of customer needs
- value creation
- cost reduction
- added-value production
- improvement of customer satisfaction indicators
- optimized company processes
- GDP increasing effect
- bleaching of the economy
- Win-Win based two party experience

Beside the acquisition of new clients the logistics companies are able to optimize their utilization, they can reduce costs and the indicators of customer service will change for better. The one of the most important advantage that using e-logistics the companies can become to a 4PL logistics service company.

*I made the following proposals:*

- E-commerce and e-logistics should be a part of modern company strategy because their value creating capabilities blaze a trail for success in the long run
- In K+F processes we should pay more attention to electronic solutions which may define the development of value creating processes in the long run
- A significant role of state engagement must be achieved in order to make it possible for companies to introduce and realize e-logistics solutions in wider circles/ areas through which further GDP growth and industrial development can be achieved. This will have a value creating effect on the whole country as well

“In conclusion, the global e-commerce market is growing. In fact, according to eMarketer, global B2C e-commerce will reach \$2.3 trillion by 2017. This explosive growth brings about new opportunities, new customers, and new challenges. One of the biggest challenges will be controlling the last mile. Logistics infrastructure, economic and political regulations, and competition have proven to be roadblocks for many companies. But as the market grows, the solutions will too. (Logistics viewpoints: E-Commerce growth brings last mile headaches, 2015)

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## **THE REASONS FOR INCREASING EMPLOYMENT DEMAND IN THE PUBLIC SECTOR IN TURKEY**

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### **Abstract**

The economic changes taking place in the world and in Turkey, have led to changes in people's employment demand. Before 2000 government jobs had been considerably less attractive in Turkey, after 2000, when the economic crisis occurred in Turkey public employment demands started to increase. One of the reasons for this that a growing number of people have started to face the unemployment situation that made the formerly less desired public employment more alluring. Beyond employment security there have been also reasons Turkish people choosing to work for government. The goal of this paper how employment demand of Turkish people is changing. Based on last few decade's employment data the paper, will try to shed some light on the reasons behind the related new labor market tendencies.

**Keywords:** *Working Life, Career, Employment*

### **Introduction**

The economical fluctuations in the world and especially in Turkey has dramatically changed the demand regarding work force. Once it was not so popular to work in the public sector, the reason for this was the lower incomes and the stabilized average salaries in terms of earning money in the public fields. Therefore employees were mostly willing to work in the private sector to earn more money.

Employees found themselves in a situation in which they intentionally retreated not to lose their current job because of the competition, the diminishing number of companies, stabilization of salaries, shrinking of the fields of demand and the economical crisis. There are several triggering reasons why people are willing to work in the public sector today. The Turkish legislation clearly shows in the 49th amendment of the constitution that the employees are supported by the government itself in order to prevent a high unemployment rate, to protect the workers and to improve the living standard of the people (D.49) According to the law, the government is under the obligation of providing a job to its citizens. Tokol (2001:13) " The Turkish law explicitly says that the government has responsibility to employ its citizens as much as it can in leading industrial and socio-political enterprises.

It is said that humans do their best when the attitude is defined in terms of capacity of people. This means that there are desires and opportunities. Desires always define the best thing for a person. On the other hand, opportunities are the methods and choices of people which are genuinely made by them. (Elster,2007:199). Nowadays, one can say that one of the best work option is a post in the public sector. The significance of this is already depicted in the applications for the KPSS civil servant exams. As we can see in the table number 1, the number of people willing to pass this exam has increased showing the growing interest.

There are a dozen of good reasons why people in Turkey really want to work in the public sector. Some of them are as follows; lower chance to get a job in the private sector due to the

augmentation of the competition, lower salary positions, the ambiguity of working terms in the private sector, growing unemployment rates caused by the crisis. We will profoundly articulate below what are the main reasons why people are indeed willing to work in the public sector.

### **The process of hiring employees**

The main reason of running a business lies in making profit by it. The highest is the profit if the production costs are low and the quality of the product is superior to the average. (Akat, 2009:28) Moreover, public organizations are launched in order to serve a larger community. Those institutions are unified by the government that aims at a principle of social pragmatism and serving to community. (Sabuncuoglu, 2010:215)

In the process of hiring workers in the private sector, personal details of applicants, his or her CV, field experiences are the most important as much as the successes once has done in order to accelerate the process. (Barutcugil, 2004:262) On the other hand, the main principle of hiring workers in a public business is to provide the equality for the applicants. (Bulutoglu, 2004:190)

The government of Turkey, during the first years of the of the republic, has installed a new work force hiring system based on the amendments of the 1924 law system. Yet it has been implemented in 1926. In the law system of 1926, according to the announcement of 93rd notification; the qualification, rights, duties, promotions and the salaries of the clerks are considered according to the regulations. In 1926, a new amendment has been announced which is considered to care about the clerk rights (Güler, 2005:213).

Clerks are selected by the public organizations according the the law n. 788. The law also details the qualities a future employee must possess. That means that a clerk is supposed to have completed his or her secondary education. If there is not a convenient person from among the ones holding a secondary school diploma, it is permitted to hire someone without a proper degree. This system was fully implemented solely in 1939. In 1939, a new law came out on “Civil servants and their monthly income” which has regulated the organization of exams. No examination is declared or required for those who are not qualified as a clerk. (Duran, 2006).

For many years, in Turkey, a system of institutional exams was used, but for the first time in history, in 1965, according to the law n. 657 a mixed system has been introduced. This law has been modified in 1984.

The new exam system was proposed by the newly formed State Personal Directorate. This new system was a forerunner of the coming centralized system which came into existence in 1999 only. (Güler, 2005:171-172).

To make it more simple to be a public servant in 1999 DMS or Devlet Memurluğu Sınavı (Government Public Servants’ Exam) has been launched. This centralized exam was renamed later on, the appellation Central Exam of Public Organizations or Kurumlar İçi Merkezi Eleme Sınavı (KMS) was used in 2001 and the Public Personal Selection Exam or Kamu Personel Seçme Sınavı (KPSS) since 2002.

**Table 1. Applicants trying the KPSS according to their degrees 2004-2014**

Years	High School	Associate Degree	Undergraduate	Total
2004	1.092.479	246.434	392.846	1.731.759
2006	1.379.211	283.554	456.804	2.119.569
2008	1.483.767	373.922	550.690	2.408.379
2010	1.812.103	606.663	835.320	3.254.086
2012	1.877.684	695.175	931.307	3.504.166
2014	1.683.696	779.314	1.028.032	3.491.042

References: [www.dpb.gov.tr](http://www.dpb.gov.tr), [www.osym.gov.tr](http://www.osym.gov.tr), 05.04.2015

### Guaranteed work place - Continuous earnings

Guaranteed work place means that the employee can be sure of being employed on a long run. (Gök, 2006:84).

A civil servant has to be punished or commit a serious crime in order to lose his or her post. If this does not happen, he or she has a guaranteed place until the day of his or her retirement from work. There is not a way to fire someone because of him or her being judged incapable. (Aygün, 2010:67).

This cannot be said about a private company. In the private sector, it is a must for an employee to progress and the person concerned can lose his or her job for various reasons.

The legal basis regarding the civil servants, the law n. 657 drafted in 1965 empowers the employees in five ways. These are the protection against the changing nature of the government, the status, of the employee, the permanence of the job and work place and the fact that the civil servant is protected by the law in case of a legal procedure by a third party. (Güler, 2005:176-181).

Nowadays, the number of employees loosing their job is increasing. This means that the fearing of loosing his or her job is increasing, too. In many sectors, there is a clear uncertainty concerning the continuous nature of the work places. (Seçer, 2009:307).

A civil servant can lose his or her job only cases defined by the law. (Kayar, 2011:386). In reality, those working in the public sector lose their job if they commit a serious crime. This also means that their position is maintained even times of economical crises in the country. We can find this motive in the answers given by those opting for the public sphere: "I am afraid of loosing my job" or "I fear that I might be fired." (Seçer, 2009:313).

The examples showed above clearly demonstrate that the public sector is not only attractive for the unemployed, but also for those working somewhere else.

The big economical changes might make the work force restless, this is why everywhere in the world people fear to lose their job, especially in times of crises whereas a permanent income is necessary for a decent life.

## **Unemployment**

Unemployment is the difference between the number of unemployed and those willing to work. In our industrialized time, the unemployment is not derived from a personal deficiency or incapability but from the economical system itself. That means that there a lot of people with the intention and ability to work but without the chance to get a job. Having said that unemployed is the one who unsuccessfully tries to find a job. (Ayvaz, 1990:15-16).

Ertürk presents the effects of unemployment on the unemployed as follows: (2004:331) “What is more difficult to realize? The fact that the value of your money is decreasing or the fact that you do not have money at all? The first situation is that of inflation, the second unemployment. Inflation means that you partially lose your capability of buying different items, unemployment means that you cannot buy anything. This shows that in the developing countries the fight against unemployment is much more important.” In developed countries, unemployment is created by the dynamism and industrialization of the economy, whereas in the underdeveloped world, it is a particular question raised by the lack of capital. The very reason for the unemployment in those countries is a mismatch between the labor supply and the capital. This form of unemployment is structural and persistent. (Ayvaz, 1990:17-18).

In Turkey, the main reason for the existence of unemployment is the high number of economical crises. The situation is more volatile in Turkey since it has a special demographic structure: the unemployment rate is incredibly high among the youth. The number of the young unemployed is growing by each and every crisis. (Yaprak, 2009).

The unemployment is a pressing issue also because many of the ones without a permanent job have to look after relatives (children, wife, parents) and have certain responsibilities within the frame of a traditional family, to might lead them to a deep unease. (Ertürk, 2004:336-337).

During the last few years, Turkey’s economic growth was spectacular contributing to a small decrease in the field of unemployment. In 2011, with 8,5%, Turkey was placed second after China in the list ranking the growth of the GDP. That means that in that particular year the economical growth of the country bypassed that of the EU or OECD countries. (www.milliyet.com.tr, 02.03.2015). This is the main cause behind the decrease of unemployment as shown in the table n. 2.

In every country, unemployment is one of the most important problems of economy. It is foreseeable that it would also remain to be one of them. Even though it would stay with, the workers develop different strategies to fight it back in their personal lives.

The new Turkish exam system introduced in 1999 has at least the virtue of championing the equality of chances, meaning that the “gates of the public sector are open” for the ones who are ready for working for it.

**Table 2. Unemployment Rate**

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Avustralia	5,93	5,40	5,03	4,79	4,38	4,23	5,56	5,21	5,08	5,22	5,66	6,07
Belgium	4,29	5,49	5,63	5,25	4,86	4,13	5,30	4,82	4,57	4,86	5,34	5,62
Canada	7,58	7,19	6,76	6,33	6,05	6,14	8,35	8,06	7,53	7,29	7,08	6,91
France	8,46	8,85	8,88	8,83	8,01	7,39	9,12	9,28	9,17	9,83	9,86	9,86
Germany	9,64	9,79	11,17	10,25	8,66	7,53	7,74	7,07	5,83	5,38	5,23	4,98
Greece	9,79	10,59	9,99	9,01	8,40	7,76	9,62	12,72	17,87	24,44	27,47	26,49
Israel	10,71	10,37	8,99	8,40	7,32	6,10	7,54	6,64	5,60	6,85	6,21	5,91
Russia	8,63	8,16	7,56	7,17	6,13	6,36	8,38	7,48	6,50	5,46	5,49	5,16
Japan	5,26	4,72	4,42	4,14	3,84	3,99	5,07	5,05	4,58	4,35	4,03	3,59
Korea	3,57	3,68	3,73	3,47	3,25	3,17	3,65	3,73	3,41	3,23	3,13	3,54
New Zealand	4,78	4,05	3,83	3,85	3,67	4,17	6,13	6,53	6,53	6,90	6,20	5,65
Spain	11,49	10,67	9,15	8,45	8,23	11,24	17,86	19,86	21,39	24,79	26,06	24,44
Switzerland	...	...	...	...	...	...	...	4,55	4,04	4,18	4,39	4,54
Turkey	...	...	...	8,75	8,89	9,73	12,58	10,68	8,81	8,17	8,74	9,88
England	4,97	4,70	4,76	5,37	5,28	5,63	7,54	7,79	8,04	7,89	7,53	6,11
United States	5,99	5,53	5,07	4,62	4,62	5,78	9,27	9,62	8,95	8,07	7,38	6,17
EU(28)	...	...	8,90	8,17	7,16	7,00	8,91	9,58	9,62	10,45	10,79	10,13

Reference: <https://data.oecd.org/unemp/unemployment-rate.htm#indicator-chart>

## Salary

The salary recognizes the physical or mental efforts one has done while working. The salaries in the private sector are defined according to the possibilities on the market. The management of a private company is free to fix the salaries after contemplating the market and the labor force market as well. Enterprises are aimed at increasing the work efficiency without raising to much the income of the workers. (Tokol, 2001:163).

This situation might fit the taste of the management, but it is hardly good for the workers. In Turkey today, the lowest salary in the public sector is much higher than the lowest salary in the private sector. To prove this, we have to have a look at the sum of the official minimum wage paid the latter one. The tendencies show that in recent times with diminution of the size of the enterprises the salary decreases as well. Even though the average salary in the public sector is not high, as it is guaranteed, many would opt for a post in the public.

If we try to define the difference between the lowest incomes in the two sectors, we find that the lowest wage in 2003 in the private sector was 306 Turkish lira ([www.csgb.gov.tr](http://www.csgb.gov.tr), 02.04.2015), at the same time the least paid civil servant got 422,54 Turkish lira. ([www.kamusen.org.tr](http://www.kamusen.org.tr), 02.04.2015) In 2015, the lowest salary of a civil servant is 2.114 Turkish lira ([www.sabah.com.tr](http://www.sabah.com.tr), 29.03.2015) whereas the official minimum wage in the private sector is as low as 949,07 Turkish lira. ([www.csgb.gov.tr](http://www.csgb.gov.tr), 05.04.2015)

## **Working conditions**

The working conditions are said to be better in the public sphere since the main interest of a private company is profit. This is why at many occasions, companies do not care about the health of their workers. A good example of that is the events that had happened in the Tuzla Shipyard in 2008 that lead to a loss in human lives. It is interesting to examine how the irresponsible behavior of the management can be blamed for the accident (Arslan, Durukanoğlu, 2009) “Metin Kalkavan, the head of the Naval Trade Chamber (Deniz Ticaret Odası, DTO) said “we are not producing iron, we are not producing textile, we produce ships. The workers have to bear in mind that they can die while working.” as if death was a natural thing.

On the 11th March 2012, in a fire occurring in Esenyurt 11 workers have been killed. The colleagues of those deceased in the incident explained the working condition in the following manner: (Zaman,2012) “All the victims were guest workers. Their families live in other parts of the country. The contractors did not do anything to make the working conditions better. Next time would we stay under tents?”

The annual report of the International Labor Organization (ILO) puts Turkey on the list of countries notorious for providing poor working conditions. They state that there are major problems as far as the taking into consideration of the security norms and regulations are concerned. (MMO,2012:147). According to the statistics of the ILO, in every 15 seconds there is an accident at work causing the death or the injury of a worker. In Turkey, on a yearly basis, 1200 workers die, 1400 more get disabled. With these sad statistics Turkey is the first in Europe and third in the World! (İlki,2012).

One might say that for sure there are many countries where much more people die at work, but they do not prepare that accurate statistics or hide the reality. We can also say that in the past few years the number of work place accidents is slowly decreasing in Turkey.

Civil servants have prescribed working hours. Those working in the private sector work under difficult conditions and are exposed to the wills and desires of the management. In the 3rd table, one can see that Turkey is one among the OECD member states where the working hours are the longest in the 2006-2013 period. There is not a law governing this at the private enterprises. In fact, workers are forced to accept all the conditions imposed by their bosses in order to keep their job.



**Table 3. Average usual weekly hours worked on the main job**

Country	2006	2007	2008	2009	2010	2011	2012	2013
Australia	36,738979	36,856101	36,836048	36,421326	36,321317	36,348215	36,401095	36,257463
Austria	39,170757	38,933303	38,492043	38,059584	37,780272	37,760769	37,605075	37,184155
Belgium	36,794734	37,079152	36,761447	36,771727	36,915255	36,83673	36,943155	37,242192
Canada	..	..	..	..	..	..	..	0
Chile	43,92874	43,696636	43,805447	43,369044	42,725561	42,673517	42,675863	42,457252
Czech Republic	41,702076	41,677377	41,662859	41,386864	41,168292	41,046791	40,838247	40,47339
Denmark	35,348419	34,365398	34,10386	33,729679	33,631796	33,658034	33,579977	33,612797
Estonia	39,644491	39,557876	39,446915	38,721502	38,733865	38,667595	38,808186	38,832472
Finland	38,099754	37,484488	37,539698	37,296269	37,294128	37,244229	37,10817	36,906825
France	38,097286	38,097981	38,129652	38,047257	38,038025	38,033482	37,921268	37,51147
Germany	35,605923	35,500808	35,578328	35,679218	35,682817	35,539577	35,549178	35,31468
Greece	42,735403	42,470764	42,444169	42,490929	42,295987	42,123748	42,024106	42,116731
Hungary	40,303222	40,227273	40,087722	39,84612	39,752103	39,45942	39,433914	39,544383
Iceland	41,653217	41,642424	41,227307	39,442283	39,088657	39,701873	39,437571	39,585155
Ireland	36,582679	36,391089	36,092091	35,214705	34,974134	34,883809	35,042434	35,373867
Israel	41,040055	41,401824	41,031859	40,609894	40,793035	40,855589	41,065638	40,704958
Italy	38,531734	38,44855	38,242456	37,998801	37,789313	37,508515	37,058582	36,93851
Japan	..	..	..	..	..	..	..	0
Korea	48,530558	47,675665	46,648479	46,551921	45,85522	44,632304	45,327864	43,778249
Luxembourg	37,270826	36,696102	36,726221	37,151501	37,153274	37,01358	37,195304	37,132894
Mexico	40,56777	40,415227	40,455902	40,303825	43,131004	43,25957	42,806668	43,00552
Netherlands	30,86487	30,77393	30,751236	30,595624	30,62216	30,518187	30,332777	29,993395
New Zealand	37,973608	37,744117	37,643195	37,355855	37,424036	37,418172	37,267926	37,545453
Norway	34,223512	34,255483	34,268715	34,191374	34,097065	34,144037	34,261314	34,240939
Poland	40,916841	41,009228	40,970458	40,744306	40,587975	40,545215	40,671146	40,713386
Portugal	39,084586	38,975126	39,038747	38,943503	38,952616	39,153775	39,158034	39,440116
Slovak Republic	40,988897	41,008359	40,943583	40,761555	40,567887	40,55462	40,739158	40,689809
Slovenia	40,341105	40,33359	40,448451	39,785167	39,365302	39,470058	39,773538	39,591035
Spain	39,407997	39,309632	39,144344	38,845649	38,667771	38,452049	38,165513	37,994254
Sweden	36,735116	36,453563	36,37532	36,2923	36,336025	36,326793	36,366855	36,326868
Switzerland	35,416985	35,550259	35,342733	35,125543	35,174421	35,237874	35,142207	35,046037
Turkey	52,335878	51,048875	50,512668	49,375147	49,266117	48,855397	48,381272	47,860752
United Kingdom	36,922432	36,990414	36,913383	36,552742	36,419022	36,407818	36,364452	36,507723
United States	..	..	..	..	..	..	..	..
Brazil	39,715029	39,751804	39,733118	39,667502	..	39,747054	39,504283	..
Russian Federation	..	..	..	..	..	..	..	0
Sout Africa	..	..	45,414125	44,702206	44,501645	44,528005	44,244164	43,974411

Reference: [www.oecd.org](http://www.oecd.org), 02.04.2015

### Social status

Social status is understood as the rights and responsibilities of a group of people as well as they position or rank according to other groups. (Yozgat, 1997:107).

Everyone has a certain social status. Everyone has a certain situation within the society he lives in as societies are not composed in random manner. Societies are organized on the basis of the elements constituting it. (Fischter, 2009:35).

Everyone has different statuses within the same society. For example one can be a father, a husband and employee at work place at the same time, he or she can -at a given level- lead other employees, as far as the national level is concerned, he is a citizen of that country. All these are different social statuses. (Gün, 2009).

Social status explains the prestige and the value of the individual for the rest of his or her society. If his or her role to be played within the frame of the given society is important, he or she holds there a high social status. (Yozgat, 1997:107).

In general, the position of a civil servant is considered as a high social status. Societies show respect towards the ones working in the public sector as they think that such a job is pleasant and fits the desires of a worker.

### **Leave**

There is a certain difference between the number of the days of leave and vacations in the public and the private sectors. According to the law n. 657 the government guarantees the following amount of days to the civil servants: during the first ten years of work 20 days, after that 30 days. A maximum of 2 days can be added to this for those commuting between their work places and homes. According to the law n. 4857 those working in the private sector have the right to 14 days during the first five years, five and fifteen years of experience let you to spend 20 days away of your office, at least 15 years spent working entitles you to get 26 days of leave. Considering this information, the civil servants have more vacations.

The civil servants can use their leaves easier than the ones working in the private sector. In the private sector, many companies force their employees to take unpaid leaves. This would be impossible in the public sector.

### **Career**

Carrier means “the personal advancement of a worker from his or her first year until the end of his professional life.” (Turgut Özal Üniversitesi KARMER,2011:10).

The person concerned advances in the hierarchy and with every step he or she gets closer and closer to high ranking positions. (Baycan,2005:54).

Someones career cannot be influenced by laws in the private sector. Every private enterprise has its own career scheme. The career of the civil servants is regulated by laws. In Turkey the Law on Civil Servants or Devlet Memurları Kanunu (DMK) which describes precisely what kind of degrees and deeds are necessary to advance in one’s career, this gives always the chance to the civil servant to improve and climb the hierarchy. (657 DMK,m.3).

In the present Turkish civil servant career system advancement is made step by step, meaning that the person has to serve a given time period (one year), to get the necessary stamps, this advancement can be called a gradual advancement. A civil servant can progress as well in a vertical way in the system, this also spells more responsibilities and work to do. According to the law n. 657 and its paragraph n. 68. A civil servant has to serve at least three years and to have all the necessary qualifications to be able to reach a high position (third level). (Şaylan, 2000:37).

This progression is not open to everybody working in the public sector, only the civil servants and some similar subgroups have access to it. So, ordinary workers and those working on the basis of a contract cannot progress in the above-described manner. (Güler, 2005:225).

## **Conclusion**

Human beings in Turkey as well as in other parts of the World out of their inherent nature want to live the best possible way. Working in the public sector in Turkey slowly became attractive not only for the ones having low degrees of education but also for the well versed. Today, it is the goal of many university students.

Finding a stable job became a preference since unemployment is high and economical crises are frequent. As the private sector becomes more and more fragile, parents advise their children to opt for the public sector causing a heavy growth in the number of civil servants.

It is nearly a fact that this growth would continue in the future. Since 1999 the exam then called DMS, later renamed KPSS let a larger number of applicants to get to the civil service.

After all the most important reason behind choosing the public sector is a security it guarantees for its employees. Because of inner problems, sometimes, private companies offer lower and lower wages. In Turkey, the salary one can obtain in the civil service is fixed, it is also known how much it can increase year by year. The salaries proposed in the public sector is linked to the economical situation of the country, it is always sufficient to live a decent life.

When civil servants go shopping they might say to the shopkeeper: "I am a civil servant, please, give me a discount", the shopkeeper would answer: "I would like to be one, too". It means that being a civil servants is convenient not only in periods of crisis, but also at times when economic growth is there.

If we consider the situation in Turkey and in the World, it seems that number of people opting for the public sector would not decrease but increase. For civil servants, the Turkish state acts as an employer. On one hand, certain Turkish governments privatize a part of the public sector, this way they distance themselves from the position of an employer, but on the other hand the growing number of people willing to work in the public sector would make this sector even stronger.

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