FOLIA GEOGRAPHICA

INTERNATIONAL SCIENTIFIC JOURNAL

CONTENT

KRAJINNÁ ŠTRUKTÚRA NÁRODNEJ PRÍRODNEJ REZERVÁCIE SIVA BRADA V ROKOCH 1877, 1957, 2015 A JEJ SÚČASNÝ STAV Z ASPEKTU OCHRANY

THE LANDSCAPE STRUCTURE OF NATIONAL NATURE RESERVE SIVÁ BRADA IN YEARS 1877, 1957, 2015 AND ITS CURRENT STATUS FROM THE ASPECT OF NATURE PROTECTION

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Abstract

National Nature Reserve Sivá Brada is located in the eastern part of Hornádska kotlina basin and is under the administration of the State Nature Conservancy of the National park the Slovenský raj. Sivá Brada was declared a nature reserve in 1979 (later in 2002 as a National Nature Reserve). It is included in the fourth degree of protection under Decree no. 543/2002 Coll. "The law of nature and landscape protection" of the National Council of the Slovak Republic. The purposes of nature protection are the forms of relief at the youngest Holocene travertine hill and rare halophytic and xerophilous species of plants and halophytic communities' wetlands on travertine hill and in vicinity. National Nature Reserve has a high of natural historical and cultural value, and its protection is important in maintaining a precious natural structure for future generations and for scientific research. The main objective of this paper is to point out the failure to the protection of this very important natural site. Domain of research was the development classes of land cover in three time horizons 1877, 1957, 2015 and research impact of human activity to National Nature Reserve and as well as status of protection this rare locality.

Key words

National Nature Reserve (NNR), travertine hill, Carpathian salty wetlands, Nature protection, Sivá Brada

ÚVOD

Výskyt travertínových kôp a iných útvarov v Západných Karpatoch je spojený s geologickou a tektonickou stavbou územia. Travertíny boli vytvorené chemickým procesom vyzrážania sa uhličitanu vápenatého z minerálnych prameňov za podpo-

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ry procesu organizmami (riasy, sinice, vyššie rastliny) v priebehu pleistocénu a holocénu. Sedimentácia travertínu je daná dvoma faktormi: chemické zloženie vody minerálnych prameňov a klíma (teplota a vlhkosť), ktoré určovali vzťah k zrážaniu $CaCO_3$ v cykloch. Travertínové kopy a travertínové terasy predstavujú významnú skupinu foriem reliéfu v kotlinách a nížinách Západných Karpát. Vo východnej časti Hornádskej kotliny vznikli z minerálnych prameňov, ktorých kolektory sú umiestnené v bloku tektonicky porušených (zlomy smeru SZ - JV, JV - SZ a S – J) druhohorných sedimentov (vápencov a dolomitov) nachádzajúcich sa v hĺbke okolo 600 - 800 m pod sedimentmi zubereckého súvrstvia vnútrokarpatského paleogénu (Gross ed. 1999). Minerálne pramene prenikli na povrch po priečnych zlomových líniách (Marcin 2000) a vytvorili sa z nich v období pleistocénu a holocénu travertínové kopy. Vo východnej časti Hornádskej kotliny sa nachádza 7 travertínových kôp, ktoré sú vekovo diferencované a travertíny rôzneho veku sú uložené vedľa seba, nie v superpozícii nad sebou. V najstarších travertínových kopách rástla mocnosť travertínu (Dreveník okolo 100 m) a minerálne pramene tu postupne stratili silu výtlaku (došlo k zmene piezometrickej úrovne) a tak sa presunuli pozdĺž zlomov na západ alebo východ Podhradskej kotliny, kde vytvorili nové mladšie travertínové kopy. Najmladšia z nich je Sivá Brada (vek 10 000 rokov) a tvorba travertínu tu pokračuje aj v súčasnosti. Prameň minerálnej vody, z ktorej sa sformovala travertínová kopa bol pôvodne vo vrchole kužeľovitého travertínového kopca. Sivá Brada je veľmi významnou lokalitou a má vysokú prírodovednú, paleontologickú a kultúrnu hodnotu, preto bola v roku 1979 vyhlásená za prírodnú rezerváciu (neskôr za národnú prírodnú rezerváciu). Hlavným cieľom príspevku je poukázať na vznik a vývoj krajinnej štruktúry v Národnej prírodnej rezervácii, ako aj na súčasný stav jej ochrany.

MATERIÁL A METÓDY VÝSKUMU

Príprava dát bola spojená s hlavným cieľom výskumu. Pre analýzu zmien krajinnej pokrývky boli pre rok 1877 použité reambulované topografické mapy tretieho vojenského mapovania a pre rok 1957 topografické mapy z mapovania v rovnakom roku. Pre rok 2015 sme využili ortofotomapy, ktorý obsah bol doplnený terénnym výskumom. Prostredníctvom vektorizácie sme vytvorili mapy tried krajinného krytu (obr. 1, 2, 3, tab. 1). Výskum štruktúry tried krajinnej pokrývky v jednotlivých časových horizontoch bol identifikovaný na základe metódy CLC (Corine Land Cover, Feranec a Oťaheľ 2001). Pre identifikáciu tried krajinnej pokrývky sme použili legendu CLC spracovanú pre potreby krajinno-ekologického výskum pre krajiny PHARE (Feranec a Oťaheľ 1996). Získali sme mapy tried krajinnej pokrývky pre jednotlivé časové horizonty, ktoré odrážajú vývoji štruktúry krajiny na skúmanom území.

GEOGRAFICKÁ POLOHA

Travertínová kopa Sivá Brada sa nachádza vo východnej časti Hornádskej kotliny, presnejšie v geomorfologickom podcelku Podhradská kotlina (Mazur a Lukniš 1980) na mierne zvlnenom reliéfe kotlinovej pahorkatiny v nadmorskej výške od 470 do 500 m (500,5 m n. m. je presná výška kopy). Geografická poloha lokality je z hľadiska ochrany prírody veľmi extrémna. Je umiestnená blízko cesty E 50 európskeho významu a diaľnice D1. Travertínová kopa Sivá Brada je predmetom ochrany prírody, ale je tiež pútnickým miestom (Spišský Jeruzalem, miesto symbolizuje pre veriacich Golgotu) a miestom návštev veľkého počtu motoristov, turistov a účastníkov školských výletov, ako aj náhodných návštevníkov Spišského salaša na susednej travertínovej kope Pažiť. Na vrchole travertínovej kopy sa nachádza pútnická kaplnka Sv. Kríža, na južnom úpätí je turistická ubytovňa (bývalé kúpele) a na východnom úpätí je parkovisko, informačné tabule, reklamné panely a toalety. Cez rezerváciu vedie peší turistický chodník a náučný chodník a okolo rezervácie cyklotrasa. Nazdávame sa, že niektoré vyššie uvedené objekty by nemali mať miesto v Národnej prírodnej rezervácie a rovnako vyššie uvedené činnosti sú nevhodné (Národná prírodná rezervácia nemôže byť masovým pútnickým miestom).

FYZICKOGEOGRAFICKÁ ŠTRUKTÚRA

Travertínová kopa Siva Brada sa nachádza na pieskovcovo-ílovcovom súvrství vnútrokarpatského paleogénu v erózno-tektonickej depresii Podhradskej kotliny v rámci geomorfologického celku Hornádska kotlina. Sivá Brada s geomorfologického hľadiska predstavuje kužeľový kopec s kruhovou základňou s priemerom 300 m a s relatívnou výškou 25 m. Budujú ho holocénne travertíny (bielo-sivej farby) s hrúbkou okolo 15 m. Kopa je vytvorená z pevných dosiek travertínu hlavne v strednej časti. Na okrajoch okrem pevného travertínu sú vápencové tufy a krusty. Samotná kopa má rozlohu 108 966 m², zatiaľ čo celá rezervácia má 195 472 m², lebo k nej patrí aj Hradská lúka (podmáčané lúky na vápnitých tufoch, mokrade a močiare). Svahy travertínovej kopy majú sklon 15° - 20°. Podľa klimatickej regionalizácie Slovenskej republiky patrí lokalita do mierne teplej oblasti do subregiónu M2, ktorý je mierne teplý mierne vlhký so studenou zimou s priemernou teplotou -5 ° C v januári a 16 ° C v júli. Počet letných dní v roku je menej ako 50 (Lapin et al. 2002). Pôdna pokrývka (Medzinárodný klasifikačný systém pôd, 2014) je reprezentovaná pôdnymi typmi: Rendzi-Lithic Leptosols a Rendzic Leptosols (v pôdach je vysoký obsah $MgSO_4$). Sivá Brada je známa výskytom spoločenstiev halofytných druhov rastlín s *Glaux maritima* (sivuľka prímorská), *Plantago maritima* (skorocel prímorský) a *Triglochin maritima (barička prímorská)* zo zväzu *Scorzonera-Juncion gerardii* a *Halo-Trichophorion pumili* (Dítě, Pukajová 2004). Existencia týchto vzácnych "karpatských travertínových slanísk" na Sivej Brade bola podmienená výskytom minerálnych prameňov. Celková výmera tohto biotopu v Západných Karpatoch na území

Slovenskej republiky je iba 10 ha (Dítě, Eliáš a Sádovský 2004). Halofytné druhy sú sústredené okolo minerálnych prameňov a nachádzajú sa aj na tej časti svahov travertínovej kopy, ktoré sú podmáčané vodou z minerálnych prameňov a sporadicky aj v mokradiach na úpätí travertínovej kopy (Hradská lúka). Tam, kde minerálne vody nestekajú po povrchu terénu sa v trávnych spoločenstvách vyskytuje prímes vzácnych druhov suchomilnej a teplomilnej vegetácie (Stanová, Valachovič 2002). Hradská lúka sa skladá z biotopov floristických asociácií, ktoré sú náročné slnečné svetlo a živiny alkalických minerálov a sú reprezentované vápnitými slatinami. Vzhľad spoločenstiev rastlín určuje *Carex davalliana* (ostrica Davallova) a *Eriophorum angustifolium* (suchopýr úzkolistý).

Faunu reprezentujú niektoré špecifické druhy, napr. z motýľov *Gynnidomorpha vectisana* (viazaný na halofytné druhy rastlín, napr. na *Plantago maritima* a *Triglochin maritima*) a *Elachista contaminella* (Patočka, Kulfan a Štrbová 2009). Z významných druhov hmyzu tu žije *Javesella salina* (*Hemiptera*) patriaci k ohrozeným živočíchom (Škapec et al. 1992). Z dôležitých európskych druhov sú tu ulitníky, rod *Vertigo* (*Vertigo angustior*, *Vertigo geyeri*), ktoré majú tendenciu zaberať alkalické močiare a vápenaté slatiny (Šteffek, Vávrová 2005). Charakteristickú skupinu predstavujú chrobáky rodu *Dyschirius* (*Carabidae,* rody *Bledius* a *Carpelimus*) žijúce vo vlhkých pôdach a sú závislé na prítomnosti slanomilných druhov rastlín, ktorými sa živia (riasy a rozsievky). Hmyzožravce sú zastúpené druhmi *Sorex araneus* a *Sorex minutus* (Stanko, Mošanský a Budayová 2000).

VÝSLEDKY VÝSKUMU KRAJINNEJ POKRÝVKY V JEDNOTLIVÝCH ČASOVÝCH HORIZONTOCH

Travertínová kopa sa nachádza uprostred poľnohospodárskej krajiny, ktorá bola intenzívne kultivovaná po celé stáročia. Štruktúra krajiny a krajinnej pokrývky bola vytvorená pod vplyvom aktivít človeka. Sivá Brada bola súčasťou poľnohospodárskej krajiny s prevahou hospodárenia v súkromnom sektore. Pokrývali ju trvalé trávne porasty využívané ako pasienky, hlavne pre ovce. Existencia súkromného poľnohospodárstva bola ukončená v roku 1958 a následný vývoj ovplyvnil veľmi negatívne charakter kultúrnej krajiny. Vyhlásenie prírodnej rezervácie (v roku 1979) podstatne zmenilo predchádzajúce využitie krajiny. Pasenie a kosenie lúk bolo v rezervácii zakázané a to významne ovplyvnilo zloženie trvalých trávnych porastov, najmä lúk. Pestré a druhovo bohaté lúky ako aj pasienky sa zmenili na jednoduché monokultúrne spoločenstvá tráv. Ďalšia zmena nastala po roku 1989 v kontexte ekonomickej transformácie poľnohospodárstva a zmeny vlastníctva pôdy. Vývoj štruktúry krajiny v súčasnej Národnej prírodnej rezervácii sme skúmali v troch časových horizontoch 1877, 1957 a 2015. V časovom horizonte 1877 a 1957 Siva Brada ešte nebola Prírodnou rezerváciou a v roku 1877 tu neboli kúpele.

Nesúvislá sídelná zástavba (1.1.2) sa nachádzala v roku 1877 (tab. 1 Obr. 1) na najmenšej ploche iba na 0,0050 ha, čo predstavuje pútnický kostol a kamenný kríž na vrchole travertínovej kopy. Trieda krajinnej pokrývky prírodných trávnych porastov (3.2. 1.) zaberala v tomto roku najväčšiu plochu (3.2.1. prírodné trávne porasty so suchomilnými a subalpínskymi druhmi) 11,5 ha a druhý najväčší areál patril ornej pôde 5,6 ha (2.1.1. nezavlažovaná orná pôda). Trieda krajinnej pokrývky, močiare, vápnité slatiny a vlhké lúky (3.2.2. močiare a vresoviská, vápnité slatiny a slatinné lúky) boli na ploche takmer 2 ha (1,90 ha). Trieda dopravných sietí (1.2.2. Cestná a železničná sieť a priľahlé areály) zaberali 0,36 ha a trieda odkrytého skalného podložia (3.3.2. odkryté skalné podložie, holocénne travertíny) sa nachádzala na ploche 0,063 ha. Trieda slaných mokradí (4.1.1. karpatské travertínové slaniská) zaberala 0,098 ha.

Podobná situácia bola v roku 1957, ale stavba kúpeľov zvýšila podiel zastavanej plochy, teda nesúvislej sídelnej zástavby (1.1.2) na 0,080 ha a podiel triedy komunikácií (1.2.2.) sa znížil o 0,085 ha. Podiel ornej pôdy (2.1.1. nezavlažovaná orná pôda) poklesol o 1,16 ha a na jej úkor sa zvýšil podiel triedy prírodných trávnych porastov (3.2.1) približne o 1,3 ha a zároveň aj podiel triedy karpatských travertínových slanísk (4.1.1.) o 0,16 ha. V triedach krajinného krytu 3.2.2. (vápencové slatiny

Tab. 1 Triedy krajinnej pokrývky na Sivej Brade v rokoch 1877, 1957, 2015

Triedy krajinnej pokrývky (CLC legenda na 3. stupni)	Výmera v m² 1877	Výmera v m² 1957	Výmera v m² 2015
1.1.2. Nesúvislá sídelná zástavba	50.14	857.97	50.14
1.2.2. Cestná a železničná sieť a priľahlé areály	3608.59	2756.88	3959.11
2.1.1. Nezavlažovaná orná pôda	56608.52	44987.95	11838.08
3.1.3. Zmiešané lesy – Kúpeľný park	0	36.22	36.22
3.2.1. Prírodné trávne porasty s xerofytmi a dealpínskymi druhmi	114491.72	124863.24	129403.04
3.2.2. Vápencové slatiny a slatinné lúky	19090.23	18756.25	45887.57
3.3.2. Odkryté skalné podložie, holocénne Travertíny	637.25	637.25	1317.77
4.1.1. Karpatské travertínové slaniská	985.50	2576.25	2908.07
Počet minerálnych prameňov	4	4 + 1	4 +1
Počet informačných tabúľ	0	0	2
Počet reklamných a propagačných panelov	0	0	2
Stánky pre predaj	0	0	v lete
Toalety	0	0	2

Zdroj: V. Solár, E. Michaeli (2015)
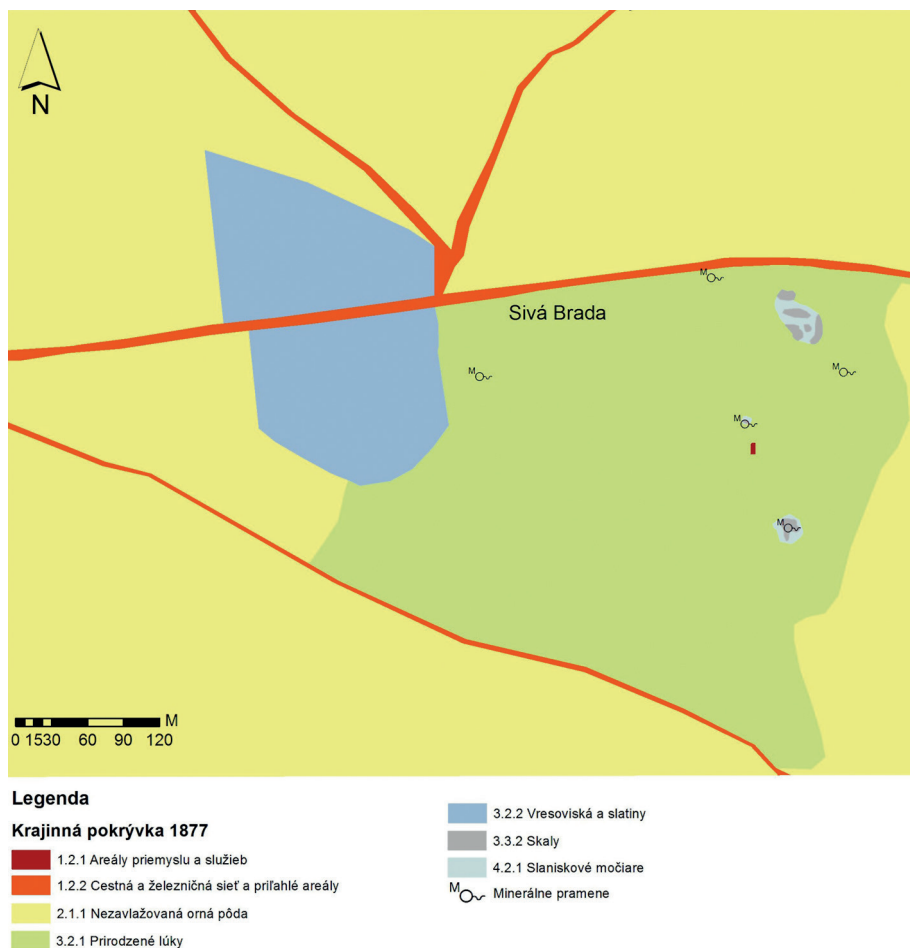
Obr. 1 Štruktúra krajinnej pokrývky lokality Sivá Brada v roku 1877

a slatinné lúky) bol pokles výmery asi o 0,033 ha. Trieda odkryté skalné podložie (3.3.2.) mala rovnakú výmeru v oboch časových horizontoch. V roku 1957 do štruktúry tried krajinnej pokrývky vstupuje nová trieda zmiešané lesy (3.1.3 zmiešané lesy, kúpeľný park) s rozlohou 0,0036 ha.

V Národnej prírodnej rezervácii sme v roku 2015 identifikovali nielen plošné, ale aj bodové objekty a sú na mape zobrazené značkami, napr. pramene minerálnej vody a hydrogeologický vrt, ďalej sú tu niektoré úplne nové prvky, napr. informačné tabule, propagačné a reklamné panely, toalety a v lete aj stánky pre predaj. Nové prvky sa infiltrovali do Národnej prírodnej rezervácie prevažne v ostatných dvoch decéniách a majú negatívny vplyv na samotný predmet ochrany v rezervácii a nie sú v súlade so zákonom o ochrane prírody a krajiny Slovenskej republiky (tab. 1, obr. 3).

Legenda

Krajinná pokrývka 1957

- 1.2.1 Areály priemyslu a služieb
- 1.2.2 Cestná a železničná sieť a priľahé areály
- 2.1.1 Nezavlažovaná orná pôda
- 3.1.3 Zmiešané lesy
- 3.2.1 Prirodzené lúky
- 3.2.2 Vresoviská a slatiny
- 3.3.2 Skaly
- 4.2.1 Slaniskové močiare
- M Minerálne pramene
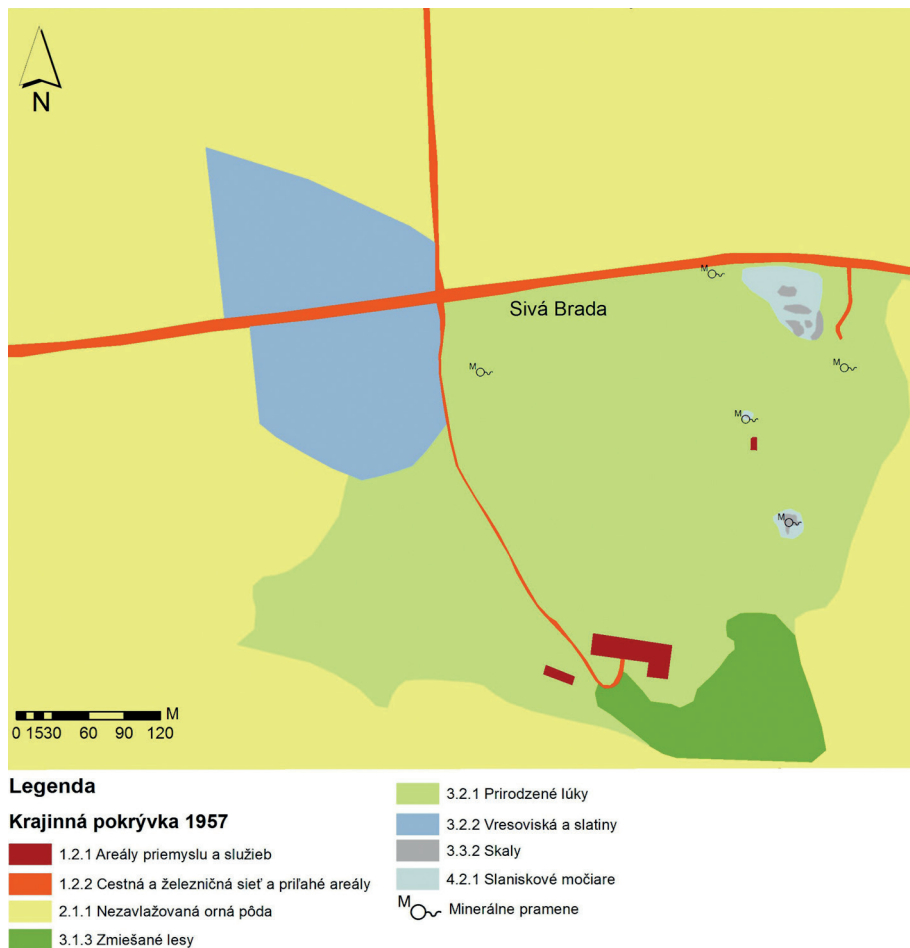
Obr. 2 Štruktúra krajinnej pokrývky lokality Sivá Brada v roku 1957

V Národnej prírodnej rezervácii sme v roku 2015 identifikovali nielen plošné, ale aj bodové objekty. Na mape sú zobrazené značkami podobne aj úplne nové prvky, napr. informačné tabule, propagačné a reklamné panely, toalety a v lete aj stánky pre predaj. Nové prvky sa infiltrovali do Národnej prírodnej rezervácie prevažne v ostatných dvoch decéniách a majú negatívny vplyv na samotný predmet ochrany v rezervácii a nie sú v súlade so zákonom o ochrane prírody a krajiny Slovenskej republiky (Tab. 1, obr. 3).

Osem tried krajinnej pokrývky v Národnej prírodnej rezervácii Sivá Brada má prírodný a polo - prírodný charakter (Tab. 1, obr. 3) a s nimi je spojená ochrana predmetnej lokality. Celkový charakter krajinnej pokrývky bol v roku 2015 následný: najmenšiu plochu zaberala nesúvislá sídelná zástavba (1.1.2), ktorú predstavo-
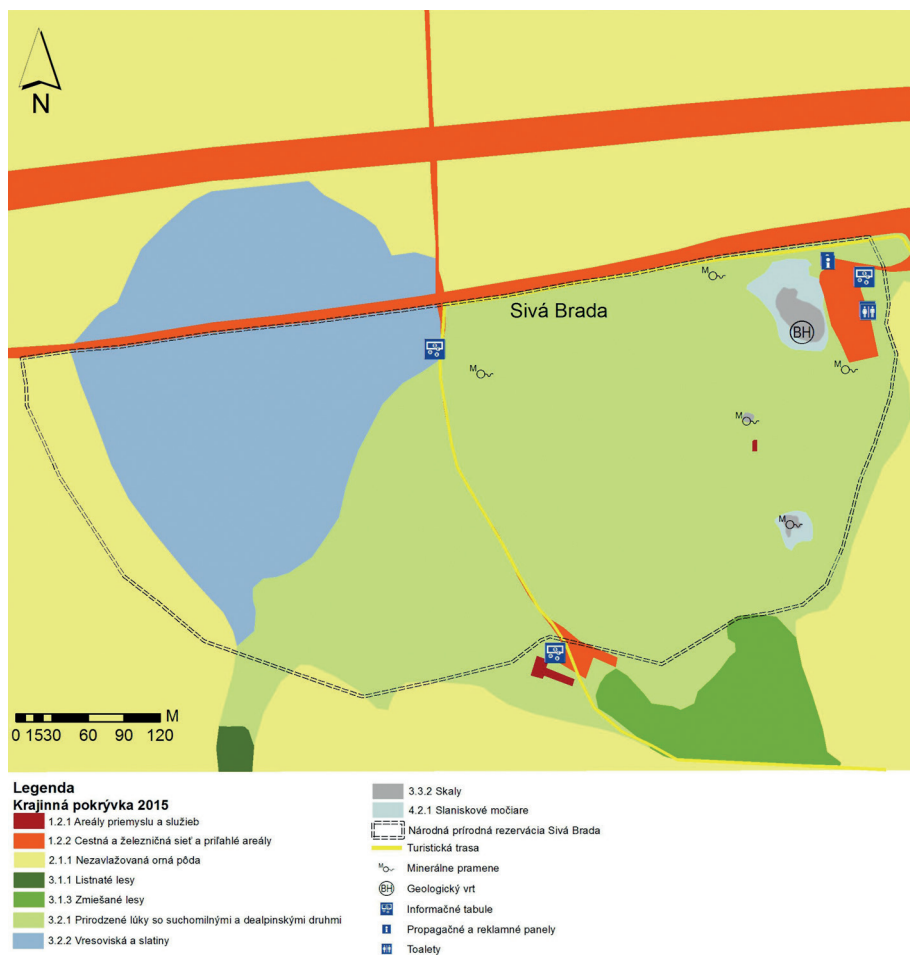
Obr. 3 Štruktúra krajinnej pokrývky lokality Sivá Brada v roku 2015

val pútnicky kostol a kríž (50,14 m² alebo 0,0050 ha). Podiel triedy 1.2.2 (Cestná a železničná sieť a priľahlé areály) sa zvýšil výstavbou parkoviska 0,12 ha (1202.23 m²). Podiel ornej pôdy (nezavlažovaná orná pôda 2.1.1) sa znížil o 3,15 ha v prospech dvoch tried: 0,45 ha v prospech triedy 3.2.1 (prírodné lúky a pasienky) a 2,70 ha v prospech triedy 3.2.2 (vápencové slatiny a slatinné lúky). Trieda zmiešaných lesov - kúpeľný park (3.1.3) mala v tomto roku rovnakú výmeru ako v roku 1957. Podiel triedy 3.3.2 (odkryté skalné podložie, travertíny) sa zvýšil o 0,064 ha a podiel plochy triedy 4.2.1 (karpatské travertínové slaniská) sa zväčšil o 0,040 ha, zrejme v súvislosti s otvorením zapečateného vrtu minerálnej vody, na úkor prírodných lúk a pasienkov (3.2.1).

Sivá Brada je najmladšia a jediná živá travertínová kopa v Hornádskej kotline. Triedy krajinnej pokrývky sú ne tejto lokalite ovplyvnená vodou minerálnych prameňov, ktoré vytvárajú podmienky pre prítomnosť vzácnej halofytnej vegetácie. Krajinná pokrývka na Sivej Brade má pozoruhodný vývoj a zloženie. Na pevnom travertíne sú prírodné lúky s prímesou xerofytných, termofilných a dealpínskych a kalcifilných druhov rastlín. Okolo minerálnych prameňov a tam kde sa rozlieva minerálna voda vyvinuli sa jedinečné halofytné spoločenstvá „karpatských travertínových slanísk", v ktorých sa nachádzajú vzácne halofytné druhy rastlín ako *Glaux maritima* (sivuľka prímorská), *Plantago maritima* (skorocel prímorský), *Triglochin maritima* (barička primorská). Tieto druhy sú v Karpatoch zriedkavé a vzácne. Vyskytujú sa hlavne na morských pobrežiach.

Sivá Brada je jedinečným prírodným celkom, v ktorom na niekoľkých desiatkach metrov štvorcových sa nachádza veľké množstvo cenných biotopov malých rozmerov a ich ochrana z aspektu významu týchto lokalít a zachovania pre budúce generácie je v súčasnosti absolútne nedostatočná. Inštitúcie, pod ktoré ochrana tejto výnimočnej lokality spadá zlyhali.

SÚČASNÝ STAV OCHRANY REZERVÁCIE

Sivá Brada je Národnou prírodnou rezerváciou podľa zákona č. 543/2002 Zb. Národnej rady Slovenskej republiky za účelom ochrany reliéfu travertínovej kopy holocénneho veku a vzácnych druhov rastlín a slanomilnej vegetácie pre účely vedeckého výskumu. Karpatské travertínové slaniská sú jedným z významných pôvodných biotopov v Západných Karpatoch. Široká škála ľudských činností a ignorovanie zákona o ochrane prírody spôsobili, že Sivá Brada je najviac ohrozená zo všetkých Národných prírodných rezervácií v Slovenskej republike. Na prírodnú štruktúru rezervácie majú vplyv nasledujúce faktory a procesy: Automobilová doprava, poľnohospodárstvo, zásah do vodného režimu minerálnych prameňov, nekontrolovaná návštevnosť ako aj vandalizmus niektorých skupín turistov, napr. vypaľovanie objektov, deštrukcia vzácnych druhov rastlín, odhadzovanie odpadu atď.

Znečisťujúce látky v ovzduší z automobilovej dopravy z priľahlých komunikácií (D1, E 50) ohrozujú hlavne vzácne spoločenstvá rastlín, najmä bylinného poschodia (rastlinné spoločenstvá sú na Sivej Brade tvorené prakticky iba bylinnou etážou). Frekvencia dopravy je vysoká. Je to viac ako 28 560 jednotkových vozidiel za 24 hodín.

Národná prírodná rezervácia sa nachádza uprostred poľnohospodárskej krajiny. Chemické látky používané v poľnohospodárstve a zmena spôsobu hospodárenia s pôdou má vplyv na rastlinné spoločenstvá a dochádza k transformácii ich zloženia, napr. pestrofarebné kvetnaté lúky sa zmenili na porasty jednoduchých trávnych spoločenstiev (monokultúry tráv).

Každý zásah do režimu minerálnych prameňov je pre Národnú prírodnú rezerváciu Sivá Brada podstatou jej vlastnej existencie. V roku 1957 bol na travertínovej kope uskutočnený 132 m hlboký hydrogeologicky vrt, pôvodne určený pre kúpele Sivá Brada (pri juhovýchodnom úpätí travertínovej kopy), ktoré však medzitým zanikli a vrt bol uzavretý a zapečatený, čo možno považovať za zodpovedný a štandardný postup zo strany geológov. Nie je známe kedy a kým bol vrt odpečatený a otvorený (predpokladáme, že to bol niekto z návštevníkov na rozhraní sedemdesiatych a osemdesiatych rokov minulého storočia). Otvorenie vrtu minerálnej vody narušilo prírodnú štruktúru Sivej Brady a poškodilo morfologickú podobu autentickej travertínovej kopy (chránená forma reliéfu), porušilo vývoj jej reliéfu z aspektu zachovania pôvodného tvaru travertínovej kopy, porušilo vývoj biotopov halofytných spoločenstiev karpatských travertínových slanísk, pričom presne obidve entity sú predmetom ochrany v rezervácii. Tento zásah bol necitlivý a neprofesionálny a podľa zákona o ochrane prírody a krajiny nebol nikým povolený. Inštitúcie štátnej ochrany prírody túto skutočnosť úplne ignorovali a ignorujú. Otvorenie vrtu minerálnej vody znížilo aktivitu minerálneho prameňa na vrchole travertínovej kopy, ktorý vytvoril pôvodný morfologický útvar. Okolo vrtu vzniká z minerálnej vody nová travertínová kopa na svahu autentickej kopy. Táto skutočnosť nie je v súlade s ochranou Národnej prírodnej rezervácie (4. stupeň ochrany) podľa vyššie uvedeného zákona Národnej rady Slovenskej republiky o ochrane prírody a krajiny, ktorý zakazuje vykonávať geologické práce v chránených územiach (v tomto prípade pôvodný zámer, voda pre kúpele mal byť rešpektovaný a vrt mal ostať zapečatený).

Devastácia rezervácie prebieha hlavne vplyvom masovej návštevnosti a vandalizmu niektorých skupín turistov. Návštevníci sú veľmi vážnym problémom rezervácie. V lete príde na Sivú Bradu takmer 200 návštevníkov denne a v sobotu a nedeľu je to viac (a navyše nesmieme zabudnúť na pútnikov a školské výlety). Niektorí návštevníci vodia do rezervácie psov, resp. iné zvieratá, kúpu a umývajú sa v prameňoch. Druhým nepríjemným faktom je znečisťovanie biotopov odpadmi (fľaše, papier, organický odpad ap.).

Pre rastlinné asociácie s *Glaux maritima* (sivuľka prímorská, halofyt), ktoré sa nachádzajú hlavne okolo minerálnych prameňov je najväčšou hrozbou nekontrolovaný pohyb návštevníkov. Chôdza veľkého počtu osôb ničí flóru karpatských travertínových slanísk ako aj formujúce sa krusty travertínu okolo minerálnych prameňov. Všetky vyššie uvedené aktivity sú v podstate v rozpore s pôvodnou myšlienkou ochrany územia, teda s tou časťou zákona NR SR o ochrane prírody a krajiny, ktorá hovorí: Národná prírodná rezervácia Sivá Brada bola vyhlásená za účelom ochrany reliéfu jedinečnej živej travertínovej kopy holocénneho veku a vzácnej halofytnej a xerofytnej vegetácie a vegetácie mokradí a močiarov pre vedecké účely. Zákon Národnej rady Slovenskej republiky o ochrane prírody a krajiny je v prípade Sivej Brady porušovaný takmer denne vo všetkých bodoch.

ZÁVER

Fyziognómia kotlín, teda ich krajinný obraz býva prevažne monotónny. Krajinný obraz krajiny vo východnej časti Hornádskej kotliny v okolí Spišského Podhradia rozhodne k takým nepatrí. Centrálnym objektom v tomto priestore, krajinnou dominantou sú travertínové kopy, ktoré vtláčajú ráz celému územiu a určujú jeho fyziognómiu. Fyziognómia krajiny je však iba zlomok hodnoty travertínových útvarov. Travertínové kopy tvoria impozantnú skupinu, ktorú nie je možné prehliadnuť a hodnota ich výnimočnej prírodnej štruktúry je znásobená aj významnými historickými a archeologickými objektmi a spolu tvoria jedinečný a neopakovateľný celok, nielen v rámci strednej Európy. Tento fakt je umocnený medzinárodným potvrdením výnimočnosti ich prírodných hodnôt, a to zaradením do sústavy európsky chránených území NATURA 2000 pod názvom Spišskopodhradské travertíny (SKUEV 0105).

Zmeny, ktorými travertíny v okolí Spišského podhradia prechádzali a prechádzajú aj v súčasnosti sú prevažne negatívne a ničia ich jedinečné vlastnosti, preto všetky lokality travertínových kôp sú chránené (rôzny stupeň ochrany) a dve z nich Dreveník a Sivá Brada majú štatút Národných prírodných rezervácií. Sivá Brada je územie zaradené do štvrtého stupňa ochrany zákonom č. 543/2002 Zb. Národnej rady Slovenskej republiky o ochrane prírody a krajiny, v ktorom sú uvedené všetky súbory činností, ktoré sú zakázané v Národných prírodných rezerváciách. Formálne je Sivá Brada zákonom dostatočne chránená, ale prax ukazuje, že zákon sa v tomto prípade sústavne porušuje takmer vo všetkých stanovených bodoch. Štátna ochrana prírody Slovenskej republiky nekontroluje dôsledne dodržiavanie zákona tohto vzácneho územia a ignoruje svoje povinnosti. Podceňuje dôležitosť Národnej prírodnej rezervácie z aspektu jej zachovanie pre vedecký výskum a pre budúce generácie.

Poďakovanie

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SUMMARY

THE LANDSCAPE STRUCTURE OF NATIONAL NATURE RESERVE SIVÁ BRADA IN YEARS 1877, 1957, 2015 AND ITS CURRENT STATUS FROM THE ASPECT OF NATURE PROTECTION

Travertine hills around Spišské Podhradie form an impressive group that cannot be overlooked. The values of their outstanding natural structure are compounded by the significant historical and archaeological objects and together create a unique and unrepeatable whole, not only in Central Europe. This fact is compounded by the international acknowledgment of their natural values of excellence, and to be included in the European system of protected areas Natura 2000 as Spišskopodhradské travertíny (Area Code / kód území: SKUEV 0105). Changes that travertine around Spišské Podhradie passed are predominantly negative and destroy their unique features, so all sites travertine hills are protected (different levels of protection) and two of them Dreveník and Sivá Brada have the status of a National Nature Reserve. Sivá Brada belongs into fourth degree nature protection according the Act no. 543 /2002 Coll. National Council of the Slovak Republic on nature and landscape protection, which sets out all the series of actions that are prohibited in the National Nature Reserve. Formally is Sivá Brada adequately protected by law, but practice shows that the law is in this case constantly violated. State Nature Conservancy of the Slovak Republic does not check for strict observance of the law at this rare territory and ignores its obligations. Underestimate the importance of National Nature Reserve from the aspect of its preservation for scientific research and for future generations.

THE SEMI-PERIPHERY IN THE GLOBAL PRODUCTION NETWORKS OF LABOUR-INTENSIVE INDUSTRIES: THE EAST CENTRAL EUROPEAN TEXTILE AND CLOTHING INDUSTRY IN THE MIRROR OF FOREIGN TRADE DATA

Ernő MOLNÁR [A*]

Abstract

This article examines the different ways of integration of East Central Europe into the global production networks of the labour-intensive textile and clothing industry based on a comparative analysis of sector-specific foreign trade data. The strongly internationalised character of the industry as well as the sectoral statistics available in a homogenous structure make the used database an adequate tool for the identification of the most important structural changes and the development paths of the larger textile and clothing exporters, which can be well compared in the busy one and a half decade after the turn of the Millennium. By mapping and explaining the main restructuring tendencies, this short writing offers a base for the evaluation of the most perspective segments within the declining industry and tries to answer the question whether there are any forms or chances for the preservation of this traditional industrial culture. The results of the research suggest that East Central Europe can be regarded less and less as a cost-efficient production location of the textile and clothing industry supplying the wealthy Western European markets. The product structure and spatial relations of the East Central European textile and apparel trade are determined to a growing extent by local actors of the clothing market building their own brands and production networks as well as by producers and consumers of technical and other special textile products.

Key words

Global production networks, textile and clothing industry, foreign trade, East Central Europe.

INTRODUCTION

Several analyses have been written about the changing role of *East Central Europe* within the international division of labour and the restructuring of the region's *labour-intensive industries* after the turn of the Millennium. These studies have been built mostly on the theoretical framework of global value chains (GVC) / global production networks (GPN) explaining the spatial inequalities of the globalized economy by the different manners of regional participation in these structures (see about the concepts Coe et al 2004, Gereffi et al 2005, Schamp 2008, Yeung -

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Coe 2015). The referred studies use methodological approaches integrating both primary and secondary research and offer insight into the case of one country or region as well as make a comparison between some countries. Not only the *deep integration* of the region *into the transnational production networks*, but also the *increasing challenge* of its earlier *manufacturing role* in a fierce global competition can be picked out from these publications (Hanzl-Weiss 2004, Scott 2006, Anić et al 2008, Kalantaridis et al 2008, Rouková et al 2008, Pástor - Belvončíková 2015, Molnár - Lengyel 2016).

Why is it still worthy to deal with the "light industry" seeming to decline in East Central Europe in the 21st century*?* First of all, according to the global sectoral restructuring trends, its disappearance from the region isn't necessary. New, *innovative and creative industrial segments* can be developed based on the existing knowledge, which can contribute to a more diversified local economic structure and which does not have the cheapness of the labour force as a main competitive factor (TMTE 2009). Secondly, the decline of the labour-intensive industries points to the problems of *social* and *spatial inequalities*. By the elimination of economic activities having been employers of disadvantaged social groups and peripheral regions for a long time (Smith et al 2014, Molnár - Lengyel 2015, Lux 2017), it is quite questionable which other economic sectors can take over their role.

The present investigation intends to contribute to the research of the East Central European industrial restructuring by making an *analysis of the textile and clothing industry for the whole region*. The sector plays a decisive role based on its employment figures within the region's labour-intensive industries (Hanzl-Weiss 2004). The second part of the research was built on the *foreign trade data* of the International Trade Centre (UN COMTRADE) available in homogenous form for the period after the turn of the Millennium and referring not only to the *structural*, but also to the *spatial features of the textile and clothing trade*. These data, as earlier in the case of our research focusing on the intraregional division of labour of the automotive industry (Molnár et al 2015), appear as an adequate mean for describing the changing geography and structure of the *spatially fragmented sector* organised within the frame of global production networks and characterized by a large-scale intra-industry trade.

The study consists of *three main structural units*. At first, the most important findings of the writings about the restructuring of the East Central European textile and clothing industry will be reviewed. Secondly, the analysis of foreign trade data according to the hypotheses set up earlier will be carried out. And finally, after the conclusion of the findings, there will be an attempt to outline further questions based on the results. The examination is extended for *16 countries of East Central Europe*: the continental countries becoming EU members in 2004, 2007 and 2013 as well as the non-member Post-Yugoslavian states and Albania are involved (Kosovo is left out because of missing data). Beside the summarised data of the 16 coun-

tries, the *7 most important textile and clothing exporters* were treated also separately in order to make a more detailed comparative analysis within the region.

LABOUR-INTENSIVE INDUSTRIES IN EAST CENTRAL EUROPE: FINDINGS OF THE LITERATURE

Investigations built up on sectoral statistics and field research within the framework of GVC / GPN approaches show that the possibilities for a *structural change* – also called upgrading (Humphrey - Schmitz 2002) – are fundamentally determined by the *way of integration* of the local actors into the transnational production networks. This participation is mostly realised in a dependent position, often by subcontracting in "*buyer-driven commodity chains*" (Gereffi - Memedovic 2003). This type of division of labour can be traced back into the socialist era: originally served to increase the hard currency reserves, later as the compensation for the eliminated Eastern and shrinking domestic markets, at the same time offering the possibility for market restructuring, learning and maintaining mass employment in a situation characterised by the lack of capital and other capabilities. But later it became clear that the *relatively small capital accumulation* ensured by subcontracting, because of its limited investment possibilities, reduces the chances for breaking out from this role and makes the industry even more dependent upon their existing relations (Hanzl-Weiss 2004, Pástor - Belvončíková 2015, Molnár - Lengyel 2016). This is one reason why East Central Europe has been influenced seriously by the changes of the global and local environments after the turn of the Millennium. The cutting down of textile trade quotas, the EU accession of most countries within the region, the economic crisis as well as the increasing local costs of production have resulted in a fierce sectoral competition, the *depreciation of the region as a location for the textile and clothing industry* and moving the subcontracting eastwards (Haas - Zademach 2005, Hamar 2006, Dicken 2011, Fernandez-Stark et al 2011).

At the same time, although East Central Europe is playing less and less role as a cost-efficient location of labour-intensive industries in global comparison, both in the cases of the clothing and the footwear sectors a relative importance of the geographical (and cultural) proximity of the region can be observed. This location factor has significance in the retention or return of the producing activities especially for the actors whose competitive strategies – opposite to the large-scale production – are based on quality and flexible supply for the European market (Dicken 2011, Molnár – Lengyel 2016b). Similarly to the cases of some globalizing services, the phenomenon of "nearshoring" (Meyer 2006, Gál 2014) can be interpreted also in the context of the textile and clothing industry within the present East Central Europe. Although the main sectoral restructuring tendencies seem to point towards the same direction, there are also some differences between East Central Europe and Southern Europe (Kapelko 2011).

The intensive global competition is forcing the local actors towards *continuous adaptation*. Beside the generally increasing efficiency of the *production process* based on technological changes and improved labour organization, Polish and Slovakian cases from the apparel industry and Hungarian cases from the footwear sector show that more and more local producers *outsource* (at least partially) the production for suppliers in cheaper neighbouring countries (such as Bulgaria, Romania, the Ukraine) under the cost pressure acquiring an *intermediate position* within the value chains led mostly by Western European enterprises. As other elements of the adaptation process, the changing *product structure*, the appreciation of more demanding and specific market segments should be mentioned, which can be observed also in the case of subcontracting, based on the decisions of the lead firms, but can be actually realised only by *actors developing their own products and brands*. Although East Central Europe is strongly present in the market segments characterised by price competition, enterprise strategies targeting the development of own products and brands in design-oriented segments or for market niches in the domestic economy (mostly by converting competencies gained from subcontracting) have appeared (Kalantaridis et al 2008, Roukivá et al 2008, Rupik 2009, Crestanello - Tattara 2011, Pástor - Belvončíková 2015, Molnár - Lengyel 2016). The development of own products and the strengthening of the strategic functions beyond the production can be interpreted as a *functional upgrading* (Humphrey - Schmitz 2002) exceeding the earlier dependent situation, which on the other hand doesn't necessarily mean the maintenance of production and mass employment "within house".

The *social dimension of upgrading* (Bernhardt 2013) appears in a specific context in East Central Europe. The enterprises find it more and more difficult to get young, skilled and motivated workforce suitable for their upgrading purposes, because of the underpaid and limited career chances offered by the workplaces of the textile and clothing as well as leather and footwear industry. In the background of this process we can find the *competition for human resources*, the increasing demand for labour force generated by other growing industrial and service activities (and the grey economy) as well as the possibility of migration and working abroad within the European Union (Kalantaridis et al 2008, Smith et al 2014). On the other hand, the increased *wages undermine the global competitiveness* of labour-intensive industries causing their long-term failure and decreasing employment. Shaped by the interaction of the two opposite effects, the cases of the Romanian and Slovakian clothing as well as the Hungarian footwear industry show the *spatial shift* of these industries *within the national economies* from the economically dynamic regions to the Eastern peripheries offering more cost-efficient production location (Crestanello - Tattara 2011, Smith et al 2014, Pástor - Belvončíková 2015, Molnár - Lengyel 2015). Similar reasons can explain the restructuring processes *between the different national economies* of the region.

Related to the long-term perspectives of the region's textile and clothing industry, it is important to emphasize that the labour-intensive *mass production* has been *relocated from the developed economies* of Europe to cheaper countries (Gereffi - Memedovic 2003, Dicken 2011, Fernandez-Stark et al 2011), while the functional clothing products as well as textiles serving not the apparel industry (home, technical, industrial textiles) have been appreciated within the *product structure* of the remained activities. The *institutional market* represents one third of the European textile market: it is growing, it is less price-sensitive, it has demand for higher quality products and also it expects services together with the products, this way offering a chance for acquiring long-term market positions. *Technical and industrial textiles* as other potential key areas of the European specialisation show an even more dynamic development. Their markets are extraordinarily fragmented, they are broadening continuously by new application fields, they use strict standards and require intensive research and development, multidisciplinary co-operations, specific knowledge and relations suitable for the targeted industries (TMTE 2009). According to the findings of the literature as well as my earlier examinations based on statistical data, I set up the following *hypotheses* related to the restructuring of the East Central European textile and clothing industry.

1. In the case of East Central European countries, the *foreign trade* balance of textile and clothing products shows a *shift towards the position of net importer*, but there are significant differences in the appearance and in the volume of import surpluses. Also in the case of countries having considerable general import surplus, product groups registering *positive trade balances* can be found, but these fields of specialization are less and *less* related to the earlier determining *labour-intensive clothing products*.

2. The structure of East Central European textile and clothing *export* shows a *move towards* the less labour-intensive, *innovative products* such as functional textile and clothing products, home textiles, technical and industrial textiles that are competitive in the European market. The *clothing products* play an *increasing role* within the textile and clothing *import,* which refers to the growing importance of foreign products covering local demand as well as to the decreased textile material consumption of the declined domestic apparel production.

3. Despite the changing product structure, the developed countries of the *EU-15* are still appearing as the *most important export markets* for the region. However, the share of East Central Europe in the textile / clothing import of Western Europe has lessened significantly. Beside the changing product structure, *non-European countries (Asia)* are more and more *important sources of* the textile and clothing *import* of East Central Europe. But, on the other hand, the region's share in the Western European textile and clothing export is growing.

TEXTILE AND CLOTHING INDUSTRY IN EAST CENTRAL EUROPE: EMPIRICAL EXAMINATION

After the turn of the Millennium the countries of East Central Europe registered altogether a *growing nominal value of export* only interrupted by the global economic crisis in 2008 *(Figure 1)*. 80-85% of the total export exceeding 23 billion euro in 2015, were given by the same 7 countries (Bulgaria, Czech Republic, Hungary, Lithuania, Poland, Romania, Slovakia) in the whole period. Poland emerged with
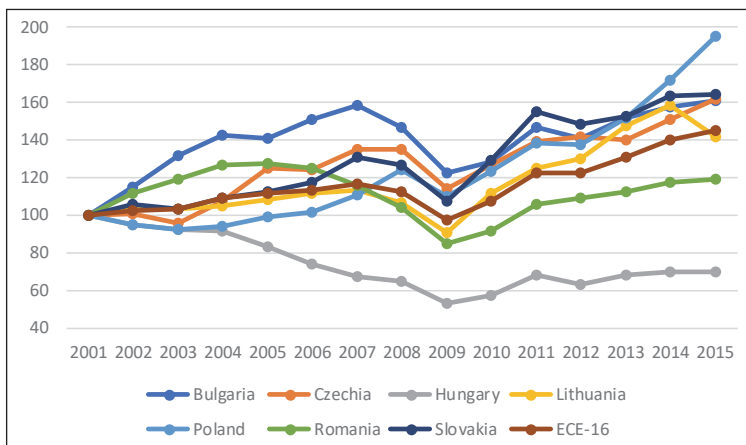
Figure 1 Development of the textile and apparel export in East Central Europe
(percentage of the value for 2001)
Source: ITC / UN COMTRADE
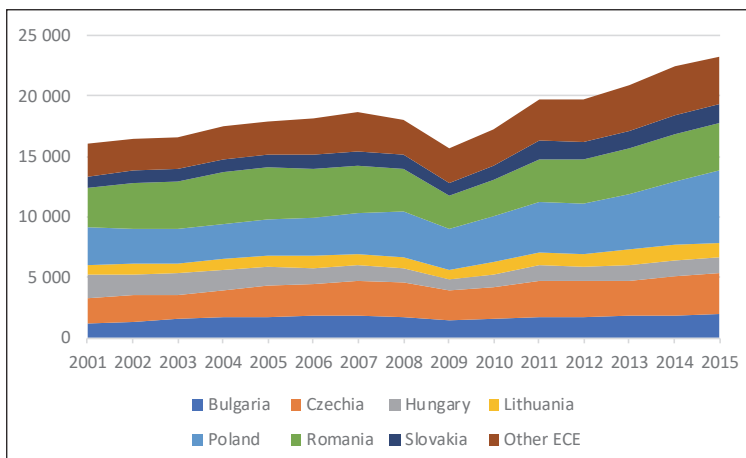
Figure 2 Distribution of the East Central European textile and apparel export
among the countries (million euro)
Source: ITC / UN COMTRADE

its 95% growth rate. The biggest national economy registered just a modest fall during the crisis showing that its economic resilience was above average not only because of the significant domestic market. From the highlighted actors, Hungary was the only country with decreasing export: as the consequence of the continuous shrinking before 2009, then by a growth under the regional average till 2015, the Hungarian textile and clothing export reached 70% of its value at the turn of the Millennium. While Estonia and Slovenia showed an export decline of similar extent, the dynamics of Poland, Slovakia and the Czech Republic as well as the slipping back of Romania indicate that *not necessarily the more cost-efficient locations have the better export indices (Figure 2).*

The textile and clothing *import* of the region shows also a continuous *growth interrupted* only *by the economic recession (Figure 3).* The 7 countries playing a dominant role in the export gave also 80-85% of the import exceeding the 29 billion euro in 2015, although in terms of import Croatia and Slovenia didn't fall behind the lea-
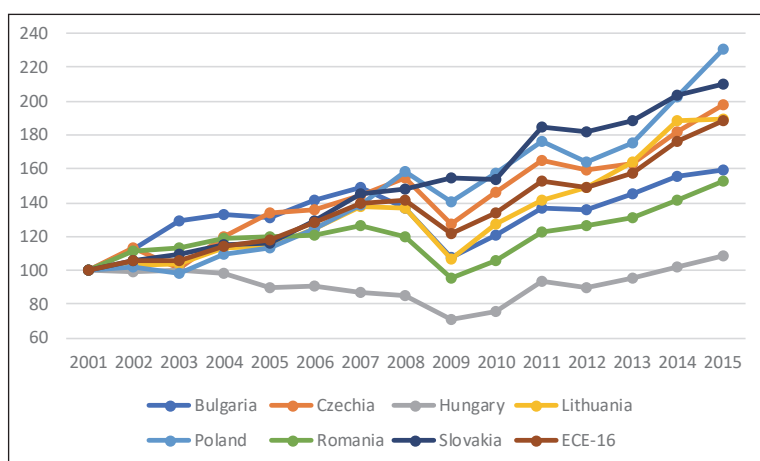
Figure 3 Development of the textile and apparel import in East Central Europe
(percentage of the value for 2001)
Source: ITC / UN COMTRADE

ding economies. The biggest importer Poland had also the largest growth dynamic (130%), but the performances of Slovakia and the Czech Republic were also above the average. Hungary had the smallest import growth among the leading economies, which was very similar to the indices of Slovenia during the same period, and refers not only to the *shrinking import demand of the declining production capacities,* but also to the *long-term growth problem* of the local economy *(Figure 4).*
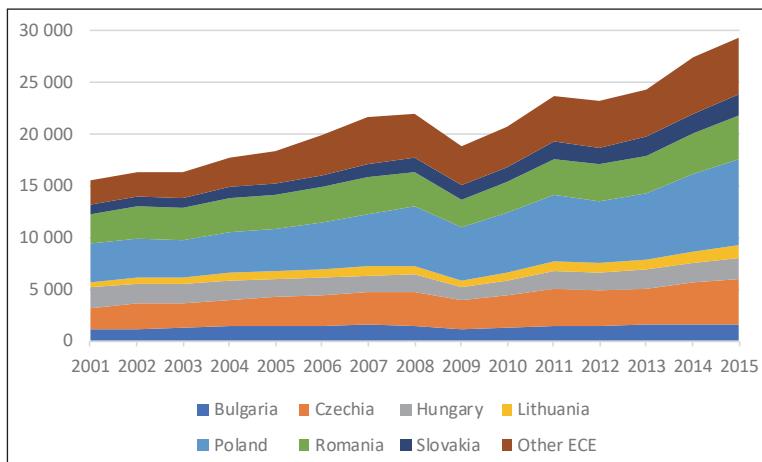
Figure 4 Distribution of the East Central European textile and apparel import among the countries (million euro).
Source: ITC / UN COMTRADE

(1) According to the related hypothesis, the summarized *foreign trade balance* of textile and clothing products shows a *growing deficit* within the region after the turn of the Millennium, despite the fact, that at the beginning of the period there was a moderate export surplus registered *(Figure 5)*. The larger exporters fitted to this trend, although they started from different positions and made uneven shifts. While the V4 countries had continuously negative and worsening foreign trade balance,
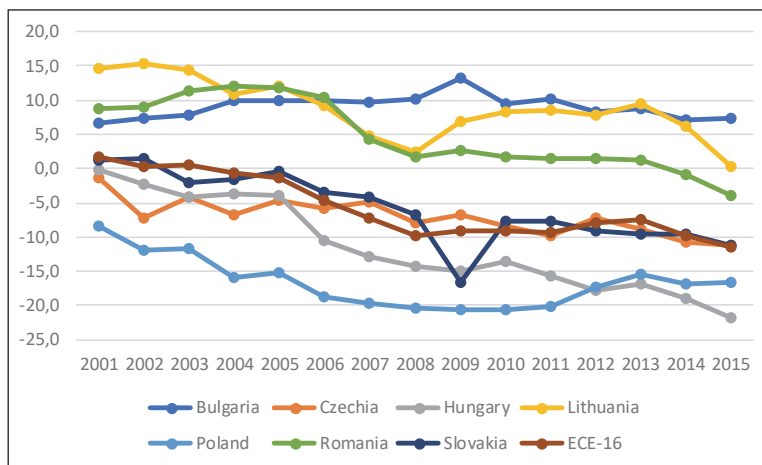
Figure 5 Foreign trade balance of textile and apparel products in the case of East Central European countries (percentage of the total volume of textile and clothing trade)
Source: ITC / UN COMTRADE

Bulgaria and Lithuania in the whole period, Romania with exception of the last two years remained in the positive range. Among these countries only Bulgaria (and in the region Macedonia as well) has significant positive balance of the textile and clothing trade now, which clearly indicates that *East Central Europe is not going to remain a globally important location of the labour-intensive industries* in the long run.

Although the textile and clothing trade of the region has deficit as a whole nowadays, *trade surplus* can be registered in the case of *apparel articles and clothing accessories* (HS 61-62) as well as *other made-up textile articles* (HS 63) during the period. But this is true only for the cases of Bulgaria, Lithuania and Romania among the larger exporters, while the foreign trade of labour-intensive clothing products is generating losses in all V4 countries now, the range of product groups having net surplus has spectacularly narrowed and *shifted typically towards the technology-intensive textile products (Table 1)*.

Table 1 Textile and apparel products of positive foreign trade balance in East Central Europe (HS codes of product groups)

	2001-2005	2006-2010	2011-2015
Bulgaria	57, 61, 62, 63	61, 62, 63	61, 62, 63
Czechia	51, 53, 58, 62, 63	51, 52, 53, 56, 63	51, 52, 63
Hungary	56, 61, 62, 63	56, 62	53, 56
Lithuania	53, 61, 62, 63	53, 56, 61, 62, 63	53, 56, 61, 62, 63
Poland	61, 62, 63	62, 63	53, 57, 63
Romania	61, 62, 63	61, 62, 63	61, 62, 63
Slovakia	54, 61, 62, 63	54, 62	54, 60
ECE-16	**61, 62, 63**	**61, 62, 63**	**61, 62, 63**

50 - Silk;
51 - Wool, fine or coarse animal hair; horsehair yarn and woven fabric;
52 - Cotton;
53 - Other vegetable textile fibres; paper yarn and woven fabrics of paper yarn;
54 - Man-made filaments; strip and the like of man-made textile materials;
55 - Man-made staple fibres;
56 - Wadding, felt and nonwovens; special yarns; twine, cordage, ropes and cables and articles;
57 - Carpets and other textile floor coverings;
58 - Special woven fabrics; tufted textile fabrics; lace; tapestries; trimmings; embroidery;
59 - Impregnated, coated, covered or laminated textile fabrics; textile articles of a kind suitable for industrial use;
60 - Knitted or crocheted fabrics;
61 - Articles of apparel and clothing accessories, knitted or crocheted;
62 - Articles of apparel and clothing accessories, not knitted or crocheted;
63 - Other made-up textile articles; sets; worn clothing and worn textile articles; rags.

Source: ITC / UN COMTRADE

(2) The *restructuring of the export* refers to the *changing character of the international division of labour*. Although there was a growth in all product groups treated separately, the share of apparel article and clothing accessories (HS 61-62) in the regional export has significantly reduced, while the importance of technical and other special textile products (HS 56-60) as well as other made-up textile articles (HS 63) has increased. Shifts have happened mostly in the cases of all larger exporters, but there are differences to observe. Bulgaria and Romania as low-cost countries of the region can be characterized by a higher share of clothing export during the whole period. The Czech Republic having traditional textile industry, exported clothes to a lesser extent also at the turn of the Millennium: the winner of its moderate structural change is the commodity group containing *technical and other special textile products* (HS 56-60). Other national economies starting "from the centre", show divergent development paths: while the clothing products have preserved their relatively high export share in Poland and Slovakia, they have lost their importance in Hungary to a bigger, in Lithuania to a lesser extent in line with the increasing share of technical and other special textile products (HS 56-60) as well as *other made-up textile articles* (HS 63) *(Table 2)*.

Table 2 Product structure of the textile and apparel export in East Central Europe (average percentage of the total value)

	2001-2005					2011-2015				
	50-53	54-55	56-60	61-62	63	50-53	54-55	56-60	61-62	63
Bulgaria	5,9	5,2	1,9	84,3	2,7	7,1	7,5	4,0	76,7	4,6
Czechia	19,6	14,8	19,8	31,6	14,3	16,7	10,8	27,4	33,7	11,3
Hungary	9,1	7,4	9,7	69,2	4,6	8,8	10,8	24,0	45,0	11,4
Lithuania	12,6	8,7	4,4	66,1	8,2	11,1	8,1	13,1	55,7	12,0
Poland	4,9	7,5	9,4	62,6	15,5	3,5	5,0	15,4	62,1	14,0
Romania	2,0	3,2	1,6	89,7	3,6	6,4	9,1	5,2	71,1	8,1
Slovakia	3,5	22,4	4,7	63,0	6,4	4,1	13,9	13,1	62,1	6,8
ECE-16	**7,7**	**8,4**	**7,4**	**68,5**	**8,0**	**7,2**	**8,8**	**13,8**	**60,4**	**9,8**

Source: ITC / UN COMTRADE

Opposite tendencies seem to develop in the case of the *import*. With the exception of textile raw materials of natural origin (HS 50-53), the import value of all commodity groups treated in separate categories has grown. However, while there were 4 product groups having approximately similar importance at the turn of the Millennium, the shares have *shifted towards apparel articles and clothing accessories* (HS 61-62), which has become the leading imported commodity group by now. In the case of the low-cost locations of Bulgaria, Lithuania and Romania having

mostly positive trade balance in the sector, the apparel articles and clothing ac-
cessories play a smaller role, while the raw material of natural and artificial origin
(HS 50-53, HS 54-55) imported for the local clothing production plays a bigger role.
Nevertheless, in the textile and clothing import of the V4 countries apparel articles
and clothing accessories (HS 61-62) play an above average role *(Table 3)*.

Table 3 Product structure of the textile and apparel import in East Central Europe
(average percentage of the total value)

	2001-2005					2011-2015				
	50-53	54-55	56-60	61-62	63	50-53	54-55	56-60	61-62	63
Bulgaria	29,8	23,4	18,0	27,7	1,1	24,7	20,4	24,2	26,6	4,0
Czechia	18,9	20,6	27,6	26,5	6,4	12,3	13,0	26,6	41,8	6,3
Hungary	18,5	16,2	26,5	34,7	4,1	8,1	13,3	26,7	42,3	9,6
Lithuania	29,2	31,5	17,7	16,8	4,8	17,1	19,8	18,8	35,7	8,6
Poland	21,8	25,1	28,2	19,2	5,7	8,0	13,8	21,1	48,7	8,4
Romania	31,8	31,0	20,4	14,8	2,0	20,8	25,0	27,0	22,5	4,6
Slovakia	21,2	18,7	29,8	23,9	6,5	7,6	10,6	19,8	55,6	6,3
ECE-16	**23,2**	**23,0**	**24,3**	**25,1**	**4,5**	**12,5**	**16,0**	**23,0**	**41,5**	**6,9**

Source: ITC / UN COMTRADE

(3) The *growth of textile and clothing export* of the East Central European coun-
tries is *distributed unevenly between the target markets,* which resulted in the redu-
ced values of the EU-15 having also nowadays a relatively high (two thirds) share.
The importance of *other European countries* has been growing, while the role of
the markets outside Europe remained marginal during the whole period. In the
case of Bulgaria and Romania the outstanding role of the EU-15 was coupled with
an above average - though decreasing - share of clothing export (and raw mate-
rial import), which emphasizes the also recently large volume of subcontracting
for the Western European markets. The main markets of Bulgaria are Germany and
Greece (exploiting its geographical proximity), while the most important partner of
Romania is Italy, underlying the literature about the orientation differences of the
countries (Kalantaridis et al 2008, Lux 2017). The majority of the Slovakian as well as
a large part of the Czech and the Hungarian export go to East Central Europe. Re-
alized by an increasing and large share of clothes or (additionally) by a huge share
of technical and other special textile products, these tendencies show the *appre-
ciating clothing and industrial markets of the region*. Nowadays Poland or the Czech
Republic are more important clothing export markets for Slovakia than Germany!
On the other hand, especially in the relation of V4 countries and other countries
located in the Eastern part of the region, the *possibility of intraregional subcontrac-*

ting cannot be excluded. In the export of Lithuania European countries beyond the EU borders, first of all Russia as the main consumer of the Lithuanian clothing products, plays an outstanding role *(Table 4)*. Beside the above-mentioned elements of restructuring we can also emphasize that *East Central Europe is less and less important textile and apparel source for the developed Western European countries*: by a moderate fall, the region's share in the EU-15 import was declining from 10% to 7 % during the examined period *(Figure 6)*.

Table 4 Share of different importing regions / countries in the East Central European textile and apparel export (average percentage of the total value)

|	2001-2005				2011-2015			
	EU-15	EU-13	Other European	Non-European	EU-15	EU-13	Other European	Non-European
Bulgaria	81,5	3,3	3,2	12,0	83,4	6,9	4,0	5,8
Czechia	74,4	16,1	4,0	5,5	60,9	25,5	5,2	8,4
Hungary	76,9	13,9	5,8	3,4	57,7	21,5	14,5	6,3
Lithuania	82,2	6,5	7,7	3,5	47,1	10,7	35,8	6,4
Poland	82,4	7,2	7,8	2,6	69,4	14,9	11,6	4,1
Romania	91,5	4,2	1,4	2,9	85,7	7,0	3,5	3,7
Slovakia	71,7	21,7	4,4	2,3	39,2	51,4	5,4	4,1
ECE-16	**81,5**	**9,1**	**5,0**	**4,3**	**67,5**	**17,3**	**10,4**	**4,8**

Source: ITC / UN COMTRADE
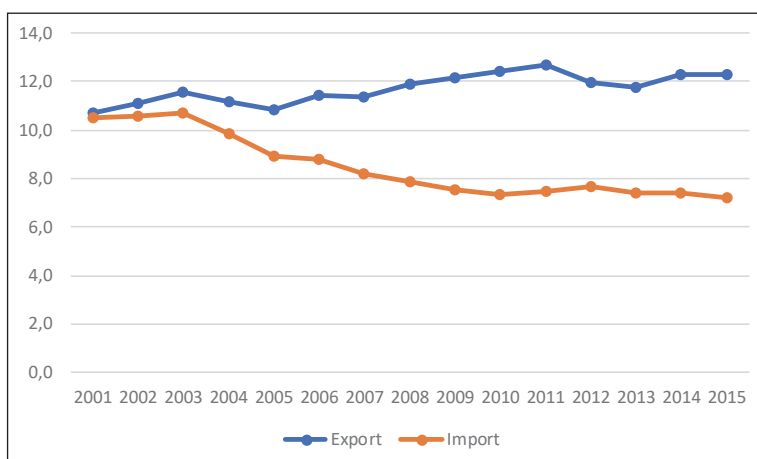
Figure 6 Textile and apparel export / import of the EU-15 to / from East Central Europe (percentage of the total volume of EU-15 textile and clothing export / import)
Source: ITC / UN COMTRADE

As a consequence of *textile and clothing import restructuring*, the share of the EU-15 fell under 50%, the import from the non-European countries approached 40% and the weight of East Central Europe reached 10% *(Table 5)*. In the import of Bulgaria and Romania, the *older EU member states* played a more decisive role with a significant share of the raw materials needed for apparel production. On the other hand, the *non-European countries* became the most important actors in the structure of the Polish, Slovakian and Czech import registering a 60-80% share of clothes with the leading role of China and Bangladesh. Hungary did not follow this import restructuring trend: the share of developed countries of the EU-15 remained high, while the import from the regions outside Europe appeared with the smallest share. Differently from Bulgaria and Romania, the share of apparel as well as technical and special textile products in the Hungarian import from the EU-15 was outstanding and Germany predominated. And differently from the other V4 countries, the share of apparel products in the import from non-European countries is significantly less (now 20-30%) and South Korea (exporting mostly tyre cord fabric to Hungary) appeared similarly important as China, the main source of clothes. The different spatial structure of the Hungarian apparel import may be explained by various reasons. Firstly, the share of *global* and *local players* with diverse relations in the national markets of the V4 countries can be different. Secondly, the local players may have different *sourcing strategies*: opposite to the more Asia-oriented production outsourcing of the Czech / Polish / Slovak firms (in the case of Poland see Rupik 2009), the Hungarian enterprises may be focusing on East Central Europe, which is also supported by the outstanding import share of the region in the case of Hungary *(Table 5)*. Thirdly, the *significance of the product group*

Table 5 Share of different exporting regions / countries in the East Central European textile and apparel import (average percentage of the total value)

	2001-2005				2011-2015			
	EU-15	EU-13	Other European	Non-European	EU-15	EU-13	Other European	Non-European
Bulgaria	74,6	3,1	1,5	20,8	67,1	9,0	2,0	21,9
Czechia	59,5	10,8	3,2	26,5	44,0	7,5	1,7	46,8
Hungary	66,6	13,6	2,9	16,9	64,2	23,4	1,7	10,7
Lithuania	68,5	10,7	5,4	15,4	56,4	19,4	5,7	18,6
Poland	62,3	6,3	1,5	29,9	36,2	6,2	1,3	56,4
Romania	80,9	3,3	0,7	15,2	72,1	10,2	1,9	15,8
Slovakia	59,0	17,7	7,7	15,6	28,0	12,7	10,8	48,5
ECE-16	**66,4**	**8,4**	**3,4**	**21,8**	**48,9**	**10,8**	**2,9**	**37,4**

Source: ITC / UN COMTRADE

(HS 6309) containing worn clothes coming from Western Europe is the biggest in Hungary among the V4 countries, by 2015 in absolute volume overtaking even the much larger Poland, which describes the characteristic culture of the local apparel consumption *(Table 6)*. The region is an *appreciating target of textile and clothing products* coming from the developed European countries: by a growth of the total value, the share of East Central Europe in the EU-15 export has grown from 10% to 12% *(Figure 6)*.

Table 6 The import volume of the product group (HS 6309) containing worn clothes (mil. EUR) and its relative importance in comparison to the total apparel import (%)

Absolute volume in million euro								
	2001	2003	2005	2007	2009	2011	2013	2015
Czechia	12,4	11,1	10,7	13,2	15,0	16,3	20,1	19,5
Hungary	13,8	13,9	12,0	23,6	29,7	41,9	74,4	60,6
Poland	33,4	29,6	32,9	46,6	57,0	59,8	100,0	57,8
Slovakia	14,1	18,0	26,9	18,1	27,0	28,7	25,7	19,0

Relative importance in percentage of the total apparel import								
	2001	2003	2005	2007	2009	2011	2013	2015
Czechia	2,6	2,2	1,1	1,3	1,2	1,1	1,4	1,0
Hungary	2,3	2,0	1,8	3,6	5,4	5,7	10,2	6,6
Poland	5,9	4,3	3,6	3,3	2,5	2,0	3,4	1,3
Slovakia	7,6	7,5	8,7	3,5	3,8	3,0	2,7	1,7

Source: ITC / UN COMTRADE

CONCLUSION AND OUTLOOK

The results of the examination have *mostly verified the hypotheses*, on which base not only the characteristic features of the intra-industrial structural change, de-scribed and explained by other studies earlier, but also their *intra-regional differ-ences* have been highlighted. The stereotype of East Central Europe as a cost-ef-ficient location for labour-intensive textile and apparel production supplying Western Europe, it can be declared, correspond less and less to the reality. This statement has been proven not only by the negative foreign trade balance, but also by the changing composition of exported and imported products, by the de-clining weight of Western European linkages as well as by the appreciating new export and import markets.

In the background of these tendencies the *crowding out of labour-intensive mass production from the region* is recognizable. On one hand, the declining importance of subsidiaries or subcontracting for Western customers and the growing signifi-

cance of *local clothing firms* building their *own brands* and *production networks* can be observed, although the process has different extents in the countries of the region. The market relations and sourcing strategies of these local brand owners are responsible - for example - for the export success of Poland determining more and more the product structure and the spatial extension of the textile and clothing trade. On the other hand, the *technical and special textile consumption* of other industries – first of all the automotive sector showing maybe the most dynamically growing capacities in the region – has an effect on this restructuring process.

Secondly, the comparison referred to a *dividing line* related to the way of integration into the textile and clothing production networks, which exists between the V4 countries as well as Bulgaria, Lithuania and Romania. This *duality* of the region *may be extended also for smaller economies* as the above-mentioned examples of Slovenia and Estonia as well as Macedonia show. We can put up the question based on the findings whether this difference can be explained only by the momentary inequalities of location factors in the countries. Are economies *moving on the same development path* as "first" and "second generation" countries with time differences? Or can we make a general *distinction between a "Northern model" and a "Southern model"* of European economic restructuring based on the different role of labour-intensive industries that can be extended also for the inner differentiation of East Central Europe? While the restructuring of the Czech, Polish and Slovakian textile and clothing industry has been realized by growing export, Hungary as an only actor among the larger exporters has shown a significant absolute shrinkage. Can we speak - based on this observation - about *"expansive" and "defensive" ways of sectoral restructuring*?

Because of the changing product and activity structures of the sector the *revaluation of location factors* is expected, making the exploration of *spatial consequences* important also on subnational level. Analyses have been made about the textile and clothing industry of more countries such as Bulgaria, Poland, Romania and Slovakia, where the durable importance of traditional centres (Southwest Bulgaria, Lódz) as well as the spatial shifts of the industry (appreciation of Northeast Romania or Eastern Slovakia) are apparent at the same time (Królikowska 2007, Crestanello - Tattara 2011, Kalantaridis et al 2008, Smith et al 2014). In the future, I would like to contribute to these East Central European findings by a deeper analysis of the spatial development characterising the Hungarian textile and apparel industry.

Acknowledgements

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INTEGRATED CRITERIA FOR RANKING BLACK SEA LAND-BASED POINT POLLUTION SOURCES

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Abstract

The aim of the publication is to present detailed explanation of the integrated criteria developed for the Methodology for identification, assessment and ranking of the Black Sea land-based pollution sources (the Hot Spots Methodology) as well as to present results of UA land-based pollution sources ranking. The paper contains also the general description of the Hot Spots Methodology. The key focus is made on two integrated criteria for ranking of the land-based pollution sources. The first one: the degree of overall impact on water quality which characterizes the influence of waste water discharge on the environment based on the "effective" mass of pollutant and the criterion of the effect of pollutant discharge on the receiving aquatic environment. Formulae used for calculation are presented in details. The another one is the degree of local impact on water quality, which characterizes the local impact of wastewater discharge on the receiving aquatic environment taking into account the dilution of waste water by inland or sea waters. Formulae used for calculation are presented in details. Results of testing are presented by using UA official statistical data. Also general comparison of ranking 4-top UA land-based pollution sources on various criteria are presented. Interpretation: the developed criteria were integrated into the Hot Spots Methodology. The obtained data were used for compilation of the final list of 10-top UA Hot Spots and provided to the Ministry of the Environmental Protection of Ukraine as well as to the Black sea Commission.

Key words

Land-based pollution, Black Sea, Hot Spots Methodology, marine ecosystem

INTRODUCTION

Black Sea (BS) is a transboundary water body and that is why international cooperation is very important for the protection of the Black Sea ecosystem. International

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cooperation includes legislation and scientific sector which are closely connected. In 1996 Convention on the Protection of the Black Sea Against Pollution (Convention, 1996); it sets out the overall objectives and obligations of the contracting Parties (Bulgaria, Georgia, Romania, Russian Federation, Turkey and Ukraine) in Black Sea protection, the actual implementation of each of these is to be done through more detailed and specific Protocols. In 1996, the Bucharest Convention implementation was given a tight time-frame through an ambitious Strategic Action Plan (SAP (BS SAP, 2009), currently replaced by (BS SAP, 2009)) and the first regional List of BS Hot Spots (HSs) was prepared shortly before (Utkina, 2012).

Land-based pollution sources (LBSs) produce great negative impact on the Black Sea ecosystem and that is why scientists have initiated national and international projects devoted to finding ways for elimination of the pressure caused by land-based pollution sources. (Koco et al., 2016, Krzemien, 2015, Utkina et al., 2016 and Velikova et al., 2016).

During 2013-2015 under the framework of the project "Integrated hotspots management and saving the living Black Sea ecosystem" – HotBlackSea (grant agreement Nr 2.2.1.72761.225 MIS-ETC 2303, Black Sea Cooperation Programme) the Hot Spots Methodology - Guiding harmonization in identification and prioritization of Hot Spots in the Black Sea Region (the Black Sea Hot Spots Methodology or the BS HSs Methodology) was developed (Utkina et al., 2015). In preparation of this methodology, the draft Black Sea Commission HSs Methodology was taken as a basis, as well as best available practices in the development of national and regional (Arctic Seas, MEDPOL, DABLAS, HELCOM, OSPAR) methods of identification, evaluation and ranking of point sources of pollution. The aim is to provide a unified approach for identification, assessment and ranking of LBSs located in the Black sea catchment area.

PURPOSE

Before 2015 each BS country used different local/regional methodologies and criteria for identification and ranking of the LBSs. Taking into account that the Black Sea is a transboundary water body the unified methodology should be used; only in this case LBSs located in different countries can compared and obtained results will be reliable. In the framework of the HotBlackSea project such methodology was developed. The purpose of the publication is to present brief information on the Hot Spots Methodology and to present detailed information about the developed integrated criteria for ranking LBSs.

THE HOT SPOT METHODOLOGY DESCRIPTION

The Hot Spots Methodology includes the following stages of work:

Stage 1 - Compilation of full LBSs List (as full as possible);

Stage 2 - First level screening – selection of Hot Spots candidates using various indicators characterizing waste water pollution;

Stage 3 - Second level screening and first prioritization to identify top Hot Spots. Prioritization is performed on environmental and socio-economic (welfare) criteria;

Stage 4 - Third level screening to verify the prioritization according to more sophisticated criteria and build the final HSs List, which would be eligible to speak about priorities in investments and their schedule (short-, mid-, and long-term), and selection of top priority HSs.

The general algorithm of the Methodology is presented in Figure 1.
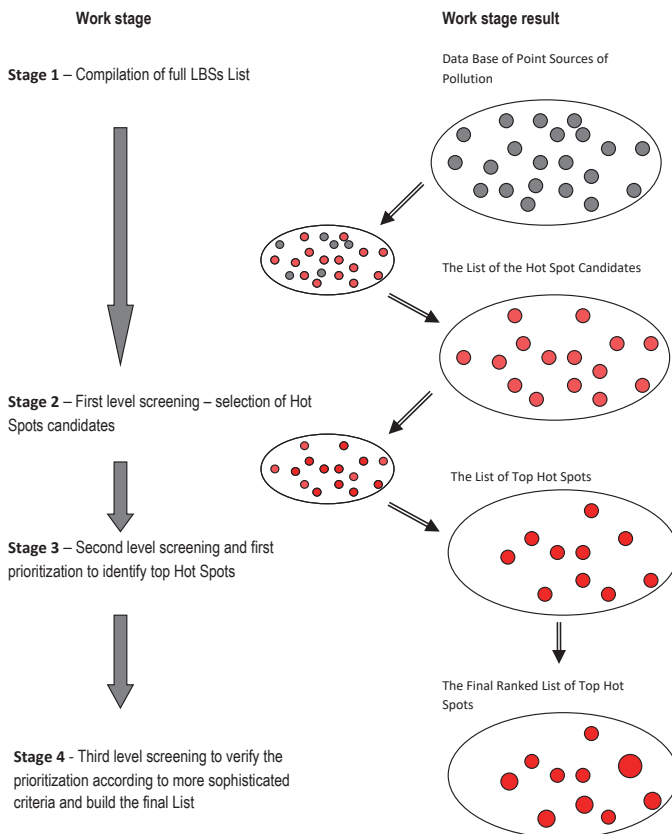

Figure 1 The general algorithm of the Hot Spot Methodology
Source: Utkina et al. (2015)

Thus, selection of Hot Spot candidates is conducted on Stage 2 of the HSs Methodology. Assessment and ranking of the Hot Spot Candidates are performed on Stage 3. Final prioritization of the Hot Spots is performed on Stage 4. It is provided in support of decision-making on investments.

At each of the stages a number of assessment criteria are used, which require additional data/information input. 'Additional' means such data/information which are not available in the LBS/HSs Database and are not automatically derived through the HS Methodology Software (see further detail explanations on the subject).

Detailed information about the Hot Spots Methodology, criteria and required data is presented at (Utkina et al., 2015).

In this publication we'd like to present information for the following two integrated criteria, which are used at the fourth stage of the Hot Spots Methodology:

– Degree of overall impact on water quality
– Degree of local impact on water quality.

INTEGRATED CRITERIA DESCRIPTION

The degree of overall impact on water quality

The degree of overall impact on water quality characterizes the influence of waste water discharge on the environment based on the "effective" mass of pollutant and the criterion of the effect of pollutant discharge on the receiving aquatic environment. Impact on the environment is evaluated on the basis of the following three factors: the effective mass of the pollutant, the coefficient of relative toxicity of pollutant and the coefficient taking into account processes of assimilation and respiration of pollutant. The value of effective mass of the i-th pollutant for Hot Spot Mx is calculated using the formula:

$$M_i = \frac{A_i \times Q_i \times C_i}{1 + K_i},$$

Where A_i is the coefficient of relative toxicity showing how many times the toxicity of the *i*-th ingredient exceeds toxicity of lignosulfonate. It is calculated according to the formula:

$$A_i = \frac{MAC_{lignosulfonate}}{MAC_i},$$

Where: $MAC_{lignosulfonate}$ = 1 mg/dm³;
MAC_i is the maximum allowable concentration of the *i*-th ingredient in the aquatic environment;
Q_i is the wastewater discharge, m³/year;
C_i is the concentration of pollutant in wastewater, mg/ dm³;

K_i is the dimensionless coefficient taking into account processes of assimilation and respiration in the water body. The values of K_i for various substances are presented below.

item No.	Name of substance	Amount, K_i
1	Metal ions, pesticides, mineralization, principal ions	0
2	BOD_5, nitrates, ammonium nitrogen, phosphates, COD, oil products	1
3	Detergents, urea	10
4	Freely decaying substances (nitrites)	100

Values of MAC_i, A_i and K_i for various substances are given in(Utkina et al., 2015).

The total value of the effective mass of pollutants discharged by the Hot Spot, M_x, is calculated as the sum of individual values of the effective mass of each of the pollutants discharged into water bodies (the list of pollutants is given in the Hot Spots Methodology using the formula:

$$M_x = K_{rs} \cdot \sum_{i=1}^{n} M_i ,$$

Where: $i = 1, \dots$;

n corresponds to the i-th pollutant;

n is the number of pollutants;

K_{rs} is a dimensionless coefficient;

$$K_{rs} = \begin{cases} 1, \text{ for point sourses} \\ N_{rs}/365, \text{ for urban rainfall runoff} \end{cases},$$

N_{rs} is the number of days with precipitation of at least 20 mm; in the absence of information on the number of days with precipitation greater than 20 mm we accept $N_{rs} = 3$.

The index of pollutant discharge impact of the Hot Spot, M_x, on the aquatic environment (S_x) is calculated with account of the effective mass of pollutants contained in wastewaters of all discharges with the following formula:

$$S_x = \frac{M_x}{\sum_{j=1}^{k} M_j} \times 100\% ,$$

Where: M_x is the effective mass of pollutants in wastewater of the x-th discharge, t/year;

$\sum_{j=1}^{k} M_j$ is the total amount of the effective mass of pollutants in wastewaters of all discharges, t/year;

S_x is the dimensionless quantity in percentage terms disclosing a contribution of the x-th discharge in the total effective mass of pollutants from all discharges;

k is the total number of wastewater discharges.

As to urban rainfall runoff, the annual mass of pollution export, (M_i), is calculated by the formula:

$$M_i = C_i \cdot Q ,$$

Where C_i is the concentration of pollutant, (mg/l); Q is the annual rainfall runoff (m³/year), which is calculated by the formula:

$$Q = 10 \cdot F \cdot (\varphi_r \cdot H_r + \varphi_s \cdot H_s) ,$$

Where φ_r, φ_s are the run-off coefficients for rainfall and snow-melt waters; F is the catchment area of the territory, ha; H_r, H_s are the average annual precipitation depth for warm and cold periods, respectively, mm. Values of φ_r coefficient are assumed to be equal to: 0.3-0.4 for small towns and urban settlements, and 0.6-0.8 for large cities. Values of φ_s coefficient are assumed to be equal to 0.5-0.7 (Regulations, 1995).

Valuation assumptions (Tuchkovenko et al., 2011) for pollutant concentrations in urban surface run-off are shown below:

Parameter	Concentration
BOD$_5$	50-100 mgO$_2$/dm³
Ammonia nitrogen	2.6-6.0 mg/dm³
Phosphates	0.5-1.0 mg/dm³
Suspended solids	1000-2000 mg/dm³
Oil products	10-15 mg/dm³
COD	400-600 mgO/dm³

After calculation, S_x is assigned with the appropriate score:

Score 7	$S_x > 40\,\%$
Score 6	$20\,\% > S_x < 40\,\%$
Score 5	$15\,\% > S_x < 20\,\%$
Score 4	$10\,\% > S_x < 15\,\%$
Score 3	$5\,\% > S_x < 10\,\%$
Score 2	$1\,\% > S_x < 5\,\%$
Score 1	$S_x < 1\,\%$

In the absence of data on pollutant concentrations for the urban surface run-off (of atmospheric origin), score is assigned according to:

	If data on WW volumes are available	In the case of absence of data on WW volumes
Score 1	< 5 mln m³/year	Town population is < 500,000
Score 2	5-10 mln m³/year	Town population is 500,000-1,000,000
Score 3	10-15 mln m³/year	Town population is 1.0 – 1,5 mln
Score 4	More than 15 mln m³/year	Town population is more than 1,5 mln

The degree of local impact on water quality

The degree of local impact on water quality characterizes the local impact of wastewater discharge on the receiving aquatic environment taking into account the dilution of waste water by inland or sea waters.

The criterion of the local impact of the discharges of pollutants on the aquatic environment, taking into account the dilution of wastewater by surface (e.g. rivers, lakes) or sea waters is calculated according to the formula:

$$f_x = \frac{K_{rs}}{N_L} \cdot \sum_{i=1}^{p_x} C_{ix} / MAC_i$$

Where: C_{ix} is the concentration of the i-th substance in the wastewater of x-th source of pollution, mg/dm³;

N_L is the reciprocal dilution of wastewater at a distance of L = 50 m from its discharge under the most unfavourable weather conditions (see further explanations);

P_x is the number of all discharged ingredients in wastewater of the x-th source of pollution;

K_{rs} is a dimensionless coefficient:

$$K_{rs} = \begin{cases} 1, \text{for point sourses} \\ N_{rs} / 365, \text{for urban rainfall runoff} \end{cases}$$

N_{rs} is the number of days with precipitation of at least 20 mm; in the absence of information on the number of days with precipitation greater than 20 mm we accept $N_{rs} = 3$.

This criterion is an approximate estimate of the total MAC exceeding ratio for substances discharged by the examined source of pollution at a distance of 50 m away from the discharge point under most unfavourable weather conditions.

For discharges of waste water directly into the sea the reciprocal dilution of wastewater at a distance of L = 50 m away from the discharge point under the most unfavourable weather conditions can be calculated approximately using the following algorithm (Barannik, Kresin, 1985):

$$N_L = \frac{\Phi(z_1)}{\gamma_0 z_2} ,$$

Where:

$$z_1 = \frac{L + x_0}{x^* + x_0} ,$$

$$z_2 = \frac{q}{u \times H^2} \sqrt{\frac{D_v}{D_h}} ,$$

$$\Phi(z_1) = \begin{cases} z_1, & \text{for } z_1 \leq 1; \\ \sqrt{z_1}, & \text{for } z_1 > 1; \end{cases}$$

$$x_0 = \begin{cases} \dfrac{q}{4\pi} \cdot \sqrt{\dfrac{D_v}{D_h}}, & \text{if } z_2 \leq 1; \\[3mm] \dfrac{q^2}{4\pi \cdot H^2 u D_h}, & \text{if } z_2 > 1; \end{cases}$$

$$x^* = \frac{uH^2}{4\pi D_v} ,$$

q is the volume of waste waters, m³/s;

L is the distance from the discharge to the nearest monitoring section, m; (L = 50 m)

x_0, x^* are the intermediate calculated parameters, m;

u is the water flow velocity in the receiving water body, m/s;

x^* is the parameter of interface of the section of two-dimensional diffusion with the section of three-dimensional diffusion, m;

D_v and D_h are the coefficients of vertical and horizontal turbulent diffusion, m²/s, respectively;

H is the average depth at the location of discharge, m;

γ_0 is the parameter taking into account the effect of shore on reciprocal main dilution; ($\gamma_0 = 2$, if WW discharge is performed directly to the sea not far from the shoreline; $\gamma_0 = 1$, if WW discharge is performed far from the shoreline;

l_0 is the distance from the discharge to the shoreline, m.

The coefficient of horizontal turbulent diffusion, D_h, is determined by the formula from (Pukhtiyar, Osipov, 1981):

$$D_h = 0,032 + 21,84u^2$$

The coefficient of vertical turbulent diffusion is calculated using the formula from * Tarnopolskiy, 1991):

$$D_v = C_0 + C_1u + C_2H + C_3u^2 + C_4H^2 + C_5uH + C_6u^2H + C_7uH^2,$$

Where $C_0...C_7$ are constant coefficients specified in the Table 1 below.

Table 1 Values of coefficients C_i to determine the coefficient of vertical diffusion

i	0	1	2	3
Ci	5.994·10^{-4}	5.347·10^{-4}	-3.681·10^{-4}	-1.469·10^{-4}

i	4	5	6	7
Ci	5.669·10^{-6}	1.426·10^{-4}	2.276·10^{-6}	-2.401·10^{-6}

In the event, when wind currents prevail, the flow velocity under the most unfavourable conditions is taken to be equal to 0.02 m/s ($u = 0.02$) (Falsenbaum, 1960). Similarly, in the case of non-wind (gradient) currents, in the absence of data from direct observations, the flow velocity is assumed to be equal to 0.02 m/s.

For discharges of waste water into the rivers the reciprocal dilution of wastewater can be calculated using the full mixing approximation:

$$N_L = \frac{q+Q}{q},$$

where   Q – the volume of river flow.

The normalization of the criterion of local impact is performed in the following manner. Dimensionless quantity F_x is calculated. It represents the relative contribution (in percentage terms) of the x-th source of pollution in the total pollution of water by all selected (top) discharges:

$$F_x = \frac{f_x}{\sum_{j=1}^{p_x} f_j} \times 100\% \cdot$$

On the base of calculated values of F_x each source of pollution receives a score in compliance with.

score 7	$F_k > 40\%$
score 6	$20\% > F_k < 40\%$
score 5	$15\% > F_k < 20\%$
score 4	$10\% > F_k < 15\%$
score 3	$5\% > F_k < 10\%$
score 2	$1\% > F_k < 5\%$
score 1	$F_k < 1\%$

For urban surface run-off in the absence of data on pollutant concentrations scores are assigned according to:

	If data on WW volumes are available	**In the case of absence of data on WW volumes**
score 1	< 3 mln m³/year	Town population is < 400,000
score 2	3-5 mln m³/year	Town population is 400,000-700,000
score 3	5-10 mln m³/year	Town population is 700,000-1,000,000
score 4	10-15 mln m³/year	Town population is 1.0 – 1.5 mln
score 5	More than 15 mln m³/year	Town population is more than 1.5 mln

It is reasonably to use two quantitative criteria characterizing pollutant loads, characterizing pressure from LBSs because of two different types of harmful impact on the sea ecosystem: local and large-scale impacts. The local impact results in increasing of pollutant concentrations in the water near the discharge point. The large-scale impact results in the contribution of sources of pollution to the formation of background concentrations and makes itself felt after a long period of time.

Quantitative criteria characterizing pollutant loads were applied already for developing different environmental programs, for example in (Barannik, Kresin, 1985; Pukhtiyar, Osipov, 1981; Tarnopolskiy, 1991; Falsenbaum, 1960; Report, 2002; WHO, 1993; DABLAS, 2003; Romanenko et al., 2003; Lloyd et al., 2004), however in that criteria the researchers did not consider two different aspects of harmful impact on the sea ecosystem from the waste water discharge source.

The both criteria that were considered above are based on pollutant loads concept. However, there is the important difference between them. The degree of overall impact on water quality criterion does not consider the processes of dilution of wastewater by sea waters, but takes into account processes of assimilation and respiration in the water body. The degree of local impact on water quality

criterion on the contrary: takes into account processes of dilution of wastewater by sea waters, but disregards the processes of assimilation and respiration in the water body.

The results of criteria calculations during testing of HSs Methodology on Ukrainian LBSs are given in table 2 for 3-top Hot Spots assigned to the 1-st category (which need short-term investments).

For effective use of the Hot Spot Methodology the Hot Spot Database was developed (Velikova et al., 2015). For Ukraine the official statistical data sources were used: 2TP-vodkhoz, statistical bulletins, etc.

Table 2 The results of ranking to the 1-st category Ukrainian LBSs according to the criteria of overall and local impact on water quality for 4-top Hot Spots

Facility Name	The degree of overall impact on water quality		The degree of local impact on water quality		Total rank
	Value	Rank	Value	Rank	
Pivnichna WWTP, Odesa	17,0	2	16,5	2	1
Pivdenna WWTP, Odesa	17,5	1	16,2	3	2
Galitsinovsky WWTP, Mikolaiv	14,3	3	36,6	1	3
Sevastopol' WWTP	26,4	1	10,0	4	3

Source: *Data on 2014 were used, that is why Sevastopol' WWTP is in this list, after 2014 Crimea was occupied by Russia and no data for Crimea LBSs are available*

As we can see, 4-top Hot Spots determined by both criteria coincide. However the ranks determined by each criterion are different. According to the criterion "The degree of overall impact on water quality" the Sevastopol' WWTP and the Pivdenna WWTP, Odesa have the 1-st rank, because the highest masses of pollutants discharge with waste water of these point sources. According to the criterion "The degree of local impact on water quality" the Galitsinovsky WWTP, Mikolaiv has the 1-st rank, because discharge of waste water of this facility is characterized by low reciprocal dilution.

Visualization of the results are presented on Figure 2.

According to the ranking taking into account both criteria as well as other integrated criteria, Pivdenna WWTP, Odesa has the 1-st rank; this LBS is characterized by higher masses of pollutants in waste waters and lower reciprocal dilution. So the testing of developed HSs Methodology has confirmed the need of using a number of integrated criteria taking into account the different aspects of discharges impact on the sea ecosystem.
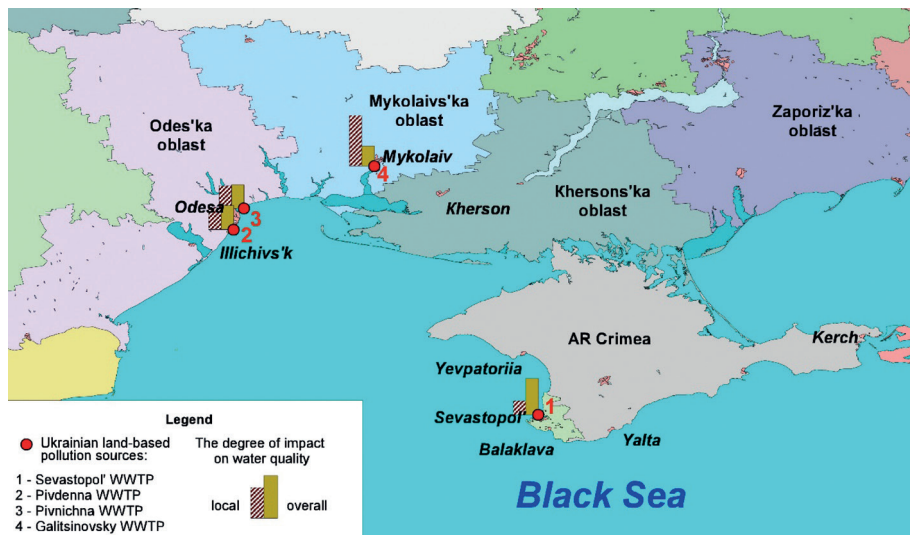
Figure 2 Four top land-based pollution sources for Ukraine

CONCLUSIONS

1. The Hot Spots Methodology of ranking has been developed for all Black Sea countries. It includes four stages and three levels of screening. On each level a set of criteria are used for evaluation and ranking of LBSs.

2. On the third level of screening several integrated criteria are included. The paper is devoted to two integrated criteria for ranking of the land-based pollution sources. The degree of overall impact on water quality characterizes the influence of waste water discharge on the environment based on the "effective" mass of pollutant and the criterion of the effect of pollutant discharge on the receiving aquatic environment. The degree of local impact on water quality characterizes the local impact of wastewater discharge on the receiving aquatic environment taking into account the dilution of waste water by inland or sea waters.

3. Both criteria are basing on pollutant loads, but have the important difference. The criteria of local impact takes into account the processes of dilution of wastewater by sea waters and the criteria of overall impact on water quality takes into account the processes of assimilation and respiration in the water body.

4. Ranking of UA LBSs has shown the following results: the Sevastopol' WWTP and Pivdenna WWTP, Odesa have the highest impact on sea ecosystem on the criterion "The degree of overall impact on water quality" (26,4 and 17,5, correspondingly); Galitsinovsky WWTP, Mikolaiv has shown the highest value on the

criterion "The degree of local impact on water quality" (36,6). However, taking into account all criteria it was proved that the Pivnichna WWTP, Odesa has the highest impact on the Black Sea ecosystem.

5. Testing of developed Hot Spots Methodology on Ukrainian LBSs has confirmed the necessity to use several integrated criteria, which consider the different aspects of LBSs impact on the sea ecosystem.

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GEOGRAPHICAL DISTRIBUTION OF THE VINEYARDS AND WINE PRODUCTION IN RURAL AREAS OF BOSNIA AND HERZEGOVINA

Rahman NURKOVIĆ A*

Abstract

Because of the climate and natural ecological conditions, Bosnia and Herzegovina produces premium wines. The geographical position of Bosnia and Herzegovina, especially of the Herzegovina region, has ideal conditions to promote Bosnia and Herzegovina as a significant producer of high-quality wines, as national brands. These potentials and advantages for wine production need to be well integrated, as a significant economic activity. Bosnia and Herzegovina is characterized by two major wine growing regions: Herzegovina and North Bosnia region. They differ in terms of climate and soil composition. The North Bosnia wine-growing region has a predominantly continental climate, and the vineyards are located on podzolic soil. The region of Herzegovina is characterized by Mediterranean climate, and the vineyards are mostly situated on lime marl soils. The vineyards of Herzegovina are located at an altitude of 10-500 meters above sea level.

Key words

Geographical distribution of vineyards, wine production, Bosnia and Herzegovina, tourism,

INTRODUCTION

The review paper aims at presenting development of viticulture and wine production as important parts of agricultural production in Bosnia and Herzegovina. Viticulture and wine in Bosnia and Herzegovina are known to go far back into the past. Grape growing areas offer a successful combination of wine, food and cultural events (Ackerman 1937). Where is, in this respect, Bosnia and Herzegovina as one of the largest wine growing areas in Southeast Europe, with more than 15,000 hectares of vineyards, which are exposed to the sun 220-270 days in a year? Bosnia and Herzegovina's geographical position, especially of Herzegovina, has ideal conditions to promote Bosnia and Herzegovina as a significant producer of high-quality wines as national brands. Can the wine and wine cellars in Bosnia and Herzegovina be part of diversified food products? Only with positioning of wine cellars in the regional and international markets, winemakers of Bosnia and Herzegovina can extensively be used in economic development in Bosnia and Herzegovina.

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In spite of the efforts that have been made in recent years, viticulture in Bosnia and Herzegovina has not reached the desired stage of wine and grapes production. This is caused by several factors, in the first place, by the age of vineyards, lack of agro-technical measures and the fact that plantation vineyards were planted late. Hence, there are fluctuations in the yields of grapes caused by climatic factors. According to the Farm survey in Uskopaljska valley (2014), most irrigation is done using tap water even 60.2% of farms use this way that significantly harm the reserves of drinking water serving households which causes the occurrence of frequent reduction of water in Uskopaljska valley. Even 33.7% of the respondents said that they do not irrigate thier land, which is surprising. (Gekić and Bidžan, 2015). The vineyards are subjected to erosion so that their surface is reduced and converted to pastures. Thus, it can be concluded that more intensive revitalisation of vineyards in Bosnia and Herzegovina should be started. Uneven regional development is the general characteristic of viticulture, which is particularly evident in the polarization of economic activities, population and income at particular developmental stages. Consequently, there are less employees and generally less developed grape growing in Bosnia and Herzegovina.

METHODS AND DATA SOURCES

The methodological approach is imperatively adapted to the purpose of work, so that viticulture and winemaking have a strong impact on the local and rural development in Bosnia and Herzegovina. The research has covered local and rural development of the areas in Bosnia and Herzegovina. In assessing the economic contribution of viticulture and wine production development, quantitative methods, ranging from stochastic to deterministic, have been almost exclusively used.

Evaluation of a direct economic contribution of viticulture to local and rural economic development in Bosnia and Herzegovina, with respect to the contents and incorporation into national accounts system, is a good basis for the definition and application of models that enable assessing the total contribution of production of more wine varieties (Arlinghaus et al. 1990). Namely, with the direct contribution of viticulture, a fuller understanding of the impact of vineyards on the local and rural development implies an expansion analysis by observing the link between the sectors that directly sell services, the wine products, and those activities that serve these sectors (indirect effects of primary, secondary and tertiary sectors). This is necessary for considering the impact of an increase in income due to the consumption of grape and wine industry. Models based on input-output analysis and computable general equilibrium models stand out in many of these methods, which can be used for considering a total or partial impact of viticulture on the economy (Chopra, 2011). As a basic method of collecting primary data sources, test methods have been used, i.e. in-depth interview, where the main in-

strument was a reminder for an interview. About 30 economic activities in Bosnia and Herzegovina were surveyed. Research has also been supplemented by the contents analysis of secondary sources, interpretation and description of appropriate databases of the Agency for Statistics of Bosnia and Herzegovina.

IMPORTANCE OF VITICULTURE IN THE ECONOMY

Viticulture occupies an important place in the economy of Bosnia and Herzegovina, especially of the Mediterranean Herzegovina. Based on previous data obtained from the Institute for Spatial Planning of the City of Mostar for 1963, viticulture in Herzegovina accounts for 5% of the gross product of agriculture, and occupies 2.3% of arable land. Participation of viticulture in the national income is 1.7%. This participation will significantly increase in the coming years by raising plantation vineyards (Woods 2009). Considering the agrarian population in Bosnia and Herzegovina, where the number of residents per 1 ha was twice bigger than in grain-growing region of the Pannonian Plain, viticulture has a special importance. The vineyards in Bosnia and Herzegovina that are cultivated in the classical way employ about 250 workers per 1 hectare, annually. It should be noted that the grape vines in Herzegovina are grown in such areas where other crops cannot be bred. In dry years, vineyards produce satisfactory amounts of quality grape and wine (Nurković 2006). Despite the fact that the percentage share is not big, the quality of wines largely compensates the quality of our country. Popular wines Žilavka and Blatina can be considered our finest wines with prices above the average of some European countries.

The Publication "S vinom kroz vrijeme" (With wine through time) (2006) states that the cultivation of vines in Bosnia and Herzegovina is most common in the region of Herzegovina. In 2012, the total area of this region amounted approximately to 10,000 km². With its sub-Mediterranean and Mediterranean climate, Herzegovina is a region in which Mediterranean fruit and vegetables are grown. Grape vine, figs, peaches, tangerines, apples, pomegranate and other varieties can be grown here, as well as medicinal herbs such as sage, heather, immortelle, etc. Due to mild climate, Herzegovina is the biggest and the only producer of grapes and wine in Bosnia and Herzegovina. Two autochthonous varieties, Žilavka and Blatina, had acclimated here long ago, and they yield crops and provide the product quality like nowhere else (Stojanović 1954).

Herzegovina is an area where the sun heats intensely six months in a year, and its stone, its glades and vales are covered by low and high vegetation of thorn, oak, ash, field maple, spruce and pine. Bosnia and Herzegovina's heritage of viticulture and winemaking culture dates back to the Illyrian times. The first grapevine seedlings were introduced to the Balkans by the Thracians. Today, wine production is limited to the catchment areas of the rivers Neretva and Trebišnjica, i.e. the Herze-

govinian wine region with Mostar, Lištica and Jablanica vineyards (Figure 1). The areas that are important for wine production are found mainly in the southern part of Bosnia and Herzegovina. Regionalization of viticulture from the 1970s recognizes the two wine-growing regions in Bosnia and Herzegovina: North Bosnia and Herzegovina. The North Bosnia region remains a potentially growing area to this day. During the last decade, modest and sporadic efforts were made to launch industrial production of wine in this region, which has not resulted in significant results so far. In this way, the overall market-significant production of grapes and wine still takes place in Herzegovina. In Bosnia and Herzegovina, viticulture is characterized by the dominance of small vineyards with an area of 0.3-0.4ha, and a very few vineyards exceeding 10 ha. These small vineyards are mainly family-owned farms whose exact number is not known, since there is still no register of grape and wine producers.

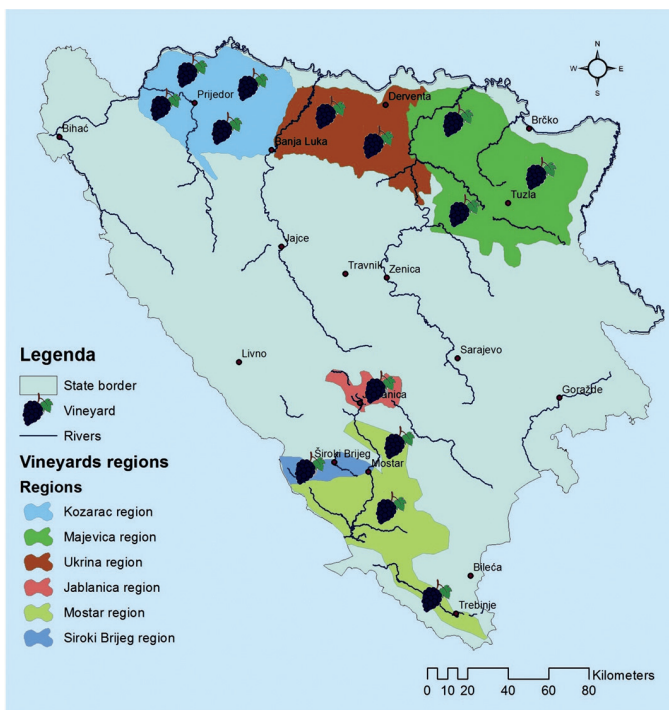**Figure 1** Wine growing areas in Bosnia and Herzegovina, 2012
Author: Nurković R.

By 1990, Bosnia and Herzegovina had 5,781 hectares of vineyards with 24.5 million of European vines grafted onto American rootstock. Of these, winegrowing region of Herzegovina covered 5.691 hectares of vineyards, or 98.4%, and the region of North Bosnia 90 ha or 1.6%. By 1990, the area under vines in Herzegovina

amounted to 5.691 ha. According to the 2007 statistics in Bosnia and Herzegovina there were 4,400 hectares of vines, of which 4,000 ha in the Federation of Bosnia and Herzegovina and 400 ha in Republic of Srpska. The official estimates of the OIV (International Organisation of Vine and Wine), which mention a total area of 4,000 hectares for the period 2002-2004, are similar. This is still a significantly lower vineyard area in relation to the period up to 1990, when Bosnia and Herzegovina had a total of 5,871 hectares of vineyards (Table 1 and Figure 2).

The most important grape varieties in Bosnia and Herzegovina are our domestic varieties Žilavka (white variety) and Blatina (black variety). In total production, Žilavka is represented with 70%, and Blatina with 30%. Recently, some producers have been planting the Montenegrin variety Vranac in their vineyards. The grape production in 2007 amounted to 21, 235 t with an average production of 1.9 kg per vine, which is almost equal to production from 2006 when 21,498 t of grapes were produced (Agency for Statistics of Bosnia and Herzegovina, 2012). Winemaking, along with the farming, becomes a significant source of income in Herzegovina. Today, Herzegovinian winemakers strive to be recognized by their Žilavka and Blatina wines, as unique varieties in the wine world, and to present themselves to the world through these wines that carry the smell of earth and harshness of the Herzegovinian sun.

Table 1 Area under vineyards in the leading municipalities in Bosnia and Herzegovina in 2012

Municipality	Total area in hectares	Vineyards in hectares	Vineyards from total area in percent
Mostar	115.764	600	0,52
Trebinje	85.963	300	0,35
Posušje	44.759	16,4	0,04
Široki Brijeg	37.958	101	0,27
Ravno	32.673	50	0,15
Ljubuški	29.798	372	1,25
Stolac	29.176	150	0,51
Čapljina	25.164	350	1,39
Neum	24.343	30	0,12
Grude	21.937	85,9	0,39
Čitluk	17.863	770	4,31
Total	495.590	2.825,3	0,77

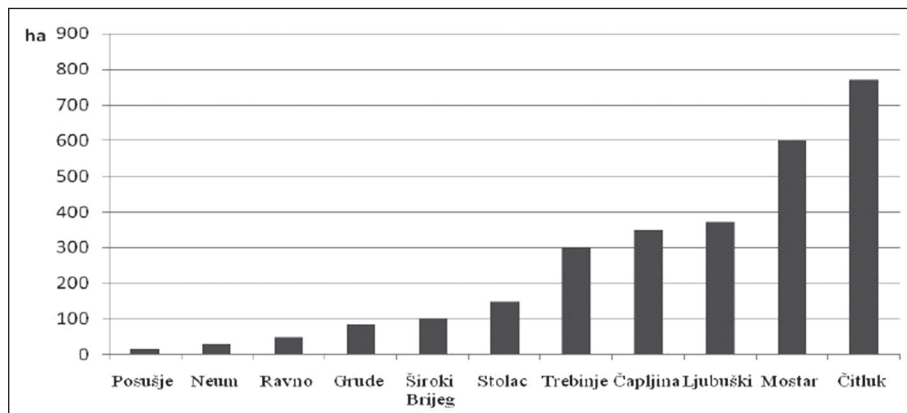*Source: Agency for Statistics of Bosnia and Herzegovina, 2012*

Figure 2 Area under vineyards in the leading municipalities
in Bosnia and Herzegovina in 2012

WINEMAKING

In 2012, Bosnia and Herzegovina had a total wine production of about 254,613 tons of grapes. As it can be seen from the table 1, the year 2009 is below the level of the year 2000, both in number of hectares planted with vineyards, and in the yields of grapes. It is a result of the restructuring of the grape vines surfaces. (Agency for Statistics of Bosnia and Herzegovina, 2012). The Ministry of Agriculture of Bosnia and Herzegovina does not really facilitate the job of digging the old plantations and revitalisation of new plantations in a short or medium deadline. Around 20 wine cellars in Bosnia and Herzegovina produce high quality wines due to climate and ecological conditions. Wine production amounts to more than 27 million litres per year. Sixty per cent of that is exports. The wines of Bosnia and Herzegovina end up on the market of Western Europe and the United States. Half of these exports go to Germany, Croatia and Austria where it is bottled without a mark of country of origin. Wine producers in Bosnia and Herzegovina are increasingly focusing on the production of bottled wines. (Table 2 and Figure 3).

The infrastructure of wineries had mainly been developed during the past decade. In the foreground, the efforts of winemakers were mostly in the direction of expansion of vineyards, and an increase in the production and quality of wine (Nurković 2013). One cannot speak about the development of wineries in terms of a food product, because, until now, a more preferential objective has been to stand on one's own feet and to offer more of bottled, quality wine to the market, opposite to the practice of selling it in tanks.

Table 2 The production of wine in Bosnia and Herzegovina, 1971-2012

Year	Vineyards in hectares	Production of grapes in tones	Yield per vine in kilogrames
	Total		
1971	5.325	31.069	1.32
1981	4.993	38.327	1.25
1991	5.781	31.134	1.87
2001	6.989	13.873	2,08
2002	7.280	14.203	2,07
2003	10.772	19.158	1,85
2004	10.827	19.541	1,95
2005	11.035	20.813	2,08
2006	11.419	19.990	2,00
2007	11.810	18.735	1,80
2008	11.912	18.845	1,91
2009	11.918	19.321	1,92
2010	13.793	22.680	1,95
2012	16.869	25.734	1,34

Source: Agency for Statistics of Bosnia and Herzegovina, 1971-2012
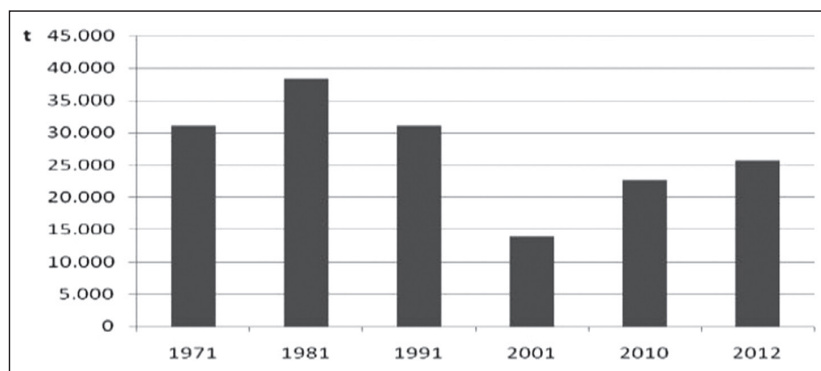
Figure 3 Production of grapes in Bosnia and Herzegovina, 1971-2012

In 2011, The Council of Ministers of Bosnia and Herzegovina accepted the plan on the development of wine regions, where industrial production of wine has a great significance for the development of the food industry. Herzegovina stands out as an area with great potential in organic agriculture and organic production of food and wine. If a very rich cultural and historical tradition is taken into con-

sideration, then it has a great potential for economic development of small and medium-sized enterprises through the food industry (Lorber, 2006).

Today, smaller wine producers in Bosnia and Herzegovina are thinking of connecting the wineries with tourism offer (Nurković, 2009). Similar to this Matlovičova and Husarova (2017) pointed to the existing and so far in tourism, little used cultural potential of the castles and their ruins as an important part of cultural heritage of Slovakia. Special attention has been paid to the example of the ruins of the castle Čičva. The rich history, unusual architecture and interesting natural environment advise the castle Čičva to monuments with a strong, but yet also considerably unused potential. Compared with other castles of the regions of eastern Slovakia has a number of flaws in the implementation of the cultural-historical events, in the width and variety of the offer and additional services, in the promotion of the activities of the association and also the castle itself, as the visitation worthy local tourist attraction.

Economic impacts of tourism have an influence on the economic situation of host community. They include features such as higher prices, employment, income and infrastructure development. Socio-cultural impact of tourism affects the social and cultural life of the population, such as quality of life, the quality of some services, cultural events, heritage, traditions, as well as crime and traffic jam (Sabolova, 2013).

According to Tej (2014) Tokaj wine in Slovakia is historically created brand that is well known in region, in country and in Europe. It is necessary to activate self-governing managements in the Tokaj region to intensify activities related to the promotion and communication in tourism local, national and international scale to attract more tourists, who may consume wine products and use many attractions in the form of festivals, hiking trails, bike routes and calm nature environment and rural environment.

Visiting the cellars and tasting of several types of wine by local and foreign tourists, all of which is certainly well-paid, ends with purchasing wine without intermediaries. The Herzegovinian wineries are already offering wine tasting and selling through their agencies for customers, i.e. the website Exploring Bosnia and Herzegovina. It seems that a real step towards the development of vineyards and wine production was done by investors from Bosnia and Herzegovina, the United States and France with the winery of 'Hepok' from Mostar.

Moreover, the local government became aware of the potential of wines and development of new vineyards (Arnold, 1985). Herzegovina has a project of exploiting comparative advantages of viticulture, wine production in a broader area of Mostar, Čapljina, Trebinje, Neum etc. The project was formed by the Agency for Sustainable Development and the Fund for support of small and medium enterprises; it designed new financial services and approved 48 loans to local entrepreneurs. This

contributes to restructuring of the local economy: the increase of vineyards, varietal plantation replacement and the increase of the quality of small wine cellars. The project supported 36 family businesses (29 individual and seven wineries) aiming at producing high quality wines, according to the European standards.

The development of viticulture in Bosnia and Herzegovina is going to be achieved through provision of new projects. In addition to the development of viticulture, Bosnia and Herzegovina has all the advantages needed for the development of wine tourism. However, in order to take advantage of this potential, development of viticulture must be approached with a plan; it should be systematically integrated into the overall economic product, which Bosnia and Herzegovina has started to build. Having in mind development factors, first of all natural-geographical, accomplished level of development, possibilities and needs in the aim of agriculture development, it is necessary to take concrete measures. Agriculture revitalization measures should be applied also to areas of husbandry and cattle breeding. One of the most important causes of decline is migration of the rural population towards towns, as well as insufficient investment in agriculture. Aggravation circumstance is that agrarian households are not provided with certain placement of products to the market. (Gekić, 2013).

CONCLUSION

The relationship of wine production and other industries is mutually beneficial. Integration of the wineries in Bosnia and Herzegovina into economic development can be of a twofold use: an increase in sales at the place of production, and marketing of their wines. In order to take advantage of this potential, the development of viticulture must be approached with a plan; so it should be systematically integrated into the overall economic product, which Bosnia and Herzegovina has started to build. It requires entrepreneurial spirit and willingness of winemakers to develop their wineries, as well as the quality of wines, but, on the other hand, it also requires a strong support by the state authorities responsible for the economic development of the wine business, and a strategic direction of this development.

In more recent years, especially after 2001, large spatial changes occurred in the rural communities of Bosnia and Herzegovina due to rapid development of new economic activities, which strongly affected the transformation of the rural settlements. Strong pressure from foreign and domestic investors leads to poor quality and the illegal construction of buildings in rural settlements, which have been spatially spreading along the vineyards and roads. The state has done little in terms of the wine brand-building in Bosnia and Herzegovina, as a recognizable wine destination. There is no informative, wine list offer whose function is to increase the customer interest; not to mention that there is no a registered "Wine Trail", or the atlas of wine regions.

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STUDY ON STRUCTURAL DIMENSIONS OF ESTABLISHMENT OF TOURISTIC RECEPTION WITH FUNCTIONS OF TOURISTIC ACCOMMODATION IN COUNTRIES OF EUROPEAN UNION

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Abstract

The article aims to analyse structural characteristics of tourist reception with functions of tourist accommodation in the European Union countries. Thus, the study has analysed services and facilities offered by over 440,000 establishments of touristic reception with functions of tourist accommodation, over 700 touristic destinations and 168 hotel chains. In order to evaluate tourist services and facilities, over 8.7 million questionnaires were filled in by tourists that had stayed at least one night in establishments of touristic reception with functions of tourist accommodation in the European Union countries. The data gathered in these questionnaires was also analysed in this article.

Key words

Star rating, beach access, property type, review score, property services, room facility, territorial distribution

INTRODUCTION

Hospitality recognized as a separate component of the economy, encompasses the totality of processes performed within the accommodation, resulting from the reception, stay and departure of the traveller. The content of the hospitality industry, its functions and features have evolved in connection with the development of accommodation capacities and their involvement in tourism activity.

Thus, the emergence and existence of the first establishments intended for the reception and accommodation of travellers were determined by performing movements for purposes other than tourism; accordingly, they were placed with priority along roads or in urban centres, and the facilities were more modest and with relatively simple functions.

Later, as the intensification of circulation, consecration and the transformation of tourism occurred into a mass phenomenon there have evolved adaptations and means of accommodation. Therefore, the number of temporary units for hosting guests and their placement is done outside cities, tourist areas eminently (Lockyer, 2007). At the same time there is a diversification of functions and improved facil-

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ities to better meet the needs of tourists. Following these changes, we can notice a phenomenon of crystallization in the hotel industry as a distinct field of activity (Morgan and Ranchhod, 2010; Tesone, 2012; Chalupa, Janoušková 2014, Klamár, Mika 2015)

Although the hotel industry does not concern solely providing the necessary facilities and accommodation for tourists, it exhibits more receptivity to their needs and evolves in close contact with tourism activity (Pearce, 2005; Kozoň, Klamár 2017).

A first dimension of this relationship is enhanced by the fact that over 70% of existing accommodation is located in tourist areas (seaside, mountain resorts or urban centres). In this way, individual tourism is more frequently register as a function of objective-hotel units (O'Fallon and Rutherford, 2011).

The link between tourism and hospitality business is much more complex, there is a mutual interrelation. The hospitality industry is growing due to increasing tourist traffic and tourism development is determined by the existence of accommodation, their level of equipment, the quality and variety of services offered (Nykiel, 2013).

It is known that besides the attractions of an element / sightseeing, the arrangements on conditions for rest and recreation, contribute decisively to the presence of tourists in the area. In this context, the hotel industry is becoming an important factor for promoting tourism, stimulating circulation and, in particular, the length of stay (Lockyer, 2013; Koščová, Koščová 2017; Matlovičová, Husárová 2017).

Better use of tourism potential is achieved by attracting different areas in the economic cycle. It is another aspect of how the hotel industry contributes to the development of tourism and, indirectly, to economic growth (Bosselman, Peterson and McCarthy, 1999).

Areas particularly rich in tourist attractions can remain outside the tourists' interest due to inadequate amenities or lack of minimum conditions of camping as areas that are less endowed with tourist attractions can receive requests from tourists due to the comfort and quality of services they offer.

This relationship between tourism and hotel industry has special value in guiding investments and directing the development of the hotel sector (Hales, 2006).

Progress in the hospitality industry reflects also how to satisfy the need for tourism. Increasing cash income, urbanization, increased leisure time, etc., were reflected in changing consumer behaviour towards tourism, meaning higher demand and diversification needs, a manifestation of increased demands on service quality. In this context, the hotel industry needs to create conditions for a growing number of people to benefit from, the opportunity to spend holidays or weekends in a tourist area.

Hotel services are insufficient in relation to the size of the demand. Their poor quality, besides rest and recreation have negative effects on consumers and will determine changes in the availability of time, income and indirectly decreases the number of tourists (Dittmer, Griffin, 1993; Beaver, 2005; Barth and Hayes, 2006).

Hospitality or accommodation service quality, influences not only tourism, but also its effectiveness. Thus, through an exerted attraction, hotel accommodation service promotes a better use of the human resources potential, the technical and material capacity, leading to the achievement of a higher operating ratios. Moreover, the complexity of the accommodation service level or quality, constitute an element of prestige, reputation for a tourism product or a business, contributing to an increase of efficiency in marketing holidays (Pender, Sharpley, 2004; Sabolová 2012).

The relationship between tourism and hospitality industry is mutual, the latter supports the quantitative and qualitative influence of transformations in tourist traffic. Increasing the number of tourists widens the reference of the market. The increasing consumer demand for holidays requires efforts to adapt the hotel industry efforts that are embodied in (I) new accommodation and upgrade existing ones in order to improve comfort, (III) extended typological units that increase the complexity of functions performed by them, and (III) diversified services and improving their quality (Bhatia, 2006a; Bhatia, 2006b).

Adaptability to the needs of tourism is one of the important features of the hotel industry. Most of the hotel particularities result from dependence and subordination to tourism, the service hotel accommodation overall performance attributes and generates tourism. Among them, there can be highlighted, for their role, terms like: complexity, seasonality, dependence on the provider, perishability etc. (Williams, 2004).

Accommodation service is the result of combining some basic benefits and some auxiliary. The hotel unit and its staff, and other links within and outside the tourism unit actively participate in this. The service has in this manner a richer and varied content, and its biggest attraction exerts on tourists. Therefore, the enrichment of accommodation service is a major concern for owners of equipment and for the personnel in the hotel industry (Lennon, 2003; Getz, Carlsen and Morrison, 2004; Page, 2012).

Regarding seasonality, it is the result of the concentration of demand in certain times of a year or week, depending on its specifics (for tourism heliotherapy, hiking, skiing, business, etc.) and is manifested in the variation of the production, and the supply of services. The overuse of accommodation during the season and the decrease of demand or its absence off season reflects negatively on the use of the material and staff and therefore on efficiency. Reducing seasonality, as a priority in the hospitality industry, require better adapt to changes in demand, more flexibility in the production of services, rigorous planning of human resources and, last

but not least, diversification of services to capture the interest of tourists. These measures diminish the role of natural conditions (Baum, 2001; Holden, Fennell, 2012).

Failure to store and preserve tourism lodging, as well as their dependence on material and personnel structures require particular concern for the identification and anticipation of future demand and greater flexibility in work organization. It can reduce or eliminate situations where there is a shortage of supply or a shortage in customer satisfaction, with negative effects on business results, but also on the material and moral satisfaction of staff (Swarbrooke, 2007; Costa, Panyik, Buhalis, 2013).

The specific element of systems of quality management are: finances, human resources, production / services and customer's satisfaction (Olkiewicz, 2015).

The hotel industry's problems, know a great diversity from the design and placement of units to their management. They have an important role on the quality of accommodation, hospitality and efficiency of operations and, indirectly, on the dynamics of tourism activity.

METHODOLOGICAL SPECIFICATIONS

Establishment of touristic reception with functions of touristic accommodation represents any building or settlement which provides permanently or seasonally the tourists with accommodation and other specific services.

The idea of this study was based on the desire to learn the structurally dimensions of tourist reception with emphasis on tourist accommodation in the 28 countries of the European Union. In this regard we analysed a total of 441,985 tourist reception structures with functions on tourist accommodation. For 2014 this indicator represents 77.50% of the total of tourist reception with functions of tourist accommodation in the 28 countries of the European Union. Structural analysis was done on indicators: star rating, beach access, property type, review score, property services and room facilities.

In the European Union countries the tourist reception with functions on tourist accommodation are divided into six categories from the point of view of comfort: 1 star, 2 stars, 3 stars, 4 stars, 5 stars and unrated.

In the European Union countries tourist reception with functions on tourist accommodation are divided into 24 categories in terms of property types: apartments, bed and breakfasts, boat hotels (also called floating hotels, boatels, hotels), campsites (also called camping sites), capsule hotels, chalets, cottages, country houses, farm stays, gites, guest houses, holiday homes (also called holiday cottages or vacation properties), holiday parks (also called holiday camps), homestays, hostels, hotels, inns, lodges (or a holiday accommodations), love hotels, luxury tents, motels, resorts, riads and villas.

Between April 2011 and October 2015 to assess tourism services there were applied a total of 8.719.910 questionnaires to the tourists that have stayed at least one night in the establishments of tourists' reception with functions on tourist accommodation and used in this study. Questionnaires were obtained with the help of Priceline Group (www.booking.com). In terms of property facility, tourist reception with functions on tourist accommodation in the European Union countries were analysed according to the following services (12): airport shuttle, facilities for disabled guests, family rooms, fitness centre, indoor pool, non-smoking rooms, outdoor pool, parking, pets allowed, restaurant, spa and wellness centre and Wi-Fi.

Based on the room facility, tourist reception with functions on tourist accommodation in the European Union countries were analysed according to the following facilities (11): air conditioning, bath, flat-screen TV, kitchen/kitchenette, patio, private pool, soundproofing, spa bath, terrace, view and washing machine.

There were considered 700 tourist destinations to analyse the territorial distribution of tourist reception with functions on tourist accommodation in the European Union countries, namely the top 25 tourist destinations in each country (based on the number of establishments of touristic reception with functions of tourist accommodation).

For hotel chains analysis of tourist reception of structures with functions of tourist accommodation in the European Union countries there were analysed 168 hotel chains.

STRUCTURAL DIMENSIONS

Star rating

From the point of view of comfort in European Union countries tourist reception with functions on tourist accommodation, are divided into two categories: measured and assessed. Thus, of the 441,985 structures of tourist reception with functions on tourist accommodation analysed, 133,692 (30.25% of the total number of tourist reception with functions on tourist accommodation analysed) are evaluated and 308,293 (69.75% of the total number of tourist reception with functions on tourist accommodation analysed) are unrated. European Union countries with high share of tourist reception with functions on tourist accommodation valued (and therefore the small share of tourist reception with functions on tourist accommodation unrated) are (top 5): Ireland (64.64%), Luxembourg (61.90%), Romania (60.16%), Bulgaria (57.26%) and Slovenia (56.75%). In contrast, the European Union countries with high share of tourist reception with functions on tourist accommodation unrated (and implicitly with small share of tourist reception with functions on tourist accommodation assessed) are (top 5): Denmark (97.50%), Estonia (93.83%), Cyprus (89.23%), Latvia (87.98%) and Hungary (86.78%) (Figure 1).
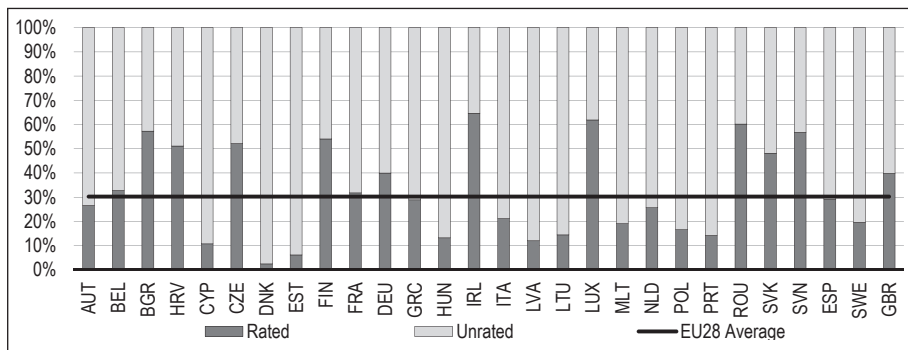
Figure 1 Rated and unrated establishment of touristic reception with functions of touristic accommodation in European Union countries

Tourist reception with functions on tourist accommodation in the European Union countries analysed are divided into five categories of comfort: 1 star, 2 stars, 3 stars, 4 stars and 5 stars. Prevalent among them are tourist reception with functions on tourist accommodation classified in 3 stars (53.34%), followed by those classified in 4 stars (25.80%) and those classified in 2 stars (14.51%). Tourist reception with functions on tourist accommodation with a star and with five stars have lower shares: 3.21% for tourist reception with functions on tourist accommodation classified under 1 star and 3.14% for tourist reception with functions on tourist accommodation classified under 5 stars (Figure 2, Table 1).
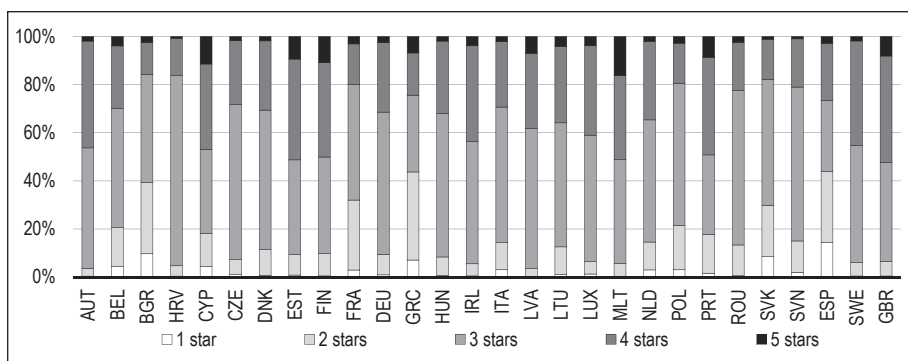

Figure 2 Rated establishment of touristic reception with functions of touristic accommodation in European Union countries

Table 1 Rated establishment of touristic reception with functions of touristic
accommodation in European Union countries (%)

Country	1 star	2 stars	3 stars	4 stars	5 stars
Austria	0.41%	3.24%	50.04%	44.42%	1.88%
Belgium	4.35%	16.19%	49.48%	26.07%	3.91%
Bulgaria	9.69%	29.55%	45.02%	13.22%	2.52%
Croatia	0.37%	4.34%	79.03%	15.50%	0.75%
Cyprus	4.33%	13.78%	35.04%	35.43%	11.42%
Czech Republic	1.00%	6.21%	64.44%	26.59%	1.76%
Denmark	0.80%	10.60%	58.00%	28.80%	1.80%
Estonia	0.85%	8.55%	39.32%	41.88%	9.40%
Finland	0.47%	9.29%	40.15%	39.21%	10.88%
France	2.92%	29.09%	47.97%	16.96%	3.06%
Germany	0.93%	8.50%	59.15%	28.83%	2.58%
Greece	7.08%	36.60%	31.95%	17.55%	6.83%
Hungary	0.69%	7.67%	59.52%	30.23%	1.89%
Ireland	0.48%	5.04%	50.87%	39.73%	3.88%
Italy	3.02%	11.25%	56.39%	27.19%	2.15%
Latvia	-	3.52%	58.29%	31.16%	7.04%
Lithuania	1.05%	11.50%	51.57%	31.71%	4.18%
Luxembourg	1.28%	5.13%	52.56%	37.18%	3.85%
Malta	-	5.69%	43.09%	34.96%	16.26%
Netherlands	3.01%	11.55%	50.78%	32.64%	2.02%
Poland	3.05%	18.48%	59.05%	16.63%	2.79%
Portugal	1.61%	16.16%	33.04%	40.43%	8.77%
Romania	0.56%	12.78%	64.23%	20.01%	2.43%
Slovakia	8.44%	21.41%	52.37%	16.61%	1.17%
Slovenia	2.00%	13.02%	63.98%	20.05%	0.96%
Spain	14.27%	29.56%	29.64%	23.63%	2.89%
Sweden	0.45%	5.63%	48.66%	43.39%	1.88%
United Kingdom	0.43%	6.06%	41.14%	44.27%	8.09%
UE Countries	**3.21%**	**14.51%**	**53.34%**	**25.80%**	**3.14%**

Beach access

Of all European Union countries there have been analysed a total of 22 295 structures of tourist reception with functions on tourist accommodation with beach access. European Union countries with a high share of tourist reception with functions on tourist accommodation with beach access are (top 5): Finland (34.94%),

Latvia (12.51%), Greece (12.40%), Cyprus (12.25%) and Estonia (11.54%), and the European Union countries with a small share of tourist reception with functions on tourist accommodation with beach access are (top 5): Denmark (0.84%), Slovakia (0.96%), Czech Republic (1.42%), United Kingdom (1.44%) and Hungary (1.58%) (Figure 3).
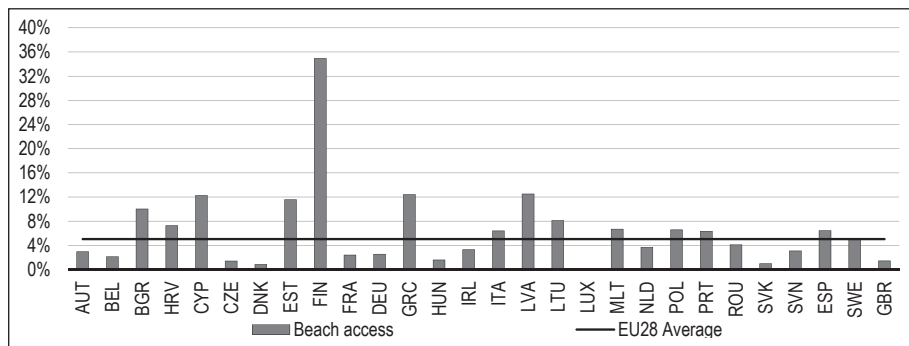

Figure 3 Beach access of establishment of touristic reception with functions of touristic accommodation in European Union countries

Property type

The 441,985 structures of tourist reception with functions on tourist accommodation analysed are divided in terms of property type in 24 categories. Of the 24 categories that are found in the European Union, only 8 are found in all the 28 countries: apartments (36.64%), bed and breakfasts (7.90%), country houses (1.80%), guest houses (9.04%), holiday homes (15.31%), hostels (1.01%), hotels (20.33%) and villas (3.27%) (Figure 4).
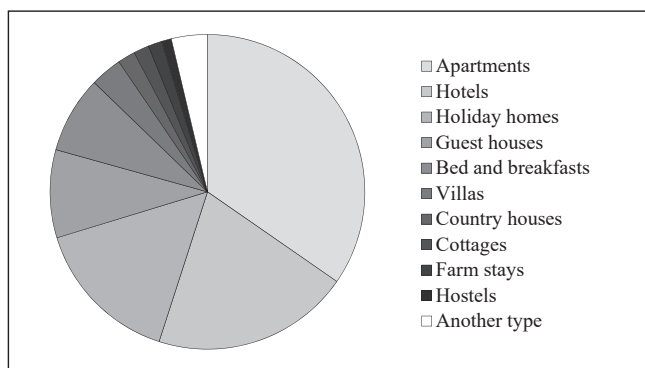

Figure 4 Property type of establishment of touristic reception with functions of touristic accommodation in European Union countries

Review score

From April 2011 to October 2015 to assess tourism services there were applied a total of 8,719,910 questionnaires to tourists that have stayed at least one night in tourist reception with functions on tourist accommodation analysed. Thus tourists have rated qualifications like: superb, very good, good and pleasant for the following services: cleanliness, comfort, location, facilities, staff, value for money and quality of Wi-Fi. Average ratings given by each tourist has generated an average for questionnaire. In the countries of the European Union the average mark for the evaluation of tourism services was 8.12/ 10. The highest scores were achieved in the evaluation of tourism services in Austria (8.23 /10) and Slovenia (8.23 /10) and lowest scores were obtained in the evaluation of tourism services Denmark (7.94/10) and Luxembourg (7.94/10) (Figure 5, Table 2).
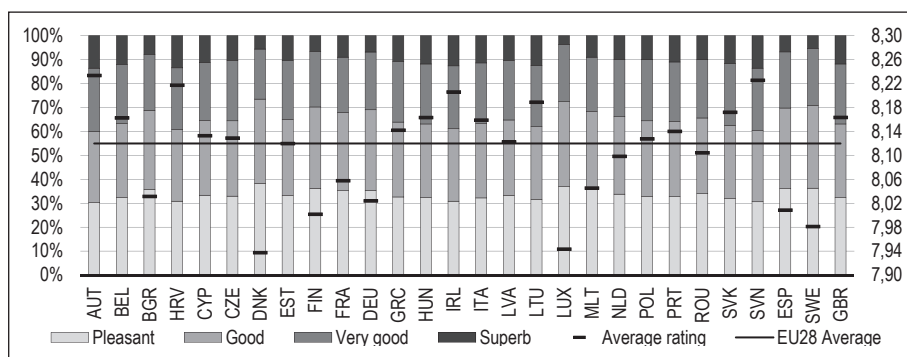

Figure 5 Review score of establishment of touristic reception with functions
of touristic accommodation in European Union countries

Property services

The 12 services offered by the establishments of touristic reception with functions of tourists accommodation – airport shuttle, facilities for disabled guests, family rooms, fitness centre, indoor pool, non-smoking rooms, outdoor pool, parking, pets allowed, restaurant, spa and wellness centre and Wi-Fi – have been analysed in percentages. In the end, it was calculated an average percentage of all services offered by establishments of touristic reception with functions of tourists accommodation. Thus, the European Union countries with a high percentage of the services in establishments of touristic reception with functions of tourists accommodation are (top 5): Bulgaria (43.28%), Czech Republic (40.77%), Luxembourg (40.34%), Slovakia (39.33%) and Poland (38.45%), and the European Union countries with a small percentage of the services in establishments of touristic reception with functions of tourists accommodation are (top 5): Denmark (21.25%), Croatia (28.51%), Sweden (30.11%), Belgium (30.34%) and United Kingdom (31.27%) (Figure 6, Table 3).

Table 2 Review score of establishment of touristic reception with functions of touristic accommodation in European Union countries

Country	Score	Superb	Very good	Good	Pleasant	No rating
Austria	8.23	13.57%	26.46%	29.72%	30.25%	5.88%
Belgium	8.16	12.03%	24.59%	30.98%	32.40%	6.72%
Bulgaria	8.03	7.77%	23.40%	33.03%	35.81%	10.05%
Croatia	8.22	13.43%	25.73%	29.94%	30.89%	16.07%
Cyprus	8.13	11.25%	24.15%	31.24%	33.37%	14.63%
Czech Republic	8.13	10.31%	25.22%	31.51%	32.96%	4.95%
Denmark	7.94	5.57%	20.93%	35.17%	38.33%	30.68%
Estonia	8.12	10.23%	24.71%	31.84%	33.22%	7.33%
Finland	8.00	6.61%	23.18%	33.97%	36.24%	4.81%
France	8.06	8.95%	23.08%	32.77%	35.21%	7.39%
Germany	8.02	6.79%	24.16%	33.69%	35.36%	5.13%
Greece	8.14	10.71%	25.39%	31.28%	32.62%	3.95%
Hungary	8.16	11.82%	25.05%	30.75%	32.38%	7.57%
Ireland	8.21	12.61%	26.26%	30.24%	30.89%	2.68%
Italy	8.16	11.38%	25.36%	31.02%	32.24%	7.51%
Latvia	8.12	10.34%	24.87%	31.49%	33.31%	7.00%
Lithuania	8.19	12.53%	25.42%	30.47%	31.59%	6.59%
Luxembourg	7.94	3.74%	23.77%	35.55%	36.93%	1.99%
Malta	8.05	8.99%	22.65%	32.27%	36.09%	9.29%
Netherlands	8.10	9.84%	23.97%	32.36%	33.83%	5.79%
Poland	8.13	10.06%	25.47%	31.62%	32.85%	4.41%
Portugal	8.14	10.95%	24.85%	31.43%	32.76%	7.51%
Romania	8.10	10.05%	24.33%	31.61%	34.01%	5.64%
Slovakia	8.17	11.70%	25.71%	30.67%	31.91%	4.11%
Slovenia	8.23	13.55%	26.04%	29.81%	30.60%	5.05%
Spain	8.01	6.75%	23.45%	33.70%	36.10%	8.69%
Sweden	7.98	5.33%	23.74%	34.63%	36.30%	7.10%
United Kingdom	8.16	11.79%	25.10%	30.77%	32.34%	7.24%
UE Countries	**8.12**	**9.50%**	**22.92%**	**29.37%**	**30.81%**	**7.41%**

Table 3 Property services of establishment of touristic reception with functions of touristic accommodation in European Union countries

| Country	Airport shuttle %	Facilities for disabled guests %	Family rooms %	Fitness centre %	Indoor pool %	Non-smoking rooms %	Outdoor pool %	Parking %	Pets allowed %	Restaurant %	Spa and wellness centre %	Wi-Fi %
Austria	15.71	9.69	65.40	8.30	6.74	69.34	7.74	96.96	55.72	23.28	8.45	86.86
Belgium	6.22	11.61	29.04	4.68	3.04	64.29	7.06	92.21	37.52	17.73	3.73	86.89
Bulgaria	53.50	7.57	63.93	20.32	9.66	45.52	37.83	93.45	35.56	47.91	14.02	90.12
Croatia	26.31	1.05	65.39	1.59	0.66	16.46	13.23	90.62	45.15	4.98	0.78	75.95
Cyprus	41.03	8.56	41.50	11.53	5.68	31.16	68.55	98.47	19.12	19.58	5.51	88.81
Czech Republic	29.45	15.86	59.11	7.20	5.96	72.55	11.83	91.80	65.66	34.65	7.35	87.77
Denmark	0.31	1.96	7.76	0.83	6.75	37.39	1.67	79.87	52.39	2.62	0.28	63.19
Estonia	17.82	8.33	48.60	3.48	4.01	64.79	2.32	95.41	53.56	14.65	4.06	84.08
Finland	21.50	19.17	43.31	11.36	8.32	75.05	2.69	95.44	59.53	32.96	4.97	79.46
France	8.59	20.16	44.91	3.95	3.18	60.67	26.15	85.60	51.38	20.92	4.07	80.25
Germany	10.65	16.09	37.50	8.56	6.65	75.31	3.13	94.97	59.37	35.51	5.69	81.88
Greece	29.29	9.43	53.79	5.93	1.90	29.63	35.12	93.15	46.73	22.18	3.62	93.95
Hungary	22.41	11.01	59.21	4.31	4.96	63.24	10.75	89.17	43.38	16.30	3.67	74.55
Ireland	9.30	26.93	38.99	10.74	8.27	60.51	0.47	93.77	20.20	30.66	5.86	89.51
Italy	29.13	16.86	51.12	4.59	2.21	46.60	22.36	82.92	59.61	21.33	3.88	77.49
Latvia	34.32	9.37	49.18	3.20	5.62	68.22	2.18	92.39	56.74	15.53	4.53	85.08
Lithuania	41.86	9.62	62.32	4.03	6.20	64.03	2.97	95.31	48.31	17.23	4.74	88.21
Luxembourg	8.73	23.81	25.79	17.86	10.32	76.98	5.95	91.67	53.97	68.65	11.11	89.29
Malta	60.25	13.82	54.81	8.07	8.39	47.83	39.29	69.57	17.55	20.81	5.90	92.24
Netherlands	6.66	12.50	28.64	5.31	4.69	65.63	7.66	89.42	38.72	26.84	3.15	91.70
Poland	27.85	17.87	59.56	8.26	5.91	65.33	3.63	90.26	55.82	30.52	7.16	89.23
Portugal	35.62	17.74	46.16	6.07	4.71	47.93	36.23	81.50	28.70	17.65	4.32	86.09
Romania	35.67	9.60	43.09	8.14	4.40	62.03	8.54	95.05	38.91	38.86	4.08	92.48
Slovakia	11.90	11.10	53.47	10.91	8.13	75.05	7.01	97.82	61.43	38.73	10.44	85.96
Slovenia	32.73	11.29	60.02	6.89	5.80	46.55	8.93	95.65	54.13	25.61	8.16	90.80
Spain	19.04	19.63	44.04	7.03	3.24	37.49	43.70	75.38	35.87	25.87	4.05	77.53
Sweden	4.12	16.42	25.34	7.94	3.24	76.24	3.47	97.07	46.52	21.27	3.42	56.28
United Kingdom	4.46	20.09	27.00	5.56	6.06	83.72	2.27	89.89	34.39	27.02	2.56	72.29
UE Countries	**19.71**	**14.42**	**46.41**	**5.59**	**4.01**	**52.68**	**18.32**	**87.24**	**49.02**	**22.24**	**4.13**	**79.70**
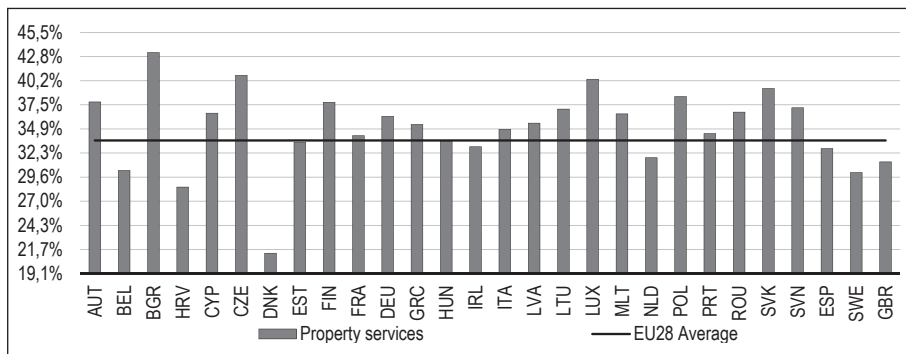
Figure 6 Property services of establishment of touristic reception with functions of touristic accommodation in European Union countries

Room facility

The 11 facilities offered by the rooms of the establishments of touristic reception with functions of tourists accommodation – air conditioning, bath, flat-screen TV, kitchen/kitchenette, patio, private pool, soundproofing, spa bath, terrace, view and washing machine – have been analysed in percentages. In the end, it was calculated an average percentage of all facilities offered by establishments of touristic reception with functions of tourists accommodation. Thus, the European Union countries with a high percentage of the facilities in establishments of touristic reception with functions of tourists accommodation are (top 5): Cyprus (48.83%), Croatia (38.64%), Malta (36.96%), Greece (35.59%) and Portugal (34.44%), and the European Union countries with a small percentage of the facilities in establishments of touristic reception with functions of tourists accommodation are (top 5): Ireland (16.58%), Sweden (18.48%), Luxembourg (18.58%), Slovakia (19.33%) and Germany (19.36%) (Figure 7, Table 4).

Table 4 Room facility of establishment of touristic reception with functions of touristic accommodation in European Union countries

| Country	Air conditioning %	Bath %	Flat-screen TV %	Kitchen / kitchenette %	Patio %	Private pool %	Sound-proofing %	Spa bath %	Terrace %	View %	Washing machine %
Austria	4.18	27.22	54.49	69.51	14.96	1.11	7.83	1.83	21.34	24.61	14.84
Belgium	12.72	43.45	48.82	56.75	16.72	1.81	11.54	5.03	26.21	24.26	21.95
Bulgaria	71.88	19.96	43.18	56.69	18.45	4.60	12.34	4.29	26.48	27.22	24.73
Croatia	83.83	29.63	34.65	89.63	25.15	9.83	16.12	7.48	53.29	28.96	46.45
Cyprus	87.07	47.05	66.94	87.66	39.00	36.54	23.31	5.13	41.08	37.47	65.88
Czech Republic	11.85	30.85	42.96	57.23	5.53	3.61	10.92	4.47	17.47	25.93	22.79
Denmark	6.81	3.63	4.90	91.47	4.10	3.00	0.60	6.99	31.31	2.65	74.82
Estonia	15.23	17.45	47.44	65.74	21.45	0.37	6.43	4.22	21.35	25.46	37.64
Finland	26.98	5.27	62.07	66.13	16.99	0.51	11.56	2.89	34.08	18.91	38.18
France	25.21	33.46	53.09	55.54	8.33	5.42	15.30	2.14	29.49	19.30	35.38
Germany	7.18	22.00	51.15	49.97	12.11	1.11	10.64	2.14	19.86	18.79	17.97
Greece	90.02	20.47	47.11	69.22	26.71	8.72	31.58	6.57	34.12	38.92	18.02
Hungary	38.59	33.78	31.74	72.76	31.82	10.54	17.55	10.18	36.90	25.67	32.18
Ireland	6.36	36.39	40.46	27.03	10.74	0.19	5.98	1.91	4.13	28.00	21.23
Italy	57.07	14.48	54.62	57.17	15.14	4.31	11.93	4.15	23.84	27.04	34.82
Latvia	13.78	26.83	40.48	63.38	15.17	1.21	17.22	5.20	20.30	37.89	37.76
Lithuania	20.86	25.34	55.21	71.34	30.68	0.55	15.26	3.43	28.11	28.87	40.91
Luxembourg	19.84	31.35	54.37	26.59	5.16	0.40	15.87	7.14	12.70	18.65	12.30
Malta	63.35	43.63	59.63	73.45	11.96	17.24	7.61	2.95	38.04	34.63	54.04
Netherlands	12.87	29.44	49.01	58.66	16.94	0.56	10.24	5.80	29.65	27.39	25.60
Poland	13.51	19.18	65.80	55.94	4.50	0.77	9.33	2.87	20.26	22.62	28.90
Portugal	43.29	45.06	50.69	70.01	25.91	10.88	14.15	4.22	31.67	37.97	45.01
Romania	45.59	25.77	55.53	36.31	5.24	1.04	17.04	6.48	17.73	23.22	18.65
Slovakia	12.06	27.33	49.21	56.11	3.40	0.59	5.98	1.82	22.77	23.50	9.81
Slovenia	43.43	18.54	50.91	67.45	12.69	1.09	13.51	2.58	27.29	36.31	26.02
Spain	55.01	44.93	51.84	64.13	15.85	14.79	8.16	5.45	39.78	26.54	49.83
Sweden	5.13	8.50	25.48	67.88	14.91	0.46	2.82	2.05	24.22	12.49	39.34
United Kingdom	6.47	33.91	45.54	50.01	7.00	2.22	3.35	1.68	4.00	43.89	38.49
UE Countries	**38.59**	**26.22**	**47.70**	**62.67**	**14.60**	**5.55**	**11.70**	**4.22**	**27.85**	**26.05**	**35.66**
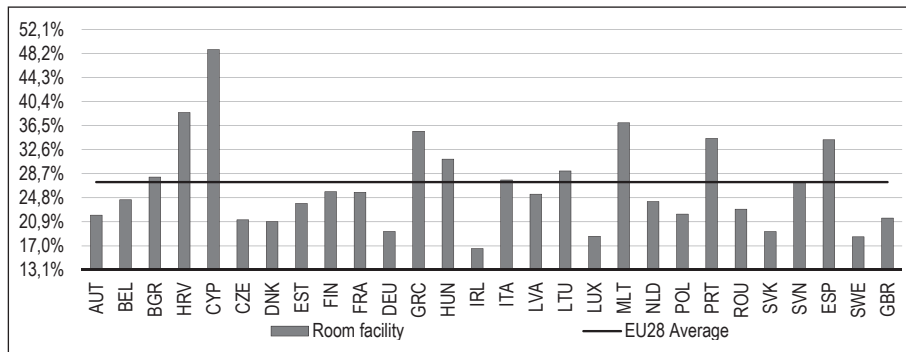
Figure 7 Room facility of establishment of touristic reception with functions of touristic accommodation in European Union countries

Territorial distributions of tourist destinations

Depending on the number of establishments of touristic reception with functions of tourists accommodation, it was analysed the percentage of establishments of touristic reception with functions of tourists accommodation in the capitals of each state of the European Union and the shares of establishments of touristic reception with functions of tourists accommodation in top 10 and top 25 tourist destinations (based on the number of establishments of touristic reception with functions of tourists accommodation). So, in the top 25 tourist destinations are included the top 10, and the top 10 tourist destinations include also the capital city. With some exceptions (Bulgaria – Sofia, 2nd place; Croatia – Zagreb, 6th place; Cyprus – Nicosia, 9th place; Denmark – Copenhagen, 6th place; Poland – Warsaw, 2nd place; and Spain – Madrid, 2nd place), the capital city is most of time the first tourist destination.

Thus, the capitals of the European Union with a high share of establishments of touristic reception with functions of tourists accommodation are (top 5): Luxembourg (Luxembourg, 29.37%), Riga (Latvia, 28.76%), Budapest (Hungary, 23.97%), Prague (Czech Republic, 23.14%) and Vilnius (Lithuania, 22.77%), and the capitals of the European Union with a small share of establishments of touristic reception with functions of tourists accommodation are (top 5): Athens (Greece, 1.67%), Zagreb (Croatia, 1.89%), Copenhagen (Denmark, 2.03%), Nicosia (Cyprus, 2.54%) and Madrid (Spain, 2.99%) (Figure 8).

A high share of establishments of touristic reception with functions of tourists accommodation in the top 10 tourist destinations from each European Union country is found in (top 5): Lithuania (75.57%), Cyprus (70.54%), Malta (63.35%), Estonia (58.46%) and Latvia (58.31%), and a small share of establishments of touristic reception with functions of tourists accommodation in the top 10 tourist destinations from each European Union country is found in (top 5): Greece (9.62%), Sweden (9.65%), Germany (11.95%), United Kingdom (15.19%) and France (15.23%) (Figure 8).
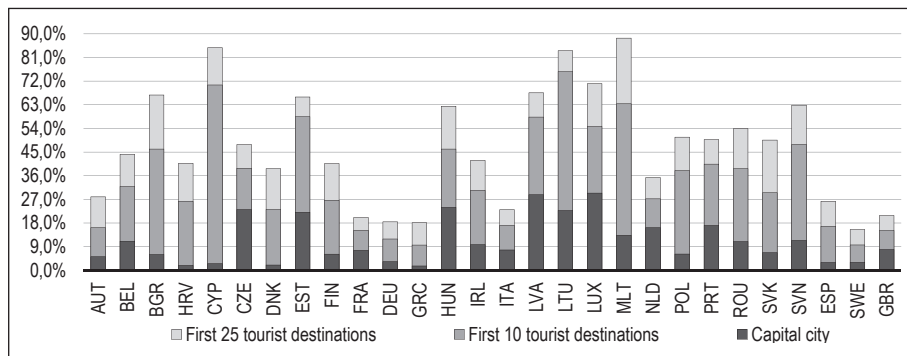
Figure 8 he percentage distribution of establishment of touristic reception
with functions of touristic accommodation in European Union countries
in first 25 tourist destinations, first 10 tourist destinations and in capital city

A high share of establishments of touristic reception with functions of tourists accommodation in the top 25 tourist destinations from each European Union country is found in (top 5): Malta (88.35%), Cyprus (84.70%), Lithuania (83.53%), Luxembourg (71.03%) and Latvia (67.55%), and a small share of establishments of touristic reception with functions of tourists accommodation in the top 25 tourist destinations from each European Union country is found in (top 5): Sweden (15.52%), Greece (18.11%), Germany (18.48%), France (20.10%) and United Kingdom (20.88%) (Figure 8).

CONCLUSION

Following the statistical analysis of data and indicators obtained by this study, we conclude:

– a large part of touristic reception with functions of tourists accommodation is unclassified (69.75%);
– between the touristic reception with functions of tourists accommodation classified, the majority of touristic reception with functions of tourists accommodation is categorized with three stars (53.34%);
– only 5% of touristic reception with functions of tourists accommodation has access to the beach;
– from numerical point of view, the majority of touristic reception with functions of tourists accommodation in the European Union countries are apartments (34.64%), followed by hotels (20.33%) and holiday homes (15.31%);
– tourist services of touristic reception with functions of tourists accommodation in the European Union countries received an average rating of "*Good*";

– the 12 property services analysed (airport shuttle, facilities for disabled guests, family rooms, fitness centre, indoor pool, non-smoking rooms, outdoor pool, parking, pets allowed, restaurant, spa and wellness centre and Wi-Fi) in touristic reception with functions of tourists accommodation in the European Union countries have been found in 1,783,929 cases, respectively an average of 4 property facility/touristic reception with functions of tourists accommodation;

– the 11 room facility analysed (air conditioning, bath, flat-screen TV, kitchen/kitchenette, patio, private pool, soundproofing, spa bath, terrace, view and washing machine) in touristic reception with functions of tourists accommodation in the European Union countries have been found in 1,329,518 cases, respectively an average of 3 room facility/touristic reception with functions of tourists accommodation;

– after analysing the distribution of touristic reception with functions of tourists accommodation in the European Union countries were identified: (I) countries with a high share of touristic reception with functions of tourists accommodation in the capital, in the top 10 cities and in the first 25 cities: Lithuania, Luxemburg, Latvia, Malta or Estonia, hence a small diversity of tourist destinations, and (II) countries with a small share of touristic reception with functions of tourists accommodation in the capital, in the top 10 cities and in the first 25 cities: Greece, Sweden, Germany, Spain or Austria, hence a high diversity of tourist destinations.

Due to these interesting and unexpected results obtained by this study, we suggest expanding the statistical analysis of touristic reception with functions of tourist accommodation in the European Union countries in the near future.

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