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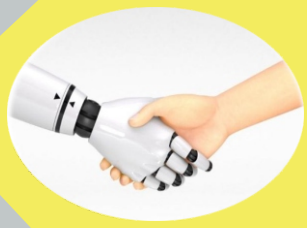

Editoriál

Doba, ktorú prežívame nám ukazuje, že celospoločenské zmeny zasahujú do životov nás všetkých. Prinášajú mnohé výzvy, otázky, ale tiež podnety. Reakcie prichádzajú na rôznych úrovniach, či už individuálnej, organizačnej alebo spoločenskej. Úspech reakcií zo strany organizácií závisí od mnohých faktorov, najmä od ich rýchlosti, schopnosti zodpovedných prijať rozhodnutia ale aj kvality realizácie týchto rozhodnutí. Rýchlosť reakcií na vzniknuté situácie závisí od schopností rozoznávať, identifikovať tieto výzvy, otázky či podnety, vnímať ich, ako aj generovať, získavať, či prijímať potrebné informácie. Schopnosť nájsť riešenia a prijať rozhodnutia závisí od miery rozvinutosti kompetencií rozhodujúcich osobností, komunikácie, schopnosti vnímať súvislosti a tiež poznania alternatív a možností. Realizácia rozhodnutí je v značnej miere závislá na dostupných zdrojoch, technológiách, infraštruktúre či úrovne organizovania.

Fórum manažéra poskytuje priestor pre zdieľanie poznatkov medzi výskumníkmi a odborníkmi za účelom zvyšovania úrovne poznania v rôznych oblastiach a zlepšovania spolupráce prostredníctvom prezentovania výstupov ich práce. Príspevky prezentujúce výsledky vedeckej, výskumnej práce či praktickej aplikácie teoretických poznatkov vytvárajú jedinečný obsah každého čísla časopisu a poskytujú podnety pre zlepšovanie reakcií jednotlivcov či organizácií na situácie, ktorým musia čeliť.

Dopadom pandémie COVID-19 na globalizáciu spoločnosti sa zaoberá prvý príspevok časopisu. Pandémia COVID-19 ovplyvňuje a mení ekonomiku spoločností a príspevok skúma zdokladované dopady týchto zmien. Je zameraný na globalizáciu, vplyv globalizácie na pracovné pozície, ich vznik, zánik, či transformáciu so zameraním na Európsku úniu.

Manažéri organizácií sú nútení hľadať nové spôsoby fungovania, aby mohli napĺňať ciele organizácií, potrebné pre zabezpečenie ich existencie, stability a rastu. Príspevok zaoberajúci sa komplexnými sieťami organizácií, predstavujúcimi dodávateľské reťazce, prezentuje poznatky vyplývajúce zo skúmania dodávateľských reťazcov a potenciálu ich zlepšovania.

Industry 4.0 je strategická iniciatíva, ktorej cieľom je transformovanie priemyselnej výroby pomocou digitalizácie a využitia potenciálu nových technológií. Ďalšie príspevky aktuálneho čísla prezentujú výsledky skúmania súčasného stavu využívania týchto technológií v organizáciách a nejednotnosťou možností na ich uplatňovanie. Prinášajú výsledky analýz, ktoré oblasti Industry 4.0 prispievajú k získaniu a udržaniu ich pozície v existujúcom konkurenčnom prostredí. Sú v nich prezentované výsledky zistení, či integrácia medzi podnikmi v kontexte systémov výmeny údajov má potenciál priniesť týmto podnikom výhody a či makroekonomická situácia prináša vyššiu implementáciu medzipodnikovej integrácie. Vplyv rapídneho rozvoja technológií je významný nie len v oblasti riadenia organizácií, ale tiež v zmysle dopadu na ľudí. Vyvíjajúce technológie ovplyvňujú nie len pracovný, ale i bežný život najmä rozvíjajúcim sa komunitám v rámci zrýchlenej urbanizácie vo viacerých krajinách. Nové technológie uľahčujú každodenný život, ale tiež zvyšujú možnosť kontroly, a preto sú dôležitou oblasťou skúmania aj otázky potreby ochrany informácií a dopad využívania pokrokových technológií na ľudské práva.

Veríme, že publikované príspevky prinášajú hodnotné informácie a podnety k hľadaniu riešení situácií, ktoré nám neustále zmeny prinášajú.

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Obsah

DOPAD PANDÉMIE COVID-19 NA GLOBALIZÁCIU SPOLOČNOSTI

THE IMPACT OF THE COVID-19 PANDEMIC ON THE GLOBALIZATION OF SOCIETY

Eliška KUBIŠOVÁ, Jaromíra VAŇOVÁ, Andrea CHLPEKOVÁ

Abstrakt
Článok sa zameriava na zhrnutie a popísanie existujúcich poznatkov v oblasti dopadu pandémie na globalizáciu spoločnosti a preskúmanie ako sa daná problematika prezentuje v dostupnej literatúre. Hlavným cieľom článku je teoreticky vysvetliť globalizáciu, jej vplyv na pracovné pozície a to, ako COVID-19 mení alebo už zmenil globálnu ekonomiku. Na dosiahnutie tohto cieľa bol použitý výber vhodnej literatúry a štúdium danej literatúry. Článok je rozdelený do dvoch častí. Prvá časť obsahuje teoretické vymedzenie pojmov súvisiacich s globalizáciou z hľadiska Európskej únie. Druhá časť analyzuje dopad globálnej pandémie COVID-19 na globálnu ekonomiku, ako aj na pracovné pozície.

***Kľúčové slová**: COVID – 19, Európska únia, globalizácia, pracovné miesta*

ABSTRACT
The article focuses on summarizing and describing the existing knowledge about the impact of the pandemic on the globalization of society and examining how the issue is presented in the available literature. The main goal of the paper is to theoretically explain globalization, its impact on jobs and how COVID-19 is changing or has already changed the global economy. To achieve this goal, the selection of appropriate literature and the study of the given literature were used. The paper is divided into two part. The first part contains a theoretical definition of concepts related to globalization from the perspective of the European Union. The second part analyzes the impact of the global COVID-19 pandemic on the global economy as well as on jobs.

***Key words:** COVID-19, European Union, globalization, job positions*

ÚVOD

Globalizácia sa dotýka skoro každej oblasti ľudskej existencie. Niektorí ju vnímajú ako možnosť, iní ako hrozbu. Globalizácia je celosvetový proces. Prináša so sebou potenciál na rozvoj, ale taktiež aj riziká pre spoločnosť. Súčasná forma globalizácie súvisí s rastúcou previazanosťou štátnych ekonomík, finančných trhov, obchodu, výroby až po distribúciu či marketing. Členstvo Slovenska v EÚ predurčuje, že globálne problémy, ktoré dopadajú na slovenskú spoločnosť a ekonomiku môže Slovensko riešiť len v spolupráci s ostatnými krajinami EÚ.

Posledná skúsenosť s pandémiou COVID-19, ukazuje, aký je náš „svet malý“. Rýchlosť šírenia nákazy, ako aj jej ekonomické dôsledky by neboli také výrazné, keby sme nežili vo svete tak popretkávanom ľudskými a obchodnými väzbami. Hoci pandémia je pre nás stále každodennou realitou, mnohí sa už zamýšľajú nad tým, či a ako táto epizóda zmení náš život v nasledujúcich rokoch či desaťročiach.

Cieľom predkladanej práce je zhrnúť existujúce poznatky a teoreticky vysvetliť globalizáciu, jej vplyv na pracovné miesta a to, ako sa pôsobením COVID-19 mení, resp. zmenila globálna ekonomika.

1 CHARAKTERISTIKA GLOBALIZÁCIE

Globalizácia odráža rozšírenie špecializácie a deľby práce na celý svet. Pred dvoma storočiami žilo najviac ľudí na farmách, dokázali si vyrobiť všetko a byť sebestační: jedlo, prístrešie, oblečenie, atď. Postupne sa ľudia začali špecializovať a kupovať veľkú časť svojej spotreby od ostatných v ich komunite, či národe. Dnes sa veľa tovaru vyrába v niekoľkých krajinách a je zároveň odosielaných do celého sveta (Samuelson, Nordhaus, 1992).

„Platíme iným ľuďom aj zato, čo by sme síce vedeli, ale neželáme si robiť, zvyčajne preto, lebo vieme svoj čas využiť na čosi lepšie.“ (Charles Wheelan, 2012)

Globalizácia má dlhú históriu. Prvýkrát však bol tento termín použitý až v 80. rokoch 20. storočia. Technologický pokrok, ktorý nastal v 20. storočí umožnil zrýchliť logistické procesy, prepravu tovaru ale aj osôb. Rozvojom komunikácie a obchodu založenom na internete došlo k prepojeniu takmer celého sveta, a možno o tom hovoriť ako o intenzívnej globalizácii (Tamene, 2010).

Informačná revolúcia spojená s rozmachom počítačov a internetu zapríčinila prístup k informáciám takmer komukoľvek a za neporovnateľne nižšie náklady ako v minulosti. Zavedenie týchto tendencií sa prejavilo na postavení a správaní všetkých subjektov vo svetovom hospodárstve zapojených do globalizácie. Jednotlivé trhy môžu vďaka ním pohotovo reagovať na akékoľvek zmeny. Spotrebitelia majú oproti minulosti väčšie možnosti výberu tovarov a služieb, vedia si efektívnejšie porovnať ponúkané produkty (Keohane, 2000).

Globalizácia v súčasnom ponímaní je proces akéhosi medzinárodného prepojenia v ekonomickej, politickej, environmentálnej, komunikačnej a kultúrnej oblasti. Ide o zjednotenie, vzájomnú integráciu. Inými slovami, možno charakterizovať globalizáciu ako: „*Neriadený, spontánny proces neustále sa šíriacej integrácii krajín sveta v ekonomickom systéme trhového hospodárstva.“* Neobmedzené sprostredkovanie v procese informácií využili ako prví tí, ktorí sa zaoberajú kapitálom a financiami. Finančné trhy sa stali globálnymi trhmi (Tamene, 2010).

Šibl a Šaková (2002) tvrdia, že ekonomické sily vo svete sa prelievajú cez národné hranice. Výsledkom čoho je viac demokracie, slobody, obchodu, príležitostí a väčšia prosperita. Svet prechádzal od obchodnej výmeny medzi jednotlivými krajinami k jednej ekonomike. Jedna ekonomika, jeden trh. To je najbližší prirodzený stupeň v hospodárskych dejinách civilizácie. Každá krajina, ktorá sa ekonomicky neotvorí a nezúčastní na globálnej hre, beznádejne zaostane. Pre hospodárstvo väčšiny krajín po celom svete je preto medzinárodný obchod veľmi dôležitý. Prostredníctvom globalizácie došlo k oslabeniu vplyvu štátov na chod ekonomík, tzv. deregulácie, čo viedlo k ohromnému rozmachu medzinárodnej spolupráce – expanzia podnikateľských aktivít cez hranice štátov, nielen finančných, ale aj výrobných aktivít a inštitúcií a ku vzniku **nadnárodných spoločností** (Gray, 2009). Nadnárodné spoločnosti vznikli vďaka globalizácii - tzn. ekonomické, geopolitické, či firemné procesy prechádzajú z národnej úrovne na vyššiu. Ich existenciu môžeme pozorovať od 20.storočia. Nové technológie umožnili nadnárodným spoločnostiam zmeniť svoje organizačné štruktúry, napríklad presúvať pracoviská po celom svete za účelom znižovania nákladov. (Švihlíková, 2010). Tieto nadnárodné spoločnosti sú jedným z hlavných aktérov celej globalizácie. Ich výhoda spočíva v tom, že pôsobia v dynamickom prostredí voľných finančných tokov. Vlády jednotlivých štátov už nemôžu neobmedzene rozhodovať o ekonomickom a politickom smerovaní svojich krajín. Dôsledkom toho je aj stieranie hraníc medzi tým čo je národné a tým nadnárodným (Eichler, 2012).

Nadnárodné spoločnosti ťažia hlavne zo svojej pozície vo výskume a vývoji, ktorý je spolu s marketingom a finančnými aktivitami umiestnený väčšinou v triáde – USA, EÚ, Japonsko. Výroba týchto podnikov sa premiestňuje do iných zemí. Možno tvrdiť, že ekonomická globalizácia poskytla priestor mnohým spoločnostiam presunúť svoje podniky do ekonomicky menej vyspelých krajín (Švihlíková, 2010). Jednou z výhod globalizácie je schopnosť veľkých spoločností privatizovať zisky zo svojho podnikania, a pritom flexibilne presúvať sídlo z lokality do inej lokality (Eichler, 2012).

Výhodou globalizácie je, že umožňuje rýchlejší prenos informácií vo svete, vytvára predpoklady na efektívny rozvoj a riešenie globálnych problémov produktivity, zdravia, bezpečnosti či rôzne ekologické problémy, ktorým jednotlivé štáty nevedia čeliť sami (Gray, 2009). Pravdou však je i to, že zďaleka nie každý spomínané výhody pociťuje aj na vlastnej koži. Otvorenejšie a intenzívnejšie svetové obchodovanie vystavilo mnohé spoločnosti konkurencii z krajín s podstatne nižšími platmi, či bezpečnostnými a environmentálnymi štandardmi (Európska Komisia, 2017)

Nevýhodou globalizácie je fakt, že spoločnou integráciou jednotlivých krajín sa mieša veľký počet rôznych názorov a kultúr, ktorý môže viesť k nestabilite a zároveň k nepokoju v jednotlivých krajinách a ďalej môže spôsobiť príliš veľkú závislosť jedného štátu od ostatných. V niektorých prípadoch to viedlo až ku zatváraniu fabrík a zániku niekoľkých pracovných miest (Gray, 2009 & Európska Komisia, 2017).

1.1 Vplyv nadnárodných spoločností na ekonomiku v domácej krajine

Globalizovaný svet predstavuje systém, ktorý prekračuje hranice štátu. Dochádza k vytvoreniu globálneho systému, v ktorom predstavujú hranice štátu iba akúsi symbolickú líniu, ktorú je možné ľahko prekročiť a dostať sa na územie cudzieho štátu (Lewis, McGrew, 1992).

Z tohto statusu plynú pre domácu krajinu určité výhody ale aj nevýhody vzhľadom na ekonomickú situáciu v krajine **(**Sochuláková, 2015):

Pozitíva vplyvu nadnárodných spoločností na ekonomiku v domácej krajine:

- zvyšuje objem predávaných tovarov a služieb v rámci medzinárodného obchodu,
- pomáha pri vytváraní dlhodobého kapitálu,
- lobovanie za voľný obchod a odstránenie bariér pri obchodovaní (clá, dane, vládne poplatky),
- stáva sa nositeľom inovácií (veda a výskum),
- vytvára pracovné miesta,
- podporuje kariérny rozvoj zamestnancov,
- uplatňuje pravidlá komparatívnej výhody znižovania nákladov na tovar,
- vyrába nový tovar a zvyšuje príležitosti sa k nim dostať prostredníctvom internacionalizácie výroby,
- rozširovanie globálnych marketingových znalostí,
- odstránenie národných bariér a uprednostňovanie globálnych princípov ekonomiky.

Negatíva vplyvu nadnárodných spoločností na ekonomiku v domácej krajine:

- zvyšuje kapitál v domácich krajinách, ale zisky sa presúvajú do krajiny pôvodu,
- obmedzená dostupnosť komodít a kontrola distribúcie v rámci sveta,
- obmedzenie miezd zamestnancov,
- narušenie kultúrnych a národných tradícií a uprednostňovanie homogénnej globálnej a konzumnej spoločnosti,
- prehlbovanie rozdielov medzi bohatými a chudobnými štátmi.

Sochuľáková (2015) zhrnula hlavné rozdiely domácich a zahraničných spoločností:

- Niektorí zamestnanci zahraničnej spoločnosti musia vykonávať viacero činností - tieto činnosti súvisia predovšetkým s medzinárodnou mobilitou pracovníkov. Týka sa to ich medzinárodnej kariéry a súvisiacich školení, práce, za ktorou sú nútení vycestovať do zahraničia na určité obdobie, aklimatizovať sa a vrátiť sa späť.
- Personálna práca v domácich spoločnostiach sa zvyčajne zameriavajú na homogénnu štruktúra zamestnancov. V spoločnostiach pôsobiacich v zahraničí sa vyskytuje rozmanitejšia sociálna štruktúra zamestnancov ako vo vedení, tak aj naprieč celou organizáciou.
- Dopady na súkromný život zamestnancov – kritériá pre výber, odbornú príprava a celkovo kariéru musia odrážať celé sociálne zázemie spoločnosti. Príkladom je zamestnateľnosť manželky / manžela v zahraničí, školy pre deti, byt prípadne dom ponechaný na vidieku atď.
- Vonkajšie vplyvy, napríklad odlišné kultúrne prostredie, tradície, rôznorodá politická a hospodárska súťaž.

1.2 Globalizácia v Európskej Únii

Globalizácia ako taká posunula hranice konkurencieschopnosti podnikov. Konkurencieschopnosť významne prispieva k dynamickému rozvoju európskej prosperity. Teda konkurenčná politika je oblasť hospodárstva, ktorá určuje vývoj členských štátov Európskej únie. V oblasti inovácie a technológie sa Európska únia zameriava na podporu celkovej konkurencieschopnosti európskeho priemyslu. Najväčšie výdavky v sektoroch sú určené hlavne na vedecký a technologický výskum, ktorý zvyšuje celkovú technologickú spoluprácu s podnikmi a vedie k zvýšenému množstvu inovácií v priemysle (Kardoš, Jánsky, 2015).

Ekonomicky Európska únia z globalizácie predovšetkým ťaží. Únia je najsilnejšou obchodnou veľmocou a približne tretina nášho národného dôchodku pochádza z obchodu so zvyškom sveta. Spolu s rastom svetových trhov rastie aj európsky vývoz, a tým aj počet lepšie platených pracovných miest. Každá miliarda eur dodatočného vývozu tovarov a služieb mimo EÚ znamená až 13-tisíc pracovných miest. Z týchto výhod výrazne čerpá i slovenská proexportne orientovaná ekonomika, ktorá patrí k najotvorenejším na svete. Ekonomické benefity globalizácie pociťujú aj jednotlivci. Jednoduchší dovoz výrobkov nám prináša väčší výber i nižšie ceny. Zvyšuje sa tak aj životná úroveň a kúpna sila domácností s nižšími príjmami. Žiadna generácia pred nami nemala taký dobrý prístup k potravinám, oblečeniu, technológiám, zdravotnej starostlivosti či možnostiam cestovať, ako majú dnešní Európania (Európska Komisia, 2017).

Dôsledky globalizácie sa prejavujú aj v jednoduchom cestovaní do rôznych krajín, v ktorých našinci nezriedka pracujú, študujú či žijú, komunikujú na webe, vymieňajú si nápady, kultúrne hodnoty a skúsenosti. Študenti majú cez internet prístup na kurzy popredných univerzít po celom svete. Prínosy globalizácie vidno aj mimo Európy. Stovky miliónov ľudí sa vďaka ním dokázali vymaniť z extrémnej chudoby a chudobnejšie krajiny získali možnosť dobiehať tie bohatšie. Tento vývoj má nezanedbateľnú úlohu pri zvyšovaní stability, demokracie a mieru vo svete.

Medzi riziká spojené s globalizáciou nepochybne patria aj rastúca migrácia, terorizmus, útoky hackerov či klimatické zmeny. Aj v týchto oblastiach je Únia aktívna, či už ide o intenzívnu rozvojovú pomoc ohrozeným krajinám, klimatickú dohodu z Paríža alebo posilnenie kontroly vonkajších hraníc EÚ (Európska Komisia, 2017).

1.3 Vplyv globalizácie na pracovné miesta

Globalizácia môže pomáhať pri vytváraní pracovných miest, no takisto môže mať na svedomí ich stratu kvôli presúvaniu výroby do krajín s lacnejšou pracovnou silou. Riadenie globalizácie je pre EÚ jednou z jej priorít, takisto sa snaží o vybudovanie sociálnej Európy, v rámci ktorej poskytuje pomoc pre ľudí, ktorí prišli o prácu (Herman, 2011).

Počet pracovných miest, ktoré priamo alebo nepriamo závisia od exportu mimo EÚ, neustále rastie. Kým v roku 2000 bolo takýchto pracovných miest 21,7 milióna, v roku 2017 sa ich počet vyšplhal na 36 miliónov. Každá miliarda z exportu mimo EÚ udržuje v priemere 13 tisíc pracovných miest. Nejde pritom len o pracovné miesta v samotných vyvážajúcich spoločnostiach, ale aj o miesta v podnikoch, ktoré im dodávajú svoje tovary a služby. Rastie tu aj pomer pracovných miest, ktoré si vyžadujú vysokú kvalifikáciu. Pracovné miesta závisiace na exporte sú aj lepšie platené - v priemere o 12% viac (Európska správa o využívaní globalizácie, 2018).

Vďaka exportu zo Slovenska do tretích krajín má na Slovensku prácu 282 tisíc ľudí. Ďalších 122 tisíc pracovných miest existuje vďaka exportu z iných členských krajín mimo EÚ. Dokopy to činí 17 percent všetkých pracovných miest na Slovensku. Vývoz zo Slovenska do tretích krajín okrem toho udržuje pri živote 96 tisíc pracovných miest v ostatných krajinách EÚ (Európska Komisia, 2017).

Rada Európskej Únie zriadila tzv. *Európsky fond na prispôsobenie sa globalizácii.* Európsky fond na prispôsobenie sa globalizácii je symbolom solidarity. Prispieva k vytváraniu dynamickejšieho a konkurencieschopnejšieho európskeho hospodárstva tým, že prepusteným ľuďom zvyšuje zručnosti a pomáha im tak nájsť si lepšiu prácu. Účelom fondu je poskytovať pomoc nadbytočným pracovníkom v prípade veľkých reštrukturalizačných udalostí, najmä tých, ktoré sú spôsobené výzvami súvisiacimi s globalizáciou, ako sú napr. zmeny v štruktúre svetového obchodu, obchodné spory, dôležité zmeny v obchodných vzťahoch v EÚ alebo zložení vnútorného trhu, finančná alebo hospodárska kríza, prechod na nízkouhlíkové hospodárstvo, alebo ktoré sú dôsledkom digitalizácie alebo automatizácie.

Z Európskeho fondu na prispôsobenie sa globalizácii sa môžu financovať projekty až do výšky 60 % ich nákladov zamerané na pomoc pri hľadaní práce alebo začatí podnikania pre pracovníkov, ktorí prišli o prácu v dôsledku reštrukturalizácie. Ide napríklad o projekty vrátane týchto opatrení (Európska Komisia, 2017):

- pomoc pri hľadaní práce,
- kariérne poradenstvo,
- vzdelávanie, odborná príprava a rekvalifikácia,
- mentorstvo a školenia,
- podnikanie a založenie podniku.

1.4 Hospodárska súťaž v rámci EÚ

Na podporu dynamického rastu ekonomiky Európskej únie, Európska komisia navrhuje nový prístup k politike hospodárskej súťaže na podporu. Konkurencieschopnosť celej Európskej únie by prospela priemyselnému rastu, ktorý by znamenal zvyšovanie resp. vytváranie pracovných miest a nasledoval by vyšší sociálny, ekonomický rozvoj a životná úroveň EÚ obyvateľov. Nový prístup k politike hospodárskej súťaže sa zameriava hlavne na jej štandardy, ako sú protimonopolné zákony, kontrola fúzií a kontrolné opatrenia štátnej pomoci.

Konkurencia vystavuje podniky neustálemu tlaku ponúkať najlepší možný sortiment tovaru, služieb za najlepšie možné ceny. Ak to spoločnosti tak robiť nebudú, spotrebitelia majú možnosť nákupu kdekoľvek. Niektoré spoločnosti sa snažia narušiť voľnú hospodársku súťaž

a presadiť si svoje pravidlá na trhu. Spoločnosti vykonávajúce podobné činnosti sa môžu vzájomne dohodnúť a kontrolovať ceny alebo rozdeliť trh medzi seba. Spoločnosť s dominantným postavením na trhu môže tiež zneužiť túto pozíciu a vylúčiť tak svojich konkurentov z konkrétneho trhu. Preto Európska únia zaviedla regulácie pre obidve strany (Kardoš, Janský, 2015):

- Lepšia kvalita: Konkurencia tiež podporuje podniky na zlepšenie kvality tovaru a služby, ktoré predávajú - na prilákanie ďalších zákazníkov a rozšíriť podiel na trhu. Kvalita môže znamenať rôzne veci: výrobky, ktoré vydržia dlhšie alebo fungujú lepšie, lepšia popredajná alebo technická podpora alebo priateľskejšia a lepšie služby.
- Väčšia variabilita: Na konkurenčnom trhu sa podniky pokúšajú svoje výrobky odlíšiť od ostatných. To má za následok väčší výber – takže spotrebitelia si môžu vybrať produkt, ktorý predstavuje rovnováha medzi cenou a kvalitou.
- Nízke ceny pre všetkých: najjednoduchší spôsob pre spoločnosť na získanie vysokého podielu na trhu. V konkurenčnom trhu sú ceny tlačené smerom nadol. To prináša výhody nielen pre spotrebiteľov (keďže si viac ľudí môže dovoliť kúpiť výrobky), ale taktiež to podporí podniky k výrobe a tým k posilneniu ekonomiky vo všeobecnosti.
- Inovácia: Podniky sú nútené vyrábať lepšie, kvalitnejšie výrobky, a inovovať nielen v oblasti výrobkov a ich dizajnu, ale aj v zlepšovaní technológii či riadení procesov.
- Lepší konkurenti na globálnych trhoch: konkurencia v rámci EÚ tiež pomáha európskym podnikom presadiť sa na trhu mimo EÚ.

Politika hospodárskej súťaže sa značne rozvinula. Jadrom politiky hospodárskej súťaže je udržanie rovnakých podmienok v celom systéme EÚ, aby si podniky mohli vzájomne konkurovať. Efektívna hospodárska súťaž politika podporuje ekonomickú efektívnosť a vytvára a priaznivé prostredie pre rast, inovácie a technologický pokrok pri súčasnom znižovaní cien (Kardoš, Janský, 2015).

Otvorenosť svetového obchodu a globalizácia mali a majú pozitívny vplyv, pričom vďaka nim sa milióny ľudí vymanili z chudoby a ako také môžu prispieť k hospodárskemu rastu, prosperite a konkurencieschopnosti krajín. Globalizácia vedie k rýchlejšiemu a širšiemu rozšíreniu technológií a inovácií, a že technológia môže byť kľúčovým faktorom umožňujúcim obchodovanie. Občania EÚ čoraz viac požadujú, aby obchodná politika Únie zabezpečila, že tovary, ktoré vstupuje na trh EÚ, boli vyrobené za dôstojných a udržateľných podmienok a aby EÚ v meniacom sa globálnom kontexte podporovala obchodnú agendu založenú na hodnotách. Otvorený a spravodlivý obchod založený na hodnotách a investičné politiky si vyžadujú celý rad účinných sprievodných politík s cieľom maximalizovať zisky a minimalizovať straty v dôsledku liberalizácie obchodu, ktoré utrpí EÚ a obyvateľstvo a ekonomiky tretích krajín (Európska správa o využívaní globalizácie, 2018).

2 VPLYV COVID-19 NA GLOBÁLNU EKONOMIKU

Pandemická kríza v dôsledku COVID-19 vo veľkej miere ovplyvňuje globálnu ekonomiku. Jej dôsledky nie sú definované iba z hľadiska úmrtnosti, ale aj ich dopadu na naše každodenné živobytie a ekonomiku, pričom globalizácia túto stratu urýchľuje a stojí výdavky vo výške miliárd dolárov. Pandémie ovplyvňujú ekonomiku z hľadiska dopytu a ponuky. Po prvé, spotrebitelia a investori majú tendenciu strácať dôveru na trhoch postihnutých pandémiou, čo oslabuje dopyt na strane trhu. Po druhé, absencia a znižovanie počtu pracovných síl negujú stranu ponuky. Napokon verejné zdravie a medzinárodná reakcia na pandémie ovplyvňujú ekonomiku a rozvojové politiky v oblasti obchodu, cestovania a reakcie na zdravie (Shrestha a kol., 2020).

Obmedzenia spojené s pandémiou na celom svete ťažko zasiahli globalizovanú ekonomiku. Správa Svetovej obchodnej organizácie (2020) zdôraznila prerušenie svetového obchodu a

globálnej ekonomiky v dôsledku pandémie koronavírusu, ktorá narušila výrobu a znížila mieru globálnej spotreby. Boli narušené dodávateľské reťazce aj priemysel. Koronavírus odhalil riziká globálneho vzájomného prepojenia (Krecké, 2020).

Autorka Krecké (2020) uvádza termín „Coronomics“. Definuje to ako nový koncept zameraný na identifikáciu dôsledkov COVID-19 na globálnu ekonomiku, ako aj súvisiaci finančný (a sociálny) chaos. Nový koncept, ktorý vynašiel prof. A. De Alwis, vznikol spojením dvoch slov „corona“ a „economics“ predstavujúcich štúdiu o dôsledkoch koronavírusu na ekonomiku (Krecké, 2020).

Účinky pandémie COVID-19 boli citeľné na ekonomiku každej krajiny. V skutočnosti bola každá ekonomika vplyvom pandémie v recesii alebo depresii. Mnohí tvrdia, že vzájomné prepojenie a závislosť medzi krajinami, ktorá je príčinou globalizácie, mohla pre hlavné krajiny ešte zhoršiť hospodársky a potenciálny vplyv pandémie na verejné zdravie. Globalizáciu podnikania dlho urýchľovali kľúčové geopolitické udalosti, ako je postupné otváranie Číny od roku 1979 a pád Berlínskeho múru v roku 1989. *Globalizácia však už nebola taká silná ako v predchádzajúcich rokoch, pred vypuknutím pandémie.* Určité aspekty globalizácie sa už dali zvrátiť kvôli dvom významným politickým udalostiam - voľbe amerického prezidenta Donalda Trumpa - vodcu ochranárskej a anti-internacionalistickej moci a hlasovaniu Spojeného kráľovstva o vystúpení z Európskej únie, a to v roku 2016. Aj v dôsledku iných javov, ako napr. rastúce ceny ropy, ktoré v roku 2008 dosiahli maximum 147 dolárov za barel a spoločnosti sa krátko snažili deglobalizovať svoje nákladné dodávateľské reťazce, vyvolali výzvy na zvrátenie globalizácie (Forbes, 2021).

Porušenie dodávateľského reťazca, zastavenie spracovateľského priemyslu a klesajúce ceny komodít, najmä ropa, ďalej zvyšujú ekonomický dopad pandémie. Taktiež sa pandémia odrazila aj na finančných trhoch, napr. v sprísnených podmienkach likvidity v mnohých krajinách. Slabé domáce meny obmedzujú schopnosť vlády dosiahnuť stimuly potrebné na stabilizáciu hospodárstva a na riešenie zdravotných problémov (United Nations, 2020).

Pandémia a nevyhnutná reakcia na verejné zdravie spôsobujú najväčší a najrýchlejší pokles medzinárodných tokov v modernej histórii. Predpovede (2020), hovoria o 13-32% poklese obchodu s tovarom, 30-40% znížení priamych zahraničných investícií a 44-80% pokles počtu cestujúcich medzinárodnými leteckými spoločnosťami. Tieto čísla znamenajú zásadné zmiernenie nedávnych ziskov globalizácie, ale nesignalizujú zásadný kolaps medzinárodnej integrácie trhu (Altman, 2020).

Účinok COVID-19 na globalizačné stratégie ovplyvňuje (Burns, John, 2020):

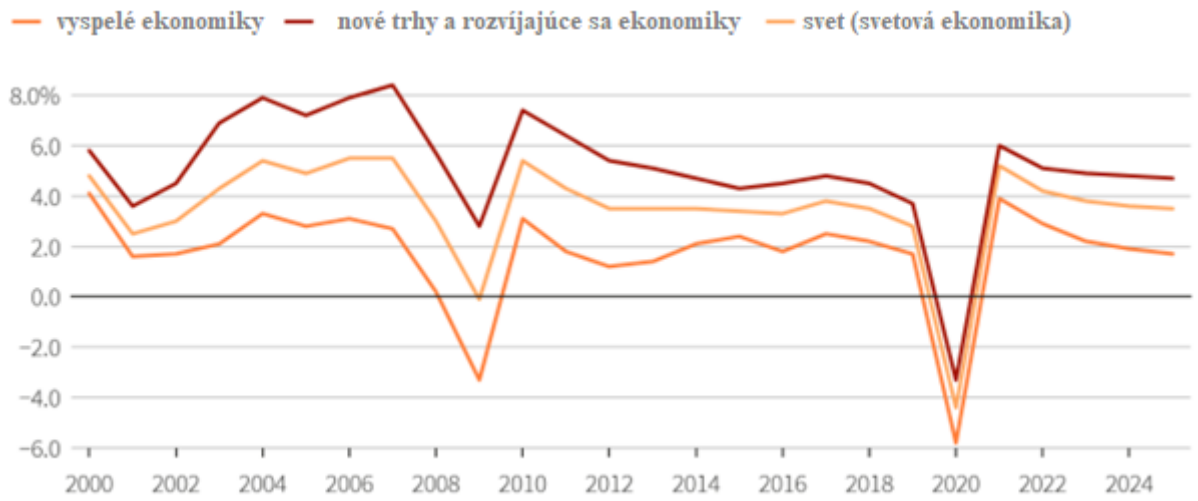
- správanie sa národných vlád,
- postoje spotrebiteľov,
- zmýšľanie vedúcich pracovníkov a kľúčových zainteresovaných strán v nadnárodných spoločnostiach
- ekonomika globalizácie podnikania.

Prehlbovanie globalizácie trvalo od roku 1970. Predovšetkým vďaka liberalizácii obchodu sa ekonomiky krajín čoraz viac prepájali. Rast objemu tovaru v medzinárodnom obchode sa výrazne spomalil a v roku 2019 sa dokonca znížil, na rozdiel od priemernej miery rastu HDP v 21. storočí na úrovni 3,4 % ročne V decembri 2019 tiež zanikol mechanizmus riešenia sporov Svetovej obchodnej organizácie (WTO). Očakáva sa preto, že napätie na svetovom trhu s tovarom bude pretrvávať. Prognózy na rok 2020 hovorili, že tempo globalizácie sa spomalí, pokračujúca integrácia globálnej ekonomiky prostredníctvom obchodných, finančných a iných tokov pôjde pomalším tempom. Veľké spoločnosti so sofistikovanými dodávateľskými reťazcami rozmiestnenými po celom svete by preto mali plánovať rôzne scenáre, s ktorými v posledných rokoch nepočítali (Kupelian, 2019).

Ďalej sa predpokladalo, že všetky hlavné ekonomiky budú v roku 2020 rásť, čiastočne posilnené finančnými podmienkami. Rast ekonomiky USA sa pravdepodobne zvýši približne o 2 %, vzhľadom na historicky nízku mieru nezamestnanosti je však pre zamestnávateľov v USA čoraz ťažšie prijímať nových zamestnancov. Očakávalo sa, že eurozóna porastie približne polovičným tempom oproti USA (približne na úrovni 1 %). Nemecko a ďalšie ekonomiky, ktoré sú citlivé na vývoj svetového obchodu, sa viac spoliehajú na spotrebu domácností ako zdroj rastu namiesto čistého vývozu a investícií. Pre Nemecko to však malo byť náročné, keďže domácnosti majú tendenciu šetriť viac, ako je európsky priemer. V rozvíjajúcich sa ekonomikách predpokladali, že čínska ekonomika narastie o menej ako 6 % — čo je ekvivalent ekonomiky Saudskej Arábie za jeden rok. Podobným tempom malo tiež rásť šesť ďalších najväčších rozvíjajúcich sa ekonomík vrátane Turecka na čele s Indiou (Kupelian, 2019).

Príchodom nečakanej, celosvetovej pandémie COVID-19 sa tieto prognózy na rok 2020 nesplnili.

Rokom 2020 pohol so svetovou ekonomikou podobným smerom ako hospodárska kríza v roku 2008. Na obrázku 1 sú zobrazené krivky ekonomík štátov, ktoré disponujú vyspelou ekonomikou – Advanced economies, rozvojovou ekonomikou - Emerging market and Developing economies a taktiež je na obrázku znázornená krivka celosvetovej ekonomiky.



***Obrázok 1**: Graf vyspelých, rozvojových ekonomík a ekonomiky sveta (Zdroj: Burn, John, 2020)*

Pandémia COVID-19 priniesla bezprecedentné bremeno pre svetovú ekonomiku, zdravotníctvo a globalizáciu prostredníctvom cestovania, rušenia udalostí, pracovných síl v zamestnaní, potravinového reťazca, akademickej obce a zdravotníckej kapacity. Miera globalizácie sa uskutočňovala z hľadiska mobility, hospodárstva a systémov zdravotnej starostlivosti. Mobilita jednotlivcov a jej veľkosť sa hodnotili pomocou údajov o obchodoch leteckých spoločností a námorných prístavov a cestovných informácií. Ekonomický dopad sa meral na základe pracovnej sily, obmedzení v poľnohospodárstve, akademických inštitúcií a dodávateľského reťazca. Kapacita zdravotnej starostlivosti bola hodnotená na základe ukazovateľov systému zdravotnej starostlivosti a pripravenosti krajín. V Afrike boli zraniteľnejšími krajinami Južná Afrika a Egypt; v Európe to boli Nemecko a Taliansko; v Ázii a Oceánii to boli India, Irán, Pakistan, Saudská Arábia a Turecko; a pre Ameriku to boli Brazília, USA, Čile, Mexiko a Peru (Shrestha a kol., 2020).

Zatiaľ čo Čína pomaly vykazuje známky zotavenia sa z krízy, ďalšia vlna sa zmocnila Európy, Ameriky a Afriky, ako aj juhovýchodnej Ázie, čo spôsobuje sociálne a ekonomicky nezmenšené škody. Šesť z desiatich najväčších svetových ekonomík tiež viedlo na popredných priečkach krajín najviac postihnutých vírusom (USA, Taliansko, Čína, Nemecko, Francúzsko a Spojené kráľovstvo, podľa počtu potvrdených prípadov) (Krecké, 2020).

Pred pandémiou COVID-19 sa Čína prezentovala ako šampión voľného obchodu na Svetovom ekonomickom fóre v Davose. V histórii medzinárodného obchodu si tento postoj osvojila vždy krajina s medzinárodnými konkurenčnými výhodami. Najskôr to bola Británia, potom USA a teraz Čína. Niektoré národné vlády však môžu použiť COVID-19 ako zámienku na odstúpenie od multilateralizmu a voľného obchodu. Aj keď môžu byť ľudia teoreticky proti voľnému obchodu, pri nakupovaní ho podporujú svojimi peňaženkami. Walmart - najväčší maloobchodný reťazec v Spojených štátoch, naďalej získava 70-80 % svojich výrobkov od čínskych dodávateľov. (Forbes, 2021)

2.1 Nezamestnanosť v čase pandémie COVID-19

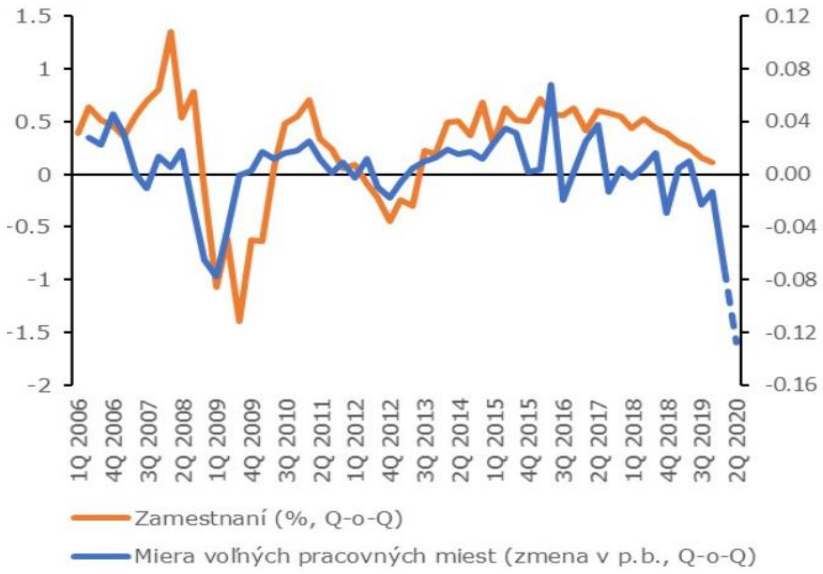
V dôsledku pôsobenia pandémie svet čelí obrovskému nárastu nezamestnanosti. Klesajúci trh práce sa zhoršuje globálnym cestovným obmedzením a poklesom medzinárodného obchodu. Globálny výhľad Medzinárodnej organizácie práce predpovedal, že miera nezamestnanosti sa zvýši o 305 miliónov pracovných miest na plný úväzok a približne 1,6 miliardy príležitostných (dočasných) pracovných síl v dôsledku priamych dopadov COVID-19.

V roku 2020 uviedla Medzinárodnej organizácie práce (MOP), že pandémia COVID-19 bude mať výrazný vplyv na trh práce na celom svete, pričom nezamestnanosť sa v porovnaní so základným scenárom zvýši až o 24,7 milióna ľudí, v závislosti od toho, ako je globálna ekonomika ovplyvnená. Napríklad za predpokladu 2-percentného poklesu globálneho HDP za rok roku 2020 MOP očakáva zvýšenie globálnej nezamestnanosti o 5,3 milióna. V prípade 4 % poklesu HDP by mal za následok 13 miliónov ďalších nezamestnaných ľudí. V najhoršom scenári vidno vážne narušenie globálnej ekonomickej aktivity, pokles globálneho HDP o 8 percent a zvýšenie globálnej nezamestnanosti o 24,7 milióna. Nárast miery nezamestnanosti výrazne ovplyvnil hlavný príjem pracovníkov, čo sa prejaví v chudobe, poklese životnej úrovne a nižšom dopyte (po tovaroch a službách). To v konečnom dôsledku oslabí ekonomiku (Richter, 2020).

Vládou nariadené zastavenie podnikania vo veľkej časti sveta rozpútali vlnu nezamestnanosti, ktorá sa od veľkej hospodárskej krízy v roku 2008 nezaznamenala. Napriek tomu sa miera nezamestnanosti na celom svete dramaticky líšila. V niektorých krajinách, napríklad v Číne, bola pandémia COVID-19 účinne potlačená prostredníctvom prísnych, ale relatívne krátkych odstávok, čo umožnilo zostať na nízkej úrovni nezamestnanosti. Iné, napríklad Nemecko, nasadili vládou podporované schémy, aby udržali zamestnancov na výplatných páskach spoločností. Vo svete, vrátane USA, nekontrolované šírenie vírusu a nepravidelné vládne nariadenia a ekonomické reakcie podporovali nekontrolovateľné straty pracovných miest. Len v marci a apríli 2020 bolo v Spojených štátoch prepustených z práce asi 22 miliónov ľudí a miera nezamestnanosti vyskočila na takmer 15% (Burns, John, 2020).

Nezamestnanosť na Slovensku

Počet voľných pracovných miest tradične ide ruka v ruke s vývojom nezamestnanosti. Keď zamestnávatelia nevytvárajú nové pracovné pozície, nezamestnanosť má tendenciu rásť a celkový počet zamestnaných klesať.



Obrázok 2: *Graf zmeny zamestnanosti a miery voľných pracovných miest (Zdroj: www.nbs.sk)*

Obrázok 2 poukazuje na situáciu na Slovensku. Na obrázku 2 sa uvádza štvrťročná percentuálna zmena počtu zamestnaných a štvrťročná zmena miery voľných pracovných miest (tj. percentuálny ukazovateľ, ktorý hovorí o tom, aký veľký je počet voľných miest v pomere k celkovej populácii aktívnych osôb na trhu práce). Z grafu vyplýva, že v roku 2020 mal prísť prudký prepad počtu zamestnaných, porovnateľný, či dokonca až prekonávajúci obdobie poslednej veľkej recesie v roku 2009. V súlade s tým výrazne vzrastie počet nezamestnaných, keďže prvá cesta prepustených bude v prvom rade na úrady práce. Podľa štatistík spoločnosti Profesia, spol. s r. o., ktorá je najväčšou spoločnosťou poskytujúcou priestor na inzerciu pracovných pozícií na Slovensku, oproti predchádzajúcim rokom poklesla job advertisement o 28%, celoročný vývoj na trhu práce kopíroval pandemickú situáciu na Slovensku. Menej pracovných ponúk a zároveň prepúšťanie z dôvodu COVID-19 zvýšilo záujem o inzerované pozície. Podľa štatistik priemerne o jednu pracovnú ponuku malo záujem 26,3 uchádzačov, čo je najviac za posledných 6 rokov. (Eurostat, 2020)

2.2 Boj krajín proti pandémii COVID-19

Na celom svete národné vlády prispôsobujú svoju reakciu na hospodársku krízu na základe svojich jedinečných finančných možností na zmiernenie finančných ťažkostí a udržania ekonomiky. Vyspelé ekonomiky zaviedli vyplácanie dočasných peňažných prostriedkov mesačne. USA okrem iných popredných ekonomík vrátane Kanady a Spojeného kráľovstva si zaistilo súhlas Kongresu s vydávaním hotovostných platieb (resp. šekov dospelým osobám v hodnote 1 200 dolárov a deťom v hodnote 500 dolárov) viac ako 100 miliónom amerických občanov (Ikechukwu, Tochukwu, 2020 & Richter, 2020).

Na druhej strane rozvojové ekonomiky, zvlášť africké krajiny uprednostňovali distribúciu potravín najzraniteľnejším občanom a znížili ceny základných komodít a komunálnych služieb. Väčšina rozvojových krajín ale nie je schopná vyčleniť stimuly na zmiernenie pandémie v dôsledku náhleho poklesu zahraničných príjmov napr. z cestovného ruchu, vývozu (Richter, 2020)

Súčasná realita ovplyvňuje tvorcov politík tak, aby uprednostňovali záchranu ekonomiky pred zvládnutím zdravotnej krízy a vyrovnaním krivky prudkého nárastu infekcií COVID-19. V oblasti vzdelávania sa kvôli pandémii museli vzdelávacie inštitúcie rýchlo prispôsobiť novému režimu. Podľa profesora LeBlanca (2020) program COVID-19 vtlačil najmä školy a univerzity do neplánovaného a nechceného online vyučovania. Online vzdelávanie sa ale netýka len študentov. Rovnako podnikové vzdelávanie je realizované častokrát online formou. Organizácie rozširujú svoje pôsobenie, najmä pomocou politiky pracovania z domu, tzv. „Home Office“. Virtuálne vzdelávanie, či už synchrónne alebo asynchrónne, sa tak stáva novou výzvou vo vzdelávacom sektore, ktorej podniky musia čeliť, aby nestrácali na konkurencieschopnosti a napredovali stále ďalej. (Ikechukwu, Tochukwu, 2020)

Organizácia pre hospodársku spoluprácu a rozvoj (OECD) vo svojej najnovšej správe podporila **odporúčania na minimalizáciu rizík spojených s COVID-19**. Sú to najmä tieto štyri (Ikechukwu, Tochukwu, 2020):

- Posilnenie obchodu a globálnych trhov prostredníctvom transparentného zdieľania informácií medzi multilaterálnymi organizáciami a vládami;
- Zabezpečiť nepretržité globálne dodávateľské reťazce tovaru a služieb, najmä potravín a zdravotníckych potrieb;
- Odstrániť všetky vývozné obmedzenia, aby sa potrebným štátom umožnil prístup k základným produktom a službám;
- Navrhnúť a implementovať komplexnú stratégia hospodárskej obnovy po COVID-19.

Aby medzinárodné toky začali opäť rásť, je potrebné sa zamerať na päť kľúčových faktorov globalizácie (Altman, 2020):

- Potreba začať s globálnymi modelmi rastu, kde hlavným poučením je, že medzinárodné toky majú tendenciu dramaticky kolísať s makroekonomickými cyklami. V dobrých časoch zvyčajne rastú rýchlejšie ako HDP a v zlých časoch sa tiež rýchlejšie zmenšujú, pretože ľudia a firmy sa hromadia za hranicami. Silný rast sa dá obnoviť iba vtedy, keď je pandémia jednoznačne pod kontrolou. Globalizácia môže tiež významne prispieť k rastu a zdraviu. Spoločnosti z rôznych priemyselných odvetví sa napríklad zapojili do výroby naliehavo potrebného zdravotníckeho materiálu.

- Budú sa spoločnosti a krajiny usilovať o väčšiu bezpečnosť pri medzinárodnej diverzifikácii, alebo sa pokúsia podporiť domácu sebestačnosť?
  Ekonomická logika takmer vždy uprednostňuje prvý prístup spojený s národnými zásobami skutočných základných vecí, ale politika si niekedy vynúti druhý.

- Nestabilita už pred COVID-19 destabilizovala medzinárodné obchodné prostredie a pandémia k tomu len prispela.
  Viedlo to k obrovskému rozšíreniu štátnej moci a k zavedeniu pandemickej kontroly ako ďalšej oblasti ideologickej súťaže. V tomto prostredí, odkiaľ spoločnosti pochádzajú a ako dobre si vlády krajín rozumejú, bude ešte viac ako predtým záležať na rozhodovaní o tom, kde získať kapitál, ktoré trhy majú uprednostniť a ktoré zásobovacie základne sa majú kultivovať.

- Prebiehajúce technologické zmeny, ako je prijatie elektronického obchodu, videokonferencie a roboty, Covid-19 preplnil.
  Veľa zmien vyvolaných pandémiou by tiež mohlo posilniť globalizáciu. Cezhraničný elektronický obchod rozširuje exportné príležitosti, najmä pre menšie spoločnosti. Treba sa zamyslieť nad tým, ako by technologické trendy mohli potenciálne zmeniť postavenie spoločnosti voči jej konkurencii, zákazníkom, dodávateľom atď. Pre väčšinu spoločností by technologické trendy mali viesť k väčšej globalizácii.

- Verejná mienka o globalizácii môže mať ďalší negatívny obrat v dôsledku pandémie COVID-19.
  Viac medzinárodného cestovania urýchľuje šírenie infekčných chorôb. Miešanie anti-globalizácie a protikapitalistických hnutí ešte viac komplikuje úlohu podnikania vo verejnej diskusii o globalizácii. Zameranie sa na fakty, zvýšenie citlivosti na nerovnosť a zdôraznenie skutočných ekonomických prínosov môžu pomôcť pri podpore zdravšej diskusie o globalizácii.

ZÁVER

Na záver možno konštatovať, že pandémia COVID-19 pre globalizáciu nie je hrozbou, ktorá vedie k jej koncu. Medzinárodné toky klesajú, ale globalizácia bude aj naďalej predstavovať obchodné príležitosti a výzvy. Dôsledná pozornosť o hybné sily budúcnosti globalizácie môže spoločnostiam pomôcť orientovať sa v turbulentných časoch globalizácie a dokonca z nich profitovať. Nestabilný svet čiastočne prepojených národných ekonomík rozširuje možnosti globálnej stratégie, aj keď komplikuje riadenie nadnárodných firiem. Teraz je čas, aby globálne spoločnosti ukázali svoju hodnotu využitím najlepších schopností sveta na ukončenie pandémie a na podporu obnovy ekonomiky a celej „globálnej spoločnosti“.

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SUPPLY CHAIN ANALYTICS: LITERATURE REVIEW AND PAPER CLASSIFICATION

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ABSTRACT:

Supply chains (SCs) represent the complex network of different organizations with the main aim of satisfying customer demand. On the other hand, each organization involved in SC has its own goals and objectives which need to be met to maintain the financial stability of the organization and individual position on the market. To do so, organizations need analytical tools. Accordingly, they strive towards a set of contemporary analytical tools to enhance the effectiveness of logistics and supply chain processes. This is exactly the topic of this paper where a comprehensive literature review is conducted in the area of supply chain analytics. This paper aims to summarize and describe the existing knowledge about supply chain analytics and to explore how much this issue is being studied in the literature and potentially discover gaps for further enhancement of this area.

Keywords: *supply chain analytics, literature review, logistics performances*

1. INTRODUCTION

Logistics is generally the detailed organization and implementation of a complex operation. In a general business sense, logistics is the management of the flow of things between the point of origin and the point of consumption to meet the requirements of customers or corporations. The resources managed in logistics may include tangible goods such as materials, equipment, and supplies, as well as food and other consumable items.

In military science, logistics is concerned with maintaining army supply lines while disrupting those of the enemy, since an armed force without resources and transportation is defenseless. Military logistics was already practiced in the ancient world and as the modern military has a significant need for logistics solutions, advanced implementations have been developed. In military logistics, logistics officers manage how and when to move resources to the places they are needed.

During the late 1940s, the complexity, working environment and impact of logistics grew very rapidly. At that time Military was the only agency that used logistics in the 1950s, and 60s. It was a saying in the 1950s and 60s that those with strong logistics ideas would improve their chances of winning. Then after this time, the scope of logistics increased beyond the army. Logistics was recognized as an important tool for the development of an organisation. Logistics provides a platform with a mechanism to deliver the desired goods to the consumer as effectively as possible without any losses to the business. As time went by the Logistics sector became the reason for the company's rise in mass production. In the early days, Production processes and distribution processes are used to operate in a sequential order here the logistics aim was to ensure the availability of all the materials required to continue for the processes listed. Logistics also provides a smooth functioning area for every involved process. Logistics is referred to as the system approach. It always works with various supply chain nodes providing the appropriate environment for organizational ease. And eventually, make an optimal route for supply chain nodes to deliver the finished product to customers in

order to meet their demand and get good feedback for the organization. Coordination between departments is required for the proper flow organization. In the earliest times, suppliers' works in distribution sectors were seen to spread activities all over the structure, resulting in overlapping and colliding in activities. But every organization, nowadays, operates according to logistics. Logistics helps the company work in a structured and formal way (Paswan, 2020).

Supply Chain Management is a large field dealing with the movement of product from raw to final state involving the partnership of various nodes coming in between i.e, from Supplier to Customer and creating different cycles during this period. Supply chain management needs proper logistics and supply chain analytics to complete those cycles successfully (Paswan, 2020).

Supply chains are longer, more complex, and geographically diverse than in the past. Customer demand patterns are more complex and there are more data sources available in real-time. All of these mean that forecasting processes are adapting to this environment. In order to understand how analytics may best be used in the forecasting process, it is necessary to understand how these forecasting processes may work. For example, analytics will enable more granular forecasting than is possible with human judgment, as a forecasting system that uses machine learning can detect demand patterns, causal relationships, and SKU dependencies. This in turn frees up the manager's time that can be used to focus on exceptions that are dependent on special circumstances that may not be identified by the system (Aloysius, 2020).

As an integral part of supply chain management, logistics plays an important role to keep the supply chain strong. It plans, implements and controls the flow and storage of goods and services in order to meet customer's requirements. Why is logistics training so important to Supply Chains? Logistics management cannot be overlooked as it contributes greatly to the success of any company's operations and has a direct impact on its bottom line. During times when freight volume grows and transportation becomes more complicated, the need for logistics management rises. Thus, training in logistics management is highly felt by organizations nowadays due to the evolving corporate world. Employees with more training can lead to increased profits. It is clear that logistics training is a fundamental factor to successfully manage any company's operations (Yves Bemelmans, 2018).

The emergence of new terms, such as Supply Chain Analytics (SCA), reflects a broad interest in leveraging the business value of supply chain data and harnessing the power of various analytical technologies and methods. Top performing companies are better at utilizing their data for business planning and execution (Kiron et al. 2011, Lavalle et al. 2011) and this has led to the increase in supply chain integration and visibility (Viswanathan and Sadlovska 2010, O'Dwyer and Renner 2011). In general, academic research expects the benefits of analytics in supporting supply chain operations (Trkman et al. 2010, Davenport and O'Dwyer 2011).

Data analytics is the most significant phase in the data value chain from raw data to meaningful insights; analytical tools and techniques are leveraged to slice through the data to data-driven insights (Arunachalam et al., 2018).

Analytics methodologies and techniques are used to optimize the routing of goods, vehicles, as well as crew (Novoa and Storer, 2009; Lei et al., 2011; Minis and Tatarakis, 2011) to balance between transportation costs and margins, and pay attention to maintenance and safety (Wang et al. 2016).

Big Data Analytics (BDA) can play a pivotal role in transforming and improving the functions of the supply chain (Arunachalam et al., 2018). BDA has the potential to govern Third Industrial Revolution (TIR), along with digital manufacturing, mass customisation and adaptive service (Tien, 2015).

The last decade has seen a tremendous increase in the adoption of a variety of Information and Communication Technologies (ICT) for Supply Chain Management (SCM), (e.g. radio frequency-based identification RFID, Enterprise Resource Planning (ERP) to the Internet of Things (IoT)). This has triggered huge data generation in the supply chain (Arunachalam et al., 2018).

In general, data can come from three different domains 'business, the Internet, and scientific research. Adoption of supply chain technologies such as Advanced planning and scheduling (APS), RFID, ERP, CRM systems and Warehouse management systems (WMS) (Autry et al., 2010), are the primary sources and antecedents for the occurrence of data deluge in supply chains. The supply chain data generation was further revolutionised with the advent of IoT technology facilitating real-time sensing and transfer of events data (Arunachalam et al., 2018).

The primary sources of data are from Enterprise information systems (EIS), which are mostly structured and transactional in nature. However, IoT, sensors, and RFID devices have the ability to convert the physical world into a virtual environment, which in turn generate a huge volume of unstructured data. The installation of RFID tags and readers on logistic objects can convert them into 'passive smart logistics object' and 'active smart logistics object' (Arunachalam et al., 2018).

The adoption of electronic supply chain management (e-SCM) such as Internet-based inter-organisational systems, Internet-based electronic data interchange (EDI) has enhanced communication, coordination, and collaboration across organisational boundaries. The adoption of these systems would also generate a volume of data through data exchange from the members of the supply chain network (Arunachalam et al., 2018).

Massive amounts of data are collated from several sources, including ERP systems, distributed manufacturing environments, orders and shipment logistics, social media feeds, customers buying patterns, product lifecycle operations, and technology-driven data sources such as global positioning systems (GPS), RFID tracking, mobile devices, surveillance videos, and others. As such, organisations are currently dealing with big datasets characterized by 4Vs: large volume, velocity, variety, and veracity (Govindan et al. 2018).

The focus on better business process has led some authors such as Grimes (2000) to identify Supply Chain Analytics as a business process reengineering enabler.

The evolution of Business Intelligence (BI) enabled wider possibilities of data integration, and Supply Chain Analytics targeted enhanced visibility across the whole supply chain (Sahay and Ranjan, 2008).

Organizational culture is a key factor in supply chain management practices and innovative information systems adoption (Khazanchi et al., 2007; Liu et al., 2010). Leidner and Kayworth (2006) argue that an organization is more likely to adopt an information system if the values embedded in the system fit its culture.

Golicic et al. (2003) argue that trust is a critical factor for effective coordination in a supply chain network. Dubey et al. (2019) argue that BDA capability and swift trust are complementary, in the sense that each demands and supports the other.

2. SUPPLY CHAIN ANALYTICS

Analytics in supply chain management is not a new thing (Souza, 2014). For a long time, supply chain management has use statistics and operation research for optimizing the objectives of matching supply and demand. Business analytics using information system support has a strong relationship to supply chain performance (Trkman, McCormack, de Oliveira, & Ladeira, 2010). However, the development of big data indeed brings out new opportunities. The term supply chain analytics can be used to define advanced big data analytics in supply chain management (Wang, Gunasekaran, Ngai, & Papadopoulos, 2016a). SCA can be categorized into descriptive, predictive and prescriptive analytic.

Descriptive analytics deal with the question of what has happened, what is happening, and why.

- Predictive analytics deal with the question of what will be happening or likely to happen, by exploring data pattern using statistics, simulation, and programming.
- Prescriptive analytics deal with the question of what should be happening and how to influence it, by driving alternative decision based on descriptive and predictive analytics, using mathematical optimization, simulation or multi-criteria decision-making techniques.
- Statistical analysis, simulation, and optimization are popular techniques in supply chain analytics (Wang et al., 2016a). These techniques are the basis for supply chain decision making besides other techniques such as the meta-heuristic method.

Souza (2014) described supply chain analytics for decision making on the five SCOR model domains: plan, source, make, delivery and return. Wang et al. (2016a) reviewed the potential application of supply chain analytics including the analytic techniques and relate them to maturity, sustainability, and holistic business analytics. Addo-Tenkorang and Helo (2016) reviewed big data applications and develop a taxonomy based on 5Vs of big data related to supply chain management. Zhong et al. (2016b) discussed big data technologies and models, current application in several service and manufacturing sectors and its global movement. Hofmann (2017) studied the big data volume, variety and velocity properties to reduce the bullwhip effect of the supply chain. Gunasekaran et al. (2017) also confirmed that big data analytics improved supply chain efficiencies, quicker response to changes, enhance relationship and planning capabilities (Tiwari, Wee, Daryanto, 2018).

Supply Chain Analytics is the consistent and organized computational representation of data, similarly, analytics of the supply chain provides meaningful observation, representation of the organization’s data. Later these data are modified or manipulated for advancing supply chain processes based on the requirements. The data which are driven from the supply chain cycle can be converted into the form of charts, graphs or any other means of representation of data. This analytics reveals all the hidden patterns and lagging behind sections of the supply chain cycle that needs improvement. Supply Chain Analytics also helps the organization to learn the patterns from the past data to make better decisions for the organization profits. The insights of the organization are divided into 3 main phases which are described below :

1. Data Analytics: Data Analytics is the process of examining the data using different software and pieces of information are drawn out from the analysis of data.
2. Studying the Data: After analyzing the data, Data Visualization comes into the picture for knowing the trends and patterns and correlations of the data.
3. Technology Selection: To increase the organisation's infrastructure, it is necessary to adopt the latest technology available in the market for proper and rapid processing.

Technologies that can manage the enormous amount of data perfectly with the data collection, analysis and storage are to be selected as a platform (Paswan, 2020).

The recent surge of interest in SCA is accompanied by new challenges and opportunities in both business and information technology (IT) environments. These challenges include issues arising from managing large amounts of data (e.g., data availability, data quality) and dealing with environmental uncertainties (Handfield and Nichols 2004, Liberatore and Luo 2010, Huner et al.2011, Lavalle et al. 2011, Manyika et al. 2011).

In the past, enhanced basic metrics and reporting were sufficient to increase supply chain efficiency. Today, supply chain executives need to knowingly invest in advanced analytics to be better positioned and empowered to make the necessary critical decisions.

SCA research is in its early stage and there is a general lack of theory and empirical studies. Using the resource-based view (RBV) as the theoretical base, this study expands the understanding of components and performance of SCA. The principal idea of the RBV is that the competitive advantage of a firm lies in its heterogeneous resources, which are valuable, inimitable, and non-substitutable (Barney 1991).

In supply chain management, there is growing interest in business analytics, which is also called Supply Chain Analytics (SCA). SCA refers to the use of data and quantitative tools and techniques to improve operational performance, often indicated by such metrics as order fulfilment and flexibility, in supply chain management (Handfield 2006, Davis-Sramek et al. 2010, Davenport and O'Dwyer 2011, O'Dwyer and Renner 2011).

SCA is viewed as a combination of IT-enabled resources for manufacturing-related data management, supply chain planning, and data-driven process and quality improvement. It is a data-driven, analytical decision-making approach to SCM supported by IT resources for data management, supply chain planning and evidence-based management methodologies.

The extensive use of supply chain analytics is a relatively new innovation in SCM practice. This research has been exploratory and theory building. While there is growing interest in SCA (Shapiro 2010, Davenport and O'Dwyer 2011, Jander 2011, O'Dwyer and Renner 2011), there is a lack of theory or theoretical framework to study SCA and its impact on SCM performance. This led us to develop a theoretical framework for SCA and identify relevant latent variables and indicators for empirical research. The results from this exploratory research have several implications for practice.

The key challenges for modern supply chain analytical systems include:

- Data explosion – supply chains need the right tools to make sense of the overwhelming amount of data generated by a growing set of data internal and external sources.
- A growing variety of data – most of the new data is unstructured or comes in different types and forms.
- Data speed – data is being generated at high velocity which makes data processing even more challenging.
- Real-time analysis – in today's turbulent business climate the ability to make the right decisions in real-time brings real competitive advantage. Yet many supply chains do not have the infrastructure, tools and applications to make timely and accurate decisions.
- Achieving simplified deployment and management – despite its promise, big data systems can be complex, costly and difficult to deploy and maintain. Supply chains need

more flexible, scalable and cost-effective infrastructure, platforms and services, such as those offered in the cloud (Stefanovic et al. 2017).

Definitions of analytics in Supply Chain Management Smith (2000) "Supply chain analytics is the process by which individuals, organizational units, and companies leverage supply chain information through the ability to measure, monitor, forecast and manage supply chain related business process." Marabotti (2003) "Supply chain analytics is the process of extracting and presenting supply chain information to provide measurement, monitoring, forecasting and management of the chain. Sahay and Ranjan (2008) "Supply chain analytics provide a broad view of an entire supply chain to reveal full product and component. Supply chain analytics provides a single view across the supply chain and includes prepackaged KPI, analytics." Pearson (2011b) "Supply Chain Analytics is […] using quantitative methods to derive forward-looking insights from data in order to gain a deeper understanding of what is happening upstream and downstream, being as a result able to assess the operational impacts of prospective supply chain decisions." O'Dwyer and Renner (2011) "Advanced supply chain analytics represent an operational shift away from management models built on responding to data. Advanced supply chain analytics can help supply chain professionals analyze increasingly larger sets of data using proven analytical and mathematical techniques". Waller and Fawcett (2013) "SCM data science is the application of quantitative and qualitative methods from a variety of disciplines in combination with SCM theory to solve relevant SCM problems and predict outcomes, taking into account data quality and availability issues." Sanders (2014) "Analytics is applying math and statistics to these large quantities of data. […] big data without analytics is just lots of data, Analytics without big data is simply mathematical and statistical.

Analytics involves the ability to gain insight from data by applying statistics, mathematics, econometrics, simulations, optimizations, or other techniques to help business organizations make better decisions (Accenture Global Operations Megatrends Study, 2014).

Big data analytics in LSCM has received increasing attention because of its complexity and the prominent role of LSCM in improving the overall business performance (Wang et al. 2016).

Big data analytics implies two perspectives: big data (BD) and business analytics (BA). BD refers to high-volume, high-velocity, and high-variety sets of dynamic data that exceed the processing capabilities of the traditional data management approach (Russom, 2011; Chen and Zhang, 2014). BA is the study of the skills, technologies, and practices used to evaluate organization-wide strategies and operations continuously to obtain insights and guide the business planning of an organization. Such evaluation ranges from strategic management to product development to customer service through evidence-based data, statistical and operations analysis, predictive modelling, forecasting, and optimization techniques (Russom, 2011; Chen et al., 2012). BDBA offers new opportunities for competitive advantage by extracting significant value from massive amounts of data. In particular, BDBA can help organizations make better decisions and improve their strategy, operations efficiency, and financial performance.

BDBA in logistics and supply chains is supply chain analytics (SCA). The consideration of BDA and the connection within a range of operational and supply chain practices (such as procurement, inventory, logistical, and planning activities) is gaining popularity (Wang et al., 2016; Gong et al., 2018).

When the focus is on logistics and supply chain strategy, SCA is applied in sourcing, supply chain network design, and product design and development at the strategic level. SCA can assist managers and decision-makers in understanding changing marketing conditions,

identifying and assessing supply chain risks, and leveraging supply chain capabilities to formulate cutting-edge, implementable supply chain strategies, thus improving supply chain flexibility and profitability. For tactical/operational level decisions, SCA involves analyzing and measuring supply chain performance on demand planning, procurement, production, inventory, and logistics. Hence, SCA is useful for improving organizations operations efficiency, measure supply chain performance, reduce process variability, and implement the best possible supply chain strategies at the tactical and operational level (Wang et al. 2016).

Wang et al. (2016) presented five different levels of SCA, based on different supply chain goals: functional SCA (resolves problems of the absence of coordination between SC partners, eliminates duplication of processes), process-based SCA (focuses on helping companies achieve operational effectiveness in SC processes), collaborative SCA (deals with situations on a strategic level, in which an organisation collaborates with external business partners to perform SC operations), agile SCA (s to cope with high uncertainties in SC operations) and sustainable SCA (SCA has the role as the 'glue' that enables information to be transformed in the format needed for taking strategic decisions related to sustainability, generally just sustainability-related data).

Although SCA has an extremely important role in LSCM operations, it should be integrated into other business activities, such as financial/accounting performance analysis, marketing, human resource management, and administration, to facilitate integrated business analytics capabilities (Wang et al. 2016).

Chen et al. (2015) have conceptualised the use of BDA in SCM into three categories; (i) Coordination/Integration process (Warehouse operations improvements, Process/equipment monitoring, and logistics improvements), (ii) Learning processes (sourcing analysis, purchasing spend analytics, CRM/customer/patient analysis, forecasting/demand management – S&OP, and Inventory optimisation), (iii) Reconfiguration processes (network design/optimisation, production run optimisation, inventory optimisation).

Adopting and practising BDA comes with some organisational and technical challenges, some of them includes time-consuming, insufficient resources, security concerns, problems with data scalability and quality, lack of skills, techniques and procedures etc (Arunachalam et al., 2018).

During our research, we were able to find some examples of SCA usage in the literature. Souza (2014) illustrated Whirpools demand forecasting for tactical and operational supply chain decisions. In this case, predictive analytics techniques were used. Also, Souza (2014) showed an example of a market basket analysis clustering method used for data mining. Tiwari et al. (2018) presented examples of BDA in Deutsche Bank, General Electric, financial firm Barclays, manufacturers like Raytheon Corp., Toyota Motor Corporation etc. These are examples of companies that use BDA not as supporting activity but as one main way to keep their superiority in business.

3. LITERATURE REVIEW

In this research, for the needs of further SCA research, about thirty papers from various sources were singled out for the purpose of determining which areas were more researched in the papers on the topic of SCA. They exclusively selected papers related to the application of SCA and their research. The keywords used when searching the papers were: SCA in practice, SCA research papers, SCA case study, supply chain, logistic etc.

Papers found for reading were classified according to different criteria, each of the read papers was classified in one or more areas listed in the table in the first place. These criteria represent the topics that researchers are most concerned with when studying the SCA field. As can be seen from the table, the main criteria by which SCA is studied are:

- Terminology and the general role of SCA.
- Case studies.
- Key elements of SCA.
- Mathematical models.
- Software implementation.

Literature review process:

- Material collection, which entails a structured process of search and delimitation of articles.
- Descriptive analysis, which provides general characteristics of the studied literature.
- Category selection, which aims to construct a classification framework based on a set of structural dimensions and analytic categories.
- Material evaluation, which analyses articles based on the proposed classification framework and interprets the results.

Table 1. *Papers classification of SCA based on hierarchy and research topics in period (2000-2021)*

Serial number of the reviewed paper	Terminology and the general role of SCA	Case studies	Key elements of SCA	Mathematical models	Software implementation
1		x	x		
2		x	x		x
3			x		x
4	x	x	x	x	x
5	x				
6					x
7		x			x
8	x	x		x	x
9	x	x			
10		x	x	x	
11		x			
12	x	x		x	
13	x		x		x
14		x	x		x
15	x		x		x
16	x			x	x
17		x		x	
18	x	x	x		x
19		x			x
20	x	x			
21		x			
22	x	x	x		
23	x		x		x
24	x				x
25	x				x
26	x				x

27	x	x		x	x
28	x	x		x	
29		x	x	x	

4. DISCUSSION

In this paper were examined 29 different research papers from various sources. The main criteria for paper classification are terminology and the general role of SCA, case studies, key elements of SCA, mathematical models and software implementation.

The results of the paper review are presented in Table 2.

Table 2. *The results of the paper review*

CRITERIA	NUMBER OF PAPERS
Terminology and the general role of SCA	17
Case studies	19
Key elements of SCA	12
Mathematical models	9
Software implementation	17

In researched papers, the most often mentioned criteria are case studies and software implementation. The least processed are the mathematical models used for SCA.

The graphic presentation of the obtained results is shown in Figure 1.

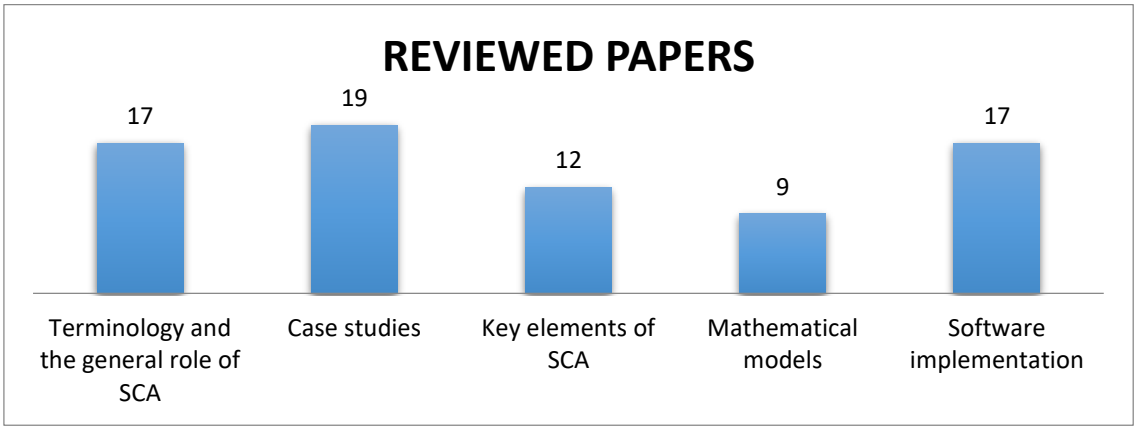

Figure 1. *The results of the paper review*

5.CONCLUSION

In this research, the concept of analytics in supply chains is presented through a review of a large number of papers on the topic of his research. The purpose of this paper was to determine which areas in supply chain analysis are more researched. A review of several papers found that of all the SCA research areas offered, the most studied is the case study

and software application in this area. In addition, a large number of papers present research on terminology in this area as well as SCA itself in supply chain management.

It can be concluded that this is a very new area in supply chain management logistics and that it is still not sufficiently researched, ie that its possibilities for improving supply chain performance are still insufficiently used. It is also known that there is not enough theory on this issue. This paper generally includes an insight into which topics are the most researched in the world.

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DIGITAL AND COLLABORATIVE SOLUTIONS FOR INNOVATIVE MANUFACTURING ECOSYSTEMS

Thomas MEIER, Helena MAKYŠOVÁ

Abstract:

Big data, artificial intelligence (AI) and the Internet of Things are terms that have long been in social and economic parlance. Must be gold-plated for digitization in connection with Big Data, so that the rights in the region of process management, production and administration in the economy, which are not capable. The extent to which digitization already belongs or should be in companies is the subject of this paper. The main goal is to show the status quo of the degree of digitization of management companies, and to become more responsible. Based on this, rights of the demanding articles digital and collaborative rights, rights to AI, platform solutions or cloud authorizations. It also provides information for the people who are checked by work disparities and labor inspectors. For this research, current contemporary literature, various articles and internet sources were systematically evaluated and rated. A critical appraisal as well as recommendations for action and a guideline for checking the feasibility conclude the explanations.

Keywords:
Digitization, Big Data, Internet of Things, collaborative work, networking

1. INTRODUCTION

The overriding relevance of data as such forms the framework for a trend analysis. Data therefore not only serve as a source of information and input factor for value creation, but also represent an independent good. [1] In this respect, the data economy and its impact on the agility of a company should be a decisive factor for competitiveness. The relevance in the economic context is shown by the demands that will be placed on employees in the future. This includes, among other things, the quantitative and qualitative evaluation of the analyzes related to big data and the industries in which data sciences are used. It shows what potential lies in the field of economics. The challenge is to reconcile trends with the technical and cognitive possibilities of big data and to shape the associated social consequences as utopia and not as dystrophy. In the context of Industry 4.0 there are many starting points for the use of AI, the application of which requires the structuring and analysis of large amounts of data. Networking is an effective method of harnessing the potential of big data and AI. Around 25% of all machines in Germany already communicate with each other and work in a network. This was the result of a representative survey by the Bitkom digital association of 553 industrial companies, each with at least 100 employees. [2]
Figure 1 shows the result of the survey conducted among executives in Germany in 2018 with regard to the proportion of machines already connected to the Internet in the company. For example, 54 percent of those surveyed stated that 20% to almost 50% of their machines are already connected to the Internet. [2]

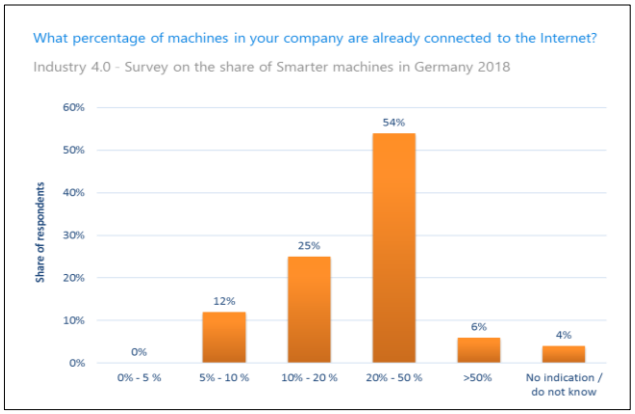


Figure 1 *Industry 4.0 - Survey on the share of smart machines in Germany 2018*

In 2018, an average of 24% of executives said their company was connected (compared to 21% in 2016). The increase of 3% in the information provided by executives compared to 2016 shows the growing trend. Companies that have not yet been networked or have not yet been networked will be networked in 2018 or have reached a higher level of digitization. Overall, it can now be assumed that more than 75% of industrial companies are already active in the field of Industry 4.0 at a moderate level (at least 15% of the machines are connected to the Internet) and thus produce large amounts of data within their value chain.

2. DEGREE OF MATURITY OF DIGITALIZATION

However, the development mentioned above requires a certain degree of maturity in terms of digital competence. "Decisive for the digital transformation are also the digital affinity of the people, the degree of their internet use and the skills in dealing with digital applications as well as the intermediaries who create the prerequisites for networking."[3] It is difficult to measure the resulting effects of added value - caused by digitization - using conventional methods of economics. For this reason, an innovative analysis of 2500 companies from the fields of industry and industry-related services was carried out in a German study. On the one hand, a distinction was made between computerized and digitized companies and, on the other hand, the connection between sales and value creation and the degree of digital maturity was established. [3] The various stages of digitization or computerization show how strongly a company or a public administration agency is digitized.
The spectrum ranges from level 0 (not digitized at all) to level 4 (heavily digitized). Figure 2 shows this relationship in business and administration

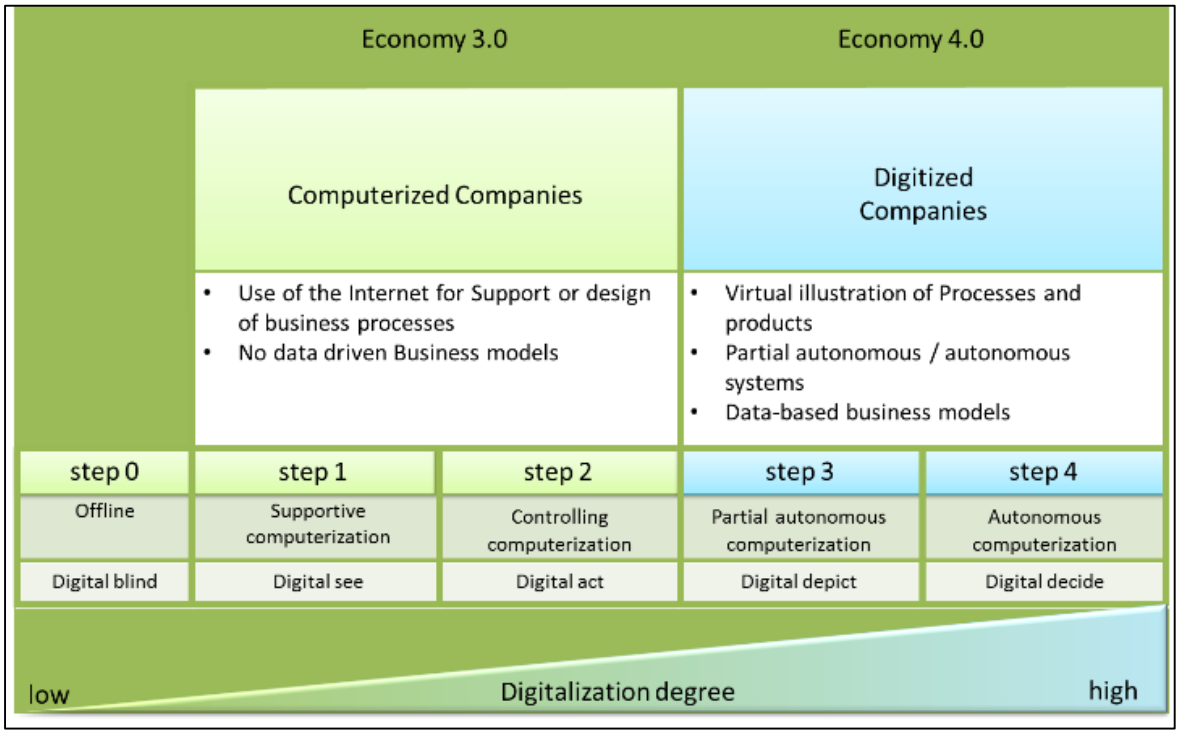


Figure 2 *Steps of the digital Maturity (own presentation based on vbw)*

In the field of industry or industry-related services (i.e. outsourcing to logistics, facility or IT service providers), around 10% of companies are still at level 0. Only around 1 out of 200 companies was fully digitized and achieved in 2018 which means the highest maturity level (level 4). Figure 3 illustrates the situation.

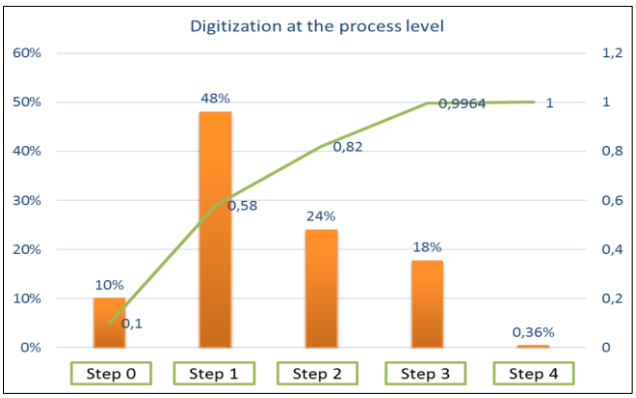


Figure 3 *Digitization at the process level*

In industry, the proportion of digitized companies is significantly lower than, for example, in the service sector. The potential in such an area is correspondingly high. This requires targeted investments in the further and advanced training of employees.

In 2020, Bitkom stated in a study they carried out that a total of 70% of the 1104 companies surveyed (20 or more employees) send their employees to further training courses in order to prepare them accordingly. The information on investment in further training varied, based on the number of employees. While the proportion of companies surveyed with more than 499 employees who invest in further training in the above-mentioned manner was as much as 78 percent, the corresponding proportion for companies with fewer than 100 employees was around 9 percentage points less.[4]

It seems that a certain level of competence in handling data and digitization in general is important to companies. The hoped-for added value, however, is currently still an elusive figure. Due to the complexity that big data and, above all, the analysis of the data bring with it, future fields of application can be assessed, but effects can hardly be measured.[5]

3. THE INTERNET OF THINGS

The Internet of Things (IoT) is inseparable from Industry 4.0 and Big Data. Behind the collective term, which describes the technologies of a global infrastructure of the information society, lies the possibility of networking physical and virtual objects with one another. You can then work together with information and communication technologies (ICT). Basically, ICT is used in three meta-level applications. On the one hand, the transmission of information takes place through space (communication), furthermore the transmission of information through time (storage) and finally the regulated transformation of information that is generated by an algorithm (calculation). The global technical capacity to calculate information with computers in 2007 was 6.4x1042 million instructions per second (MIPS).[6] With these communication technologies it is possible to network physical things with one another via interfaces. Networking objects does not only result in huge amounts of data, but also in different types of data. It is only through the absolutely necessary big data technologies that economic potential emerges, which also entails risks in a social and psychological context.[7] Ever smaller computers are supposed to support people in various activities without distracting from the core activity or even being noticed. However, the miniaturization of computer components is reaching its physical limits this year. It remains to be seen whether researchers will be able to overcome these limits and advance into the nano range. For the first time, the experts in this field have succeeded in realizing the transport of information in very compact microchips with spin waves.[8] For the first time, Mark Weiser spoke in 1991 in his essay “The Computer for the 21st Century” of a vision in which objects are equipped with sensors and seamlessly integrated into their surroundings.[9] This vision has long since been realized 30 years later. Today's technology enables relevant information from the real world to be captured, networked and made available in the network. This can be understood as the goal of the IoT. In this way, status information of real objects (e.g. the lubricant level of a machine or the stock of frozen pizza in the refrigerator) is made available to a network for further processing. Further processing could mean that pizza is automatically reordered as soon as a critical limit has been fallen below.

This information seems to be particularly attractive and valuable for the early detection of errors, maintenance or even the replacement of equipment. To do this, however, it is best to evaluate and interpret this information by the participants themselves. The large number and different types of information have the advantage that the degree of effectiveness is greater, and therefore the quality of prevention is significantly more targeted. The difference to a simple sensor is that it usually only processes one signal, which then determines the further course of the process. If, for example, a heat sensor is installed in an unsuitable place, this could lead to incorrect information and an associated heater unnecessarily regulates the room temperature. In order to be able to use the networking of objects optimally, a standardization of the software components and the services should take place. Another prerequisite is a simple and secure network connection and the development of automated or even autonomous digital services in the network.

According to estimates by the IEEE (Institute of Electrical and Electronics Engineers), more than 50 billion things will be connected to each other in a few years.[10] In 2020 there will be around 100 billion things. In view of these figures, the question of sustainability from an ecological point of view arises. Basically, the sustainability goals of the IoT are to be assessed positively, as it promises higher energy efficiency. However, the energy consumption in the area of the Internet of Things is worrying. According to a study by the iHomeLab of the Lucerne University of Applied Sciences and Arts, global energy consumption would increase by 20% by 2025. This happens as a result of the steadily growing number of networked devices through

building automation and smart household appliances. In standby mode alone, this would correspond to the electricity consumption of Portugal with 46 terawatt hours (p.a.).[11] Accordingly, there is a need for further research in this area with regard to the energy balance of the Internet of Things.

4. COLLABORATIVE WORK

Collaborative work can also be described as an intensive form of cooperation. The term collaboration is borrowed from the French "collaboration" and means cooperation or collaboration.[12]
In this context, collaboration with such a high intensity inevitably leads to changes in the processes. The division of labor as such is also intensified and the work is - as an imperative - shared among all those involved. Collaborative work in the narrower sense means that even several groups (and also machines) work on identical content. This procedure can take place at the same time or with a time delay. The place of the event is also not fixed and the participants can remain anonymous. The term digitization is closely related to collaborative work, as it forms the prerequisite for it. From this context, areas of application arise, for example, for the organization of educational work, in classic project organization, in the field of transport logistics or industrial production.
This collaboration in automation with lightweight robots can be shown impressively. According to Professor Jeschke (University of Aachen), there is hardly a professional field that is not being called into question by advancing digitization. This trend is most evident in the collaborative production workplace. The Aachen University with its mechanical engineering faculty has specialized in automation solutions with lightweight robots. As a certified system integrator of Universal Robots (UR), Professor Jeschke's research group has unrestricted access to an extensive network of partners and can therefore implement targeted cobot (collaborative robot) solutions for customers.[13] The way the machines work is efficient, targeted and autonomous. For example, two robots stack Lego blocks on top of each other, while one analyzes the movements and processes of the other and adjusts its own actions accordingly. Robot 1 waits when robot 2 acts in its radius and uses it to find the stones that are closer to it.
The above example is a typical application at a classic production workstation, where workers are already being replaced by machines. This technical progress will not automatically benefit the employee, as there is no longer any need for their work. Whether this marks the end of classic wage labor leaves room for future discussions.

5. FURTHER SOLUTIONS

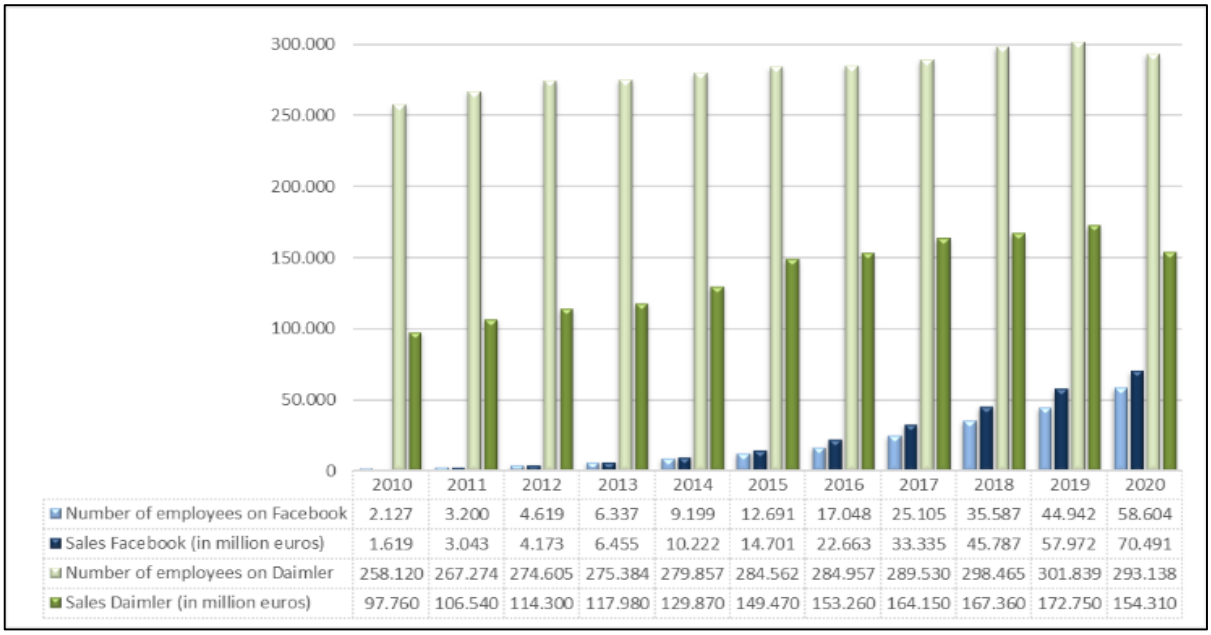
Similar systems based on the same principle with so-called weak AI can also be used in intralogistics. Be it in the hospital, nursing home, schools or in the classic production hall. Mobile robots that can navigate freely are not so much a single tool in a process chain, but rather an overall concept to make it easier for employees to carry out their transport tasks. They interact collaboratively through the connection to Enterprise Resource Planning, Web Map Service (WMS) or other common software systems in the company, supported by innovative security technology. The “cobots fleet” is controlled by additional apps and AI cameras. As they drive past, these automatically recognize whether, for example, a pallet is ready to be removed.
Collaborative solutions can be seen as a pillar of the digitization of processes in logistics. However, the possibilities of advancing digitalization and automation in industry for transport logistics can only be fully exploited if the individual systems can communicate with one another across the board. Peter Förster, Managing Director of the Transporeon Group, says: "A common thread runs from Industry 4.0 and the Smart Factory through Logistics 4.0 to Transport Logistics 4.0."[14] Gunnar Sohn, a business journalist from Bonn, made this clear in 2012 with the words: "Digital eats analog - everything that can be digitized will be digitized." [15]

6. PLATFORM SOLUTIONS - CROWD AS A TECHNOLOGICAL SOLUTION

The crowdsourcing concept according to Howe provides the basis for the advanced concepts, which essentially provide for the outsourcing of individual entrepreneurial tasks to a large number of private individuals. The Internet serves as a communication medium and resource store.[16] Crowdsourcing can therefore be understood as a distributed online model for problem solving and production in which companies use the collective intelligence of online communities. Furthermore, crowdsourcing is a combination of top-down management processes with open bottom-up innovation processes and can be understood by organizations to solve problems related to information management or brainstorming.[17]
The advantages of crowdsourcing are particularly attractive for companies in the technology sector. Especially when these companies are still quite young in their development and do not yet have the necessary organizational resources, but have a high level of special competence in the industry. Ambitious companies can use an online marketplace ("Mechanical Turk" from Amazon) that offers casual work and requires human intelligence.[18] In the USA there is also talk of a "gig economy", in which a large number of freelancers search for job opportunities on a platform, and thus for a "gig". [19] The occasional jobs that are offered on such a platform are diverse and range from research tasks to video analysis of advertising films. In order to earn money quickly and easily in this way, data must be provided in large quantities and in various forms (e.g. videos or prices) via the platform and the feedback, i.e. the data return, must be ensured.
Crowdworking is so far less established in Central Europe than in the USA. In this country it is primarily used as a source of additional income, but the demand for work that can be called up is growing steadily. If the inquiring companies have the technical possibilities, this represents an attractive possibility for them to outsource employment risks. The crowdworkers are entrepreneurs in the broadest sense who act on their own behalf and bear their own risks (e.g. health insurance, etc.). Labor laws that regulate wages, working hours or protection against dismissal do not yet exist, at least in German-speaking countries. Crowdworking thus undermines the principle of social security on which, among other things, the economic model is based. The former Minister for Labor and Social Affairs Andrea Nahles brought the results of a dialogue process in a so-called White Paper Work 4.0 on how the state should react to the changed working conditions due to digitization. "Digitization brings flexibility in terms of working time and location for companies and employees."[20] For example, one must strengthen the right to work from home or integrate the new self-employed into the statutory pension insurance. As of 2021: The concept has so far only been implemented to a limited extent. For example, the expansion of the home office was enforced, but against the background of the pandemic, not out of the original intention.[21]

7. NEW TRENDS - OLD ECONOMY VS. NEW ECONOMY

Digital technology, the ability to process huge amounts of data, is about to replace the economic structures of the 20th century. The so-called service economy uses the possibilities of fast digital reproduction in order to be able to work efficiently and be successful. The costs that would be necessary for such a spread in the old economic world have hardly increased in relation to the growth of the new economy. Figure 4 shows the ratio of employees to the turnover generated by Daimler AG as a representative of the old economy and Facebook, representative of the new economy worldwide.[22, 23]



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Number of employees on Facebook	2.127	3.200	4.619	6.337	9.199	12.691	17.048	25.105	35.587	44.942	58.604
Sales Facebook (in million euros)	1.619	3.043	4.173	6.455	10.222	14.701	22.663	33.335	45.787	57.972	70.491
Number of employees on Daimler	258.120	267.274	274.605	275.384	279.857	284.562	284.957	289.530	298.465	301.839	293.138
Sales Daimler (in million euros)	97.760	106.540	114.300	117.980	129.870	149.470	153.260	164.150	167.360	172.750	154.310

Figure 4 *Employees and sales of Facebook and Daimler from 2010 to 2020*

In 2020, Facebook employed over 58,000 people with a turnover of over 70 billion euros. This corresponds to a turnover per employee of approx. 1.2 million euros, while at Daimler it amounts to less than half, to only around 520,000 euros. Figure 5 shows the sales in euros per employee of Daimler AG and Facebook for the years 2010-2020.

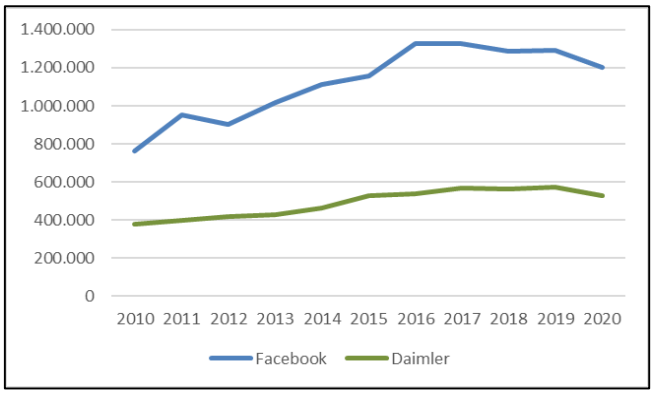


Figure 5 *Sales per employee (euros)*

Companies in the New Economy are better exploiting the potential of big data, platform economics and AI, which can be seen, for example, in the return on sales. The example of the automotive industry shows that the basic concept of vehicle production has hardly changed since Henry Ford. Although Daimler has introduced the “Factory 56” in Sindelfingen (Germany), a new, innovative, flexible and 2.1 billion-dollar monthly system, the idea of factory production remains.[24] Thousands of employees in many production plants, with a plant area of 2,950,697 m².[25]

The alternative to this old economy model could be decentralized production in so-called microfactories close to the customer.

Local Motors, an American automobile manufacturer headed by company founder and CEO Jay Rogers, uses the core principles of using techniques such as open source and crowdsourcing and counts as a pioneer of these ideas. Spread across four locations, a production hall only has around 4600 m². The production of various components, including the carbon fiber chassis, is taken over by the 3D printer. The “OLLI” model, an autonomously driving shuttle bus, consists of a few parts, whereby the motor, battery and cable are purchased separately. The vehicle will be produced using additive manufacturing techniques, including 3D printing, and has been in operation at the United Nations ITCILO campus in Turin (Italy) since January 2020. [26]
In 2016, the company only had 116 employees, but has access to a global network of around 52,000 designers, developers and engineers.[19] If tasks are to be solved that require these abilities, this network is questioned and thus synergy effects are made usable through swarm intelligence. The best solution concept thus prevails. According to company founder Jay Rogers, the savings potential is enormous: "We are five times faster and need a hundred times less capital."

8. SUMMARY - RECOMMENDATIONS FOR ACTION AND OUTLOOK

Digitization is penetrating almost all areas of employment. Collaborative processes, strong networks and platforms are about to replace rigid hierarchies. The networked world allows for a better pooling of creative reserves of strength. Even demanding tasks can be broken down into very small pieces and thus distributed to the most suitable crowdworkers worldwide. In particular, company founders face numerous challenges that go hand in hand with the constant risk of failure. The published theories according to Fallgatter, Liability of Newess, Liability of Adolescence and Liability of Smallness show that founders usually have to manage a lack of resources and skills as well as a lack of networks, which significantly increase the risk of insolvency.[27] One approach to reducing this risk could, for example, provide the innovative models described based on the example of Local Motors. In particular, collaborative work in connection with crowdworking can supplement the idea of the component portal, based on the component model according to Faltin (to structure and coordinate company processes as clearly as possible so that they mesh almost perfectly and identify and eliminate everything superfluous).[28] The cost-efficient possibility of obtaining a wide range of services on demand, i.e. without fixed costs and, above all, without building up your own resources, appears particularly attractive for newly founded companies. They emphasize the reduced time-to-market that is made possible by communicating and performing tasks at the same time.[29] Furthermore, tasks can be outsourced and resources are increasingly obtained online via platforms. In order to fully exploit this potential, it is necessary, on the one hand, to build up extensive knowledge of the possibilities and potential of crowdworking and, on the other hand, to familiarize oneself with the technological conditions.

In summary, the following specific recommendations for action with regard to collaborative, digital work can be stated:

<u>Process management should be professionalized:</u>
In order to smoothly integrate individual process chains into the overall process, in addition to the technical prerequisites, further training for employees in the area of process management is necessary. This is the basic requirement for the different tasks, at different locations, with partly different technical requirements and knowledge levels, to be able to be synchronized. For this, an exact understanding of roles must be present among all employees involved in order to be able to evaluate and prioritize the respective process chains with regard to their added value and under risk aspects.

Interfaces between the actors should be automated:
For those IT components that communicate in the process chain, it is advisable to develop communicators (facade patterns) as uniform interfaces (particularly suitable for soft projects). They provide the required services with defined interfaces. As an intermediary, the Facade object ensures that access and communication with the individual components of a subsystem are simplified and the direct dependency on these components is minimized. [30]

Appropriate use of electronic signatures:
Electronic signatures are electronically linked data that identify the signer, i.e. the signature creator. They thus support security goals such as integrity, authenticity, liability and non-repudiation. Legal protection is regulated by the EU Regulation No. 910/2014 published by the European Commission on August 28, 2014 on electronic identification and trust services for electronic transactions in the internal market. The regulation replaces the Signature Directive 1999/93 / EC, but at the same time strengthens and expands the existing legal provisions that have already been introduced with the Signature Directive. The ordinance has been applicable since July 1, 2016.[31]
Basically, the usability and the costs have to be taken into account with electronic signatures. For this purpose, it must be checked in advance where electronic signatures must be used from a legal point of view. It should also be noted that the eCard API framework (BSI TR-03112) of the Federal Office for Information Security should be used for new developments for electronic authentication.[32]

Networking should take place with a standardized data schema:
The exchange of data should take place on the basis of structured, machine-readable eXtensible Markup Language (XML) documents. A text-based data format that can be opened, read and edited by almost any editor. The widespread use and the comparatively easy handling are ideal for collaborative projects. The only disadvantage is that a structure saved in XML format requires more storage space and is therefore processed more slowly than a binary format, for example. Typical areas of application for XML formats are, for example, representations of customer databases.

The networking should be carried out without media breaks:
If the process chain is not fully digitized, a seamless system environment is not possible. As a result, process values and results are not available to the company and the outsourced process elements across all process levels. For the seamless processing of information, it may be necessary to implement interfaces in order to avoid manual recording of the data. This would slow down the entire workflow or even come to a standstill. Furthermore, sources of error that occur when the information is transferred manually are avoided.
Process values and results from production, for example, reliably reach the desired target systems because, with networked data transfer, transmission errors are virtually completely eliminated, provided that rule-compliant networking prevents the occurrence of data redundancies. The implementation of Open Platform Communications via the OPC UA protocol (here representative of alternative solutions) could help. Such a platform is one of the most important communication protocols for Industry 4.0. With OPC, access to machines, devices and other systems in the industrial environment is standardized and enables the same type of data exchange regardless of the manufacturer.[33]

In order to be able to implement the recommendations for action listed above, some central aspects are required, which should be analyzed in a feasibility study for collaborative work - or, in general, for a project.

1. It must be checked whether the technical capacities for the implementation of a networked project are sufficiently available for all parties involved.

2. Furthermore, the financial resources (initial investments, fixed costs, fees for maintaining the platforms, etc.) must be considered separately. It is advisable to draw up a budget and carry out a cost-benefit analysis.
3. Furthermore, it is imperative to record the legal framework in order to ensure legality.
4. Risks should also be identified and critically assessed as part of risk management.
5. Process owners should check whether a collaboration / project is feasible in an operational sense. For example, problems related to the time difference may arise when operating globally.
6. Finally, the duration of when the collaboration is to end or a project should be completed should be determined.

Industry 4.0, and therefore the digitization of the economy, should be understood as an opportunity for an industrialized Central Europe. Digitalization, which creates so-called cyper physical systems (CPS) through the integration of computing power, forms the basis of the intelligent factory - the smart factory. Intelligent machines work collaboratively with humans and independently control production processes. The Internet of Things is the basic building block of smart networking. In the future, companies will be interlinked via platforms with standardized applications and thus optimize the entire value chain. New business models will shape the world of work 4.0 and thus (must) change the understanding of the skills, requirements and qualifications of employees. It is important to gain trust in new technologies and processes, but to critically assess the sustainability of digitization.

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METHODEN FÜR DIE BEWERTUNG UND KLASSIFIKATION DER ARBEITEN NACH RISIKEN UND EFFEKTIVITÄT

Benjamin Abdullah Karl SCHMACHER

Abstrakt

Die derzeitige Situation in den Büros weltweit ist nicht fördernd. Das Kollegium wird mit Informationen überflutet und die permanenten Ablenkungen führen zunehmend zu Schwierigkeiten, effizient zu arbeiten.

Um den Schwierigkeiten entgegen zu wirken, wird durch statische Analysen entgegengewirkt. Ebenso gibt es diverse Bewertungsmethoden.

Schlüsselworte: *Arbeitsrisiken, Arbeitseffektivität, Bewertung, Klassifikation*

1 Methoden für die Bewertung und Klassifikation der Arbeiten nach Risiken und Effektivität[1]

In Deutschland wurde eine Blitzumfrage von **Steelcase** durchgeführt, welche ergibt, dass 42% der Deutschen sich am Arbeitsplatz nicht konzentrieren können. Die am häufigsten genannten Störfaktoren sind wie folgt:

- Sehr laute Gespräche,
- Die Überflutung von E-Mails jeglicher Art,
- Probleme technischer Natur sowie
- Die Aktivitäten des Kollegiums in der Nähe oder Unmittelbar neben dem eigenen Arbeitsplatz.

Aus diesem Grund sehnen sich Menschen wonach?

Menschen, die Arbeiten an komplexen Problemen durchführen oder daran arbeiten wollen, sehnen sich nach mehr Freiraum zur Konzentration.
Eine Ermöglichung könnten Sie sich die Arbeitnehmerinnen durch

- Diverse Arbeitsstille,
- Privatsphäre und
- Frische Luft vorstellen.

1.1 Statistik – Statische Analyse[2]

Statistik wird sehr oft als Schätzfunktion bezeichnet. Der Grund hierzu ist, dass ein die Statistik ein umfassendes methodisch-quantitatives Instrumentarium ist. Dies wird zur Auswer-

[1]Vgl. VNR Verlag für die Deutsche Wirtschaft AG: wie Sie im Büro effektiver arbeiten online im Internet: https://www.simplify.de/zeit/selbstorganisation/artikel/10-tipps-wie-sie-im-buero-effektiver-arbeiten/, 30.12.2019.
[2]Vgl. Mentorium GmbH: Statische Verfahren – Was ist das? online im Internet: https://www.mentorium.de/statistische-analyse/, 28.04.2021.

tung sowie zur Charakterisierung empirischer Befunde bei gleichartigen Einheiten („Massenphänomenen“) herangezogen. Dessen Einsatzmöglichkeiten findet man in der Politik, Wirtschaft oder Gesellschaft wieder. Natürlich auch in Geistes-, Sozial- und Naturwissenschaften mit Einschluss der Medizin und Technik, in denen mit Zahlen oder Bewertungen gearbeitet wird.
Die daraus resultierenden Ergebnisse einer statischen Untersuchung werden ebenso als Statistik bezeichnet.[3]

Nicht nur eine korrekte Wahl und Anwendung von Methoden nennt man eine gute statistische Analyse. Sie beinhaltet weit mehr – Sie ist ein komplexer Prozess, der Herausforderungen mit sich bringt. Diese designen den Fragebogen, erfordern anschließend einen Stichprobenziehung und erfordern grafische Darstellungen.

1.2 Statistische Analyse - Daten als Grundlage

Gute und genaue Daten sind die Grundlage für eine optimales Ergebnisses eines statischen Tests mit belastbaren Daten. Die besten Ergebnisse enthalten ohne aussagekräftige Daten kaum Wertigkeit. Der vorhandene Datensatz muss daher schlüssig, vollständig und aus aktuellen Daten bestehen. Ebenso müssen die Daten zur Beantwortung der Fragestellung geeignet sein.

1.3 Statistische Analyse und Kausalität

Nach der Erhebung der statischen Daten müssen diese analysiert werden. Die Vorgehensweise ist die Verfolgung einer konkreten Fragestellung. Dann ist das Ziel für die statistische Analyse, Deine Hypothesen näher zu untersuchen.
Aufzupassen ist jedoch, dass nicht Variablen miteinander in Verbindung gebracht werden, wo gar kein direkter Zusammenhang vorliegt. Es kann sein, dass Zusammenhänge gar keine Bedeutung geben – bezugnehmend auf die Forschungsfrage.

1.4 Grafische Darstellungen für die statistische Analyse

Eine der häufigsten Fehlerquelle besteht darin, dass die grafischen Darstellungen falsch interpretiert werden. Die Manipulation mit Darstellungen kann bewusst erfolgen oder können durch Unachtsamkeit entstehen.
Eine der beliebtesten Fehlerquellen ist das Abschneiden, weglassen oder eine mangelnde Beschriftung der Achsen diverser Grafiken sein. Die Grafiken sollen für den Mensch (das Auge) gut erkennbar und eindeutig sein.
Mehr als nur die Anwendungen von konkreten und korrekten Methoden ist die statische Analyse. Von Beginn an muss man sorgfältig und genau arbeiten. Damit ist die Datenerhebung gemeint und muss bis zur Datengewinnung Gewissenhaft durchgeführt werden. Um keine Falschaussagen darzustellen, muss die Darstellung genauso gewissenhaft bearbeitet werden wie die Analyse an sich selbst. Das zu erreichende Ziel ist es, statische Ergebnisse zu formulieren, welche den Ursprung aus einer begründeten und standfesten Analyse nehmen.

[3]Vgl. Gabler Wirtschaftslexikon – Das Wissen der Experten.: Definition: Was ist „Statistik“? online im Internet: https://wirtschaftslexikon.gabler.de/definition/statistik-45267, 28.04.2021.

1.5 Bewertungskriterien – Statische Analyse Gütekriterien[4]

Bei empirischen Untersuchungen sind die Reliabilität, Validität, Handhabbarkeit sowie die Objektivität wichtige Kriterien. Diese genannten Kriterien bauen aufeinander auf. Die Kriterien sollen im Folgenden zur Auswahl einer geeigneten Methode zur vergleichenden Bewertung von Honorierungsansätzen für Umweltleistungen in der Landwirtschaft herangezogen werden.

- **Objektivität**
  Objektivität bezeichnet die Übereinstimmung mit einer Sache oder einem Ereignis ohne eine Wertung oder subjektive Verzerrung.
- **Validität**
  Die Überprüfung einer Aussage in unterschiedlicher Art und Weise – es ist eine Art „Messinstrument“.
- **Reliabilität**
  Für das Maß für die Zuverlässigkeit wissenschaftlicher Überprüfungen wird die Reliabilität herangezogen. Der Grad der Übereinstimmung zwischen einem objektiven, "wahren Wert" und dem gemessenen Wert.
  Im Idealfall ist der Wert zwischen Messung und dem wahren Wert 1.
- **Handhabbarkeit**
  In diesem Fall kann eine Bewertungsmethode durch einen Nutzer verwendet werden um somit bestimmte Ziele effektiv, effizient und zufrieden stellend zu erreichen

Bewertungsmethoden[5]

Bewertungsmethoden sind Verfahren zur Bestimmung bestimmter Werte bzw. Ergebnissen hinsichtlich Lösungsfindungen. Im Folgenden werden 4 Methoden kurz erläutert.

- **ABC-Analyse**
  Mit dieser Methode sind nur sehr grobe Klasseneinteilung möglich, da die Bewertungsgrenzen subjektiv sind. Durch die Aggregation sind nur unscharfe Zuordnungen möglich sowie ein hoher Informationsflussverlust kann auftreten. Im Gegenzug ist dies eine sehr leichte und übersichtliche Bewertung.

- **Checklisten**
  Durch die objektive Herangehensweise ist eine vollständige Auflistung der Kriterien möglich. In diesem Fall muss der Ersteller bzw. Nutzer ein hohes Maß an Wissen diesbezüglich aufweisen. Weiters ist dies ein sehr zuverlässiges Verfahren und stellt keine großen Kenntnisse bzgl. der Handhabung zu diesem Verfahren an den Benutzer.

- **Portfolio-Analyse**

[4]Vgl. Cornelia Deimer, Honorierungsansätze für Umweltleistungen in der Landwirtschaft: Genese, Trends und Bewertung (Dissertation zur Erlangung des akademischen Grades doctor agriculturarum (Dr. agr.) vorgelegt an der Landwirtschaftlichen Fakultät der Martin-Luther-Universität Halle-Wittenberg), verteidigt am 24.10.2005.
[5]Vgl. Cornelia Deimer, Honorierungsansätze für Umweltleistungen in der Landwirtschaft: Genese, Trends und Bewertung (Dissertation zur Erlangung des akademischen Grades doctor agriculturarum (Dr. agr.) vorgelegt an der Landwirtschaftlichen Fakultät der Martin-Luther-Universität Halle-Wittenberg), verteidigt am 24.10.2005.

Hier sind die Bewertungskriterien eher subjektiv aufgestellt, welche in Abhängigkeit des Wissens vom Ersteller stehen. Ebenso können Wechselbezeichnungen nicht gut bzw. kaum dargestellt werden, jedoch ergibt sich eine einfache und zweckmäßige Visualisierung vom Sachverhalt.

- **Relevanzbaum**
  Durch die subjektive Herangehensweise ist eine sehr große Unsicherheit und teilweise Zuordnungswillkür vorhanden. Die Klasseneinteilung erfolgt sachlich und die Konzentration erfolgt auf die wesentlichen Merkmale. Wie zuvor können hier keine Wechselbezeichnungen dargestellt werden. Die Wertung ist transparent und erfordert trotzdem umfassende Kenntnisse zu diesem Verfahren.

2 Resümee

Die im Rahmen dieser Veröffentlichung durchgeführten Informationsansammlungen konnten die statischen Analysen dargestellt werden.

Kurzerhand wurde die erforderliche Theorie zum Thema Statistik – Statische Analyse und desen Aufbau erläutert. Ebenso wurden Bewertungskriterien und Bewertungsmethoden dargestellt.

Abschließend ist zu sagen, dass die Bewertungskriterien aufeinander aufbauen und die Bewertungsmehtode von den vorlieden Daten sowie der Darstellung abhängig ist.

3 Schlusswort

Aus dieser Veröffentlichung wird der Entschluss gezogen, dass es erforderlich ist, zuerst Begriffe zu erläutern und deutlich darzustellen, bevor weitere Schritte vorgenommen werden. Um ein qualtitätiv hochwertiges Ergebnis zu erhalten, sind gutbedachte Rahmenbedingungen erforderlich.

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Möglichkeiten zur praktischen Analyse zur Duchführung von Arbeiten

Benjamin Abdullah Karl SCHMACHER

Abstrakt

Um eine passende Forschungsmethode für einen Forschungsgegenstand zu eruieren, müssen die Vor- sowie Nachteile berücksichtigt werden.
Um die geforderte Leistung bzw. die Leistungsfähigkeiten des Einzelnen zu optimieren oder zu fördern, gibt es Möglichkeiten, welche im folgenden Kontext beschrieben werden.

Schlüsselworte: *Analyse der Arbeit und Verfahren*

1 Ansätze der praktischen Analyse[1]

Große, repräsentative Gruppen lassen sich durch quantitative Forschungsmethoden erreichen. Zur Auswahl der passenden Forschungsmethode für einen Forschungsgegenstand gelingt unter Berücksichtigung von Vor- und Nachteilen folgender verschiedenen Vorgehensweisen. Quantitative Methoden in der Forschungsanwendung findet sich:

- *Standardisierte Befragung* –Multiple-Choice-Fragen (z.B.als (Online-)Fragebogen, Interviews oder Gruppendiskussion)
- *Standardisierte Beobachtung* – von Muster von Verhalten
- *Experimente und Versuche* – zur numerischen Datenerhebung
- *Quantitative Inhaltsanalyse* – unter Erfassung von messbaren Daten

Weitere Möglichkeiten zur praktischen Analyse bzw. um die Leistungsfähigkeit des Gehirnes am jeweiligen Arbeitsplatz zu optimieren bzw. zu fördern und effektiver arbeiten zu lassen, gäbe es folgende 10 Möglichkeiten:

Den Blick in die „Natur“ schweifen lassen
Es gibt Zufälle, JA, jedoch ist es kein Zufall, dass die besten Ideen unter der Dusche, beim Radfahren, Spazieren gehen oder sogar Joggen in den Sinn kommen. Schweifen die Gedanken ab, verarbeitet das Gehirn im Hintergrund Informationen und trägt zur Bildung neuer Aktivierungsmuster bei. Wenn man bei einer Aufgabe, Herausforderung oder sogar einem Problem nicht weiterkommt, ist der beste Weg, sich kurzfristig von diesem Thema zu entfernen, um auf die Arbeiten des Gehirnes im Hintergrund zugreifen zu können.
Indem den Neuronen der Freiraum gewährt wird, sich neue Verbindungen zu schaffen, wird alles klarer gesehen und Lösungen werden leichter gefunden, die im „blockierten“ Zustand in den Wortsinnen nicht denkbar gewesen wären.

Definierte Ziele
Erst wenn das Gehirn weiß, welche Rahmenbedingungen für eine Tätigkeit vorliegen, kann erst wirklich mit voller Aufmerksam gearbeitet werden. Die Ressourcen werden erst anschließend bestmöglich verteilt.

[1]Vgl. qualtrics XM: Marktforschung, Quantitative Forschung, online im Internet: https://www.qualtrics.com/de/erlebnismanagement/marktforschung/quantitative-forschung/ ,02.03.2020.

Die Aufgaben müssen einen deutlich, definierten Anfang und ein noch deutlicheres, definiertes Ende aufweisen. Aus diesem Grund ist es so förderlich in kurzen Zeiteinheiten - noch kurz vor dem Meeting den Bericht fertig zu bekommen - um anschließend besonders gut effektiv arbeiten zu können.

Mit TO-DO Listen effektiver arbeiten
Das innere Belohnungssystem und die persönliche Motivation für nachfolgende Herausforderungen, Aufgaben oder Probleme werden durch abgehackte Tätigkeiten aktiviert. Dies ist auf dem ersten Hinblick etwas unbedeutend, jedoch das Gehirn sehnt sich nach solchen „kleinen" Belohnungen.
Von Vorteil wäre, wenn der erste Punkt der Abarbeitungsliste der wichtigste, schwierigste oder zeitaufwendigste Punkt ist. Da diese Aufgabe dann als erstes abgearbeitet werden würde, schöpft man gleich jede Menge Motivation für die weiteren Punkte der Liste.

Mit sich selbst kommunizieren (Selbstgespräche)
Um nicht in Gefahr zu laufen, die Konzentration zu verlieren oder die Gedanken vom Thema abschweifen zu lassen, wäre es wichtig ab und zu Selbstgespräche oder Kritzeleien zu machen – dies ermöglicht Ablenkungen auszublenden und die Gedanken bei der gerade durchzuführenden Tätigkeit zu behalten.

Regelmäßige Pausen
Trotz allem ist die Kapazität des menschlichen Gehirnes begrenzt und ermüdet daher. Den Fokus auf eine Aufgabe länger als 45 Minuten vollständig zu leisten ist für die meisten Menschen nahezu unmöglich. Sofern regelmäßige Pausen eingehalten werden, kann die Leistungsfähigkeit des Gehirns enorm steigen und Sie so deutlich effektiver arbeiten.

Aufmerksamkeit – Nähe zu anderen suchen
Die sogenannte Aufmerksamkeit ist davon abhängig, wie nah neuronale Reize sind. Daher ist es in problemloseren Kommunikationsumgebungen viel einfacher neue Ideen entstehen zu lassen. In diesen Umgebungen kann auch jederzeit direkter Augenkontakt gehalten werden und die erforderlichen Informationen direkt und einfacher geteilt werden.

Richtig atmen
Gehirne von Menschen, die regelmäßig meditieren, weißen eine überdurchschnittliche Gamma-Aktivität auf, was auf starke Fokussierung und Konzentration hindeutet. Das regelmäßige, tiefe durchatmen trägt einen großen Beitrag zu innerer Ruhe bei.

Bewegung
Eine weitere Form der Konzentrationsminderung ist statisches Sitzen. Der Grund hierzu ist, dass der eigene Körper bei Bewegung verstärkt das Protein „BDNF" (Brain-derived Neurotrophic Factor) produziert, welches die Lernfähigkeit sowie das Gedächtnis und das Denkvermögen um vielfaches fördert. Dadurch sind immer mehr Arbeitgeber bemüht, Schreibtische anzubieten, welche in der Höhe verstellbar sind. So kann durchaus hin und wieder auch im Stehen gearbeitet werden. Im Verhältnis zu höher Effektivität der Mitarbeiter sind die Kosten solcher Tische mehr als gerechtfertigt.

Vermeidung von mehreren Dingen zu gleich (Multitasking)
Mehrere Aufgaben zu gleich zu absolvieren ist für das Gehirn eine Aufgabe, welche nicht bewältigt werden kann. Ein sogenanntes „REALES" Multitasking gibt es demnach nicht - stattdessen muss die Aufmerksamkeit zwischen diversen Tätigkeiten immer wieder hin- und hersprin-

gen. Dies ist am Ende mit höherem Zeitaufwand verbunden, sehr stark fehleranfällig und die Priorisierung der einzelnen Tätigkeiten leidet sehr stark darunter. Wenn man also effektiver arbeiten will, sollte stets nur eine Aufgabe im Focus sein. Ist diese zu Gänze erledigt, sollte die nächste begonnen werden.

Genügend Ruhephasen (Ausreichend schlafen)
Ausreichend Schlaf ist für Konzentration und Aufmerksamkeit von großer Bedeutung. Fehlender Schlaf führt außerdem sehr oft dazu, dass die Lernfähigkeit abnimmt und Stimmungsschwankungen auftreten. Um einen effektiven Arbeitstag zu beginnen, ist es sehr wichtig, ausreichend Schlaf gehabt zu haben. Dies ist besonders wichtig, wenn außergewöhnliche und hartnäckige Besprechungen oder Aufgaben auf der TO-DO Liste stehen.

2 Resümee

Die im Rahmen dieser Veröffentlichung durchgeführten Informationsansammlungen konnte die praktische Analyse dargestellt werden.
Kurzerhand wurde die erforderliche Theorie zum Thema praktische Analyse und desen Aufbau erläutert. Ebenso wurden quantitative Mehtoden in Zusammenhang mit der Forschung dargestellt.
Abschließend ist zu sagen, dass jede einzelne Möglichkeit zur Steigerung der Leistungsfähigkeit des Gehirnes beiträgt.

3 Schlusswort

Aus dieser Veröffentlichung wird der Entschluss gezogen, dass es notwendig ist, zuerst Situationen zu beobachten und die Rahmenbedigungen zu dokumentieren, bevor weitere Schritte vorgenommen werden. Um die Leistung jedes Einzelnen am Arbeitsplatz zu erhöhen ist es erforderlich, sich die Rahmenbedingungen sowie die einzelnen Möglichkeiten zur Leistunstungsteigherung anzusehen und umzusezten.

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IS IMPLEMENTATION OF BUSINESS-TO-BUSINESS INTEGRATION AND DATA EXCHANGE SYSTEMS A GOOD MEASURE FOR LOGISTIC FIRMS IN COVID ECONOMIC RECESSION?

Libor ŠIMEK, Václav CEMPÍREK

ABSTRACT

The paper examines the significance of business-to-business integration in the context of data exchange systems in the time of intensified competitive environment. It is ascertained whether these systems can bring about a certain advantage for logistic firms, especially in the current COVID economic recession, whose impact is very manifest especially in the field of logistic activities. Various methods of B2B and data exchange systems implementation are also discussed and their benefits for logistic enterprises are pointed out. In order to identify the importance of B2B, the study also discusses whether macroeconomic instability (economic crisis) leads to a higher B2B implementation. It is concluded that B2B and data exchange systems can represent a very powerful tool for gaining and preserving a competitive position, which is very topical issue in the present coronavirus-afflicted world.

KEYWORDS

logistics, business-to-business integration, systems for data exchange, COVID, economic recession

INTRODUCTION

The market economy, even as a result of the globalization of business practices, places a stress on the timely and cost-effective fulfillment of consumer demands, and therefore – as pointed out (Eagle et al. 2014) – on the timely execution of orders made. This aim is primarily accomplished by the use of electronic business, also known as e-Business, as described. However, it is also emphasized (Zhu et al. 2004) that in order for this to be properly implemented and operated, well-conceived and reliable data sharing mechanisms must be in operation. This is because meeting customer needs necessitates intense knowledge flows (Yoon & Occeña 2015), which are realized between firms, the end customer or client, and public administration. The introduction of a data exchange scheme, followed by B2B integration, can be a very effective tool for increasing the productivity of market subjects, especially those engaged in logistic activities (Habibi et al. 2015). This is supported by the fact that this entrepreneurial area is inextricably linked with the transportation of people and products, which is at the heart of logistics. As a result of this, logistics is undeniably one of the areas that has been most heavily impacted by anti-COVID interventions, which had to be introduced internationally in order to deter or at least slow the transmission of the disease, thus building barriers to free trade (Gourinchas 2020). As a result, they are simply logistic firms that are under pressure to increase their market competition, for which B2B implementation can be the most effective tool. It has the critical power to determine their economic sustainability in the "hard" times of a general economic downturn, or in the 2020 COVID economic recession (Baldwin & Tomiura 2020).

1 AIM OF STUDY

The article examines the state of affairs and expertise and aims to provide congested information that will enable the researchers to gain an all-around and in-depth perception of

state-of-the-art awareness relevant to e-Business implementation (Kanji 2002). Furthermore, the study can be a helpful source of knowledge for business managers in developing their B2B strategy in conjunction with their company's strategic objectives with the aim of increasing its competitiveness, especially those involved in logistics and in challenging economic times of the coronavirus global downturn.

2 B2B AND DATA EXCHANGE SYSTEM IMPLEMENTATION

The operational mechanism that leads to the decision of whether or not a logistic corporation can adopt B2B incorporation entails switching to an entirely new platform of contact with its business partners (Huang & Hsu 2010), changing its job schedules, and changing the definition of employee obligations (Pagani & Pardo 2017). This judgment can represent an opportunity for the organization to achieve a positive reputation (Horst 2014). It is a business move that is solely the responsibility of the board, i.e. the top level (Terazi & Senel 2011). The introduction of B2B integration is one of the responses to the increasingly evolving global economic conditions, with a particular focus on anti-COVID interventions and their effect on logistics (Bénassy-Quéré et al. 2020). It is reasonable to assume that the number of logistic companies that have already implemented (or are seriously considering) B2B integration will continue growing, as this will provide them with a competitive advantage.

3 ADVANTAGES OF B2B FOR LOGISTIC FIRMS

A logistic business is given the potential to achieve a wide variety of economic benefits, including the chance to enter new markets (whether regional or product) (Eagle et al. 2014), develop new - and improve current - consumer partnerships (Curwen & Else 2006). In addition, the company will broaden its range of products and services sold, reduce its sales prices, and achieve greater overall utilization (allocation) of available capital (Amit & Zott 2001). The most important advantages of e-Procurement, which has a leading role in B2B, include reliable optimization of internal business processes, reduced error risk, the establishment and consolidation of strategic alliances, and significant cost savings for the organization (Porter 1997). The demand to reduce running costs drives many businesses to form integrated and organized chains in which a Supply Chain Management mechanism is applied and actively used. All of the advantages are clearly seen, especially in the case of logistic firms, where achieving optimum economic effectiveness is critical in a period of increased competitiveness due to the existence of logistics (Badrinath & Wignaraja 2004).

4 INFLUENCE OF MACROECONOMIC INSTABILITY

From the above it ensues that the implementation of B2B and data exchange systems should be on the increase in time of macroeconomic instability, be that an economic crisis or only a recession. This supposition is confirmed by the research of the authors (Šimek & Cempírek 2021)., which examines the impact of the past 2008-2009 global economic crisis on the extent in which the logistic firms residing on the Czech territory had these systems implemented. The research article states that it is based on an analysis of the situation in B2B implementation during the period of the 2008-2009 economic crisis, where – on a sample of 229 logistic companies based in the Czech Republic – it ascertains whether the extent of B2B implementation changed over this period. This is done in a short-time (2006 vs. 2010) as well as long-time (extended with 2014 vs. 2018) horizon (Šimek & Cempírek 2021). Although some conclusions are in contradiction with other authors, they state a high extent of B2B implementation, which even further increased over the above economic crisis

and even continued in a longer time horizon following the crisis. Based on the information received from the respondents, the data was obtained as presented in Fig. 1.

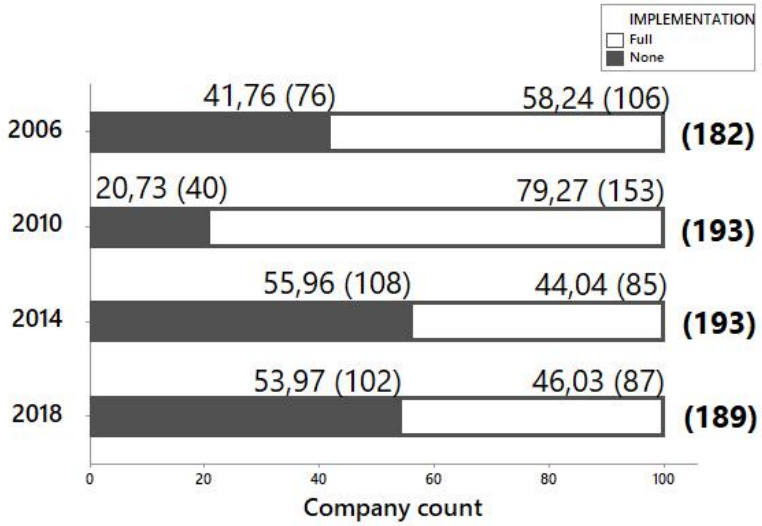

***Figure 1**: B2B implementation – data obtained from respondents. Source:* Šimek & Cempírek (2021)
Count: % of the respondents in year (absolute count is given in parentheses)

We conclude that there is difference in B2B implementation when comparing the year shortly preceding (2006) and following (2010) the 2008-2009 economic crisis.

The authors (Šimek & Cempírek 2021) also performed a stratification analysis. The company sample was stratified into 6 (disjunctive) categories (strata) according to the criterion of employee count. Thus the individual implementation proportions of B2B implementation for each stratum (size category of company) were obtained (Fig. 2).

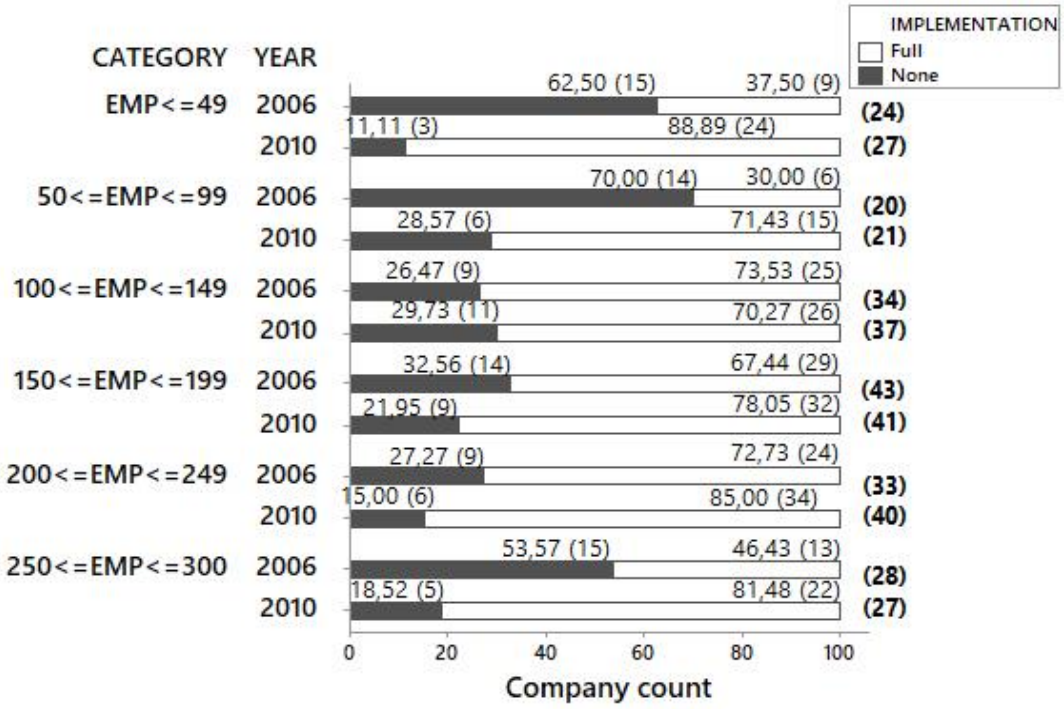

***Figure 2**: B2B implementation – stratification (2006 vs. 2010). Source:* Šimek & Cempírek (2021)
Count: % of the respondents in year (absolute count is given in parentheses)

The highest – respectively lowest – odds for the year 2010 were ascertained in the stratum of EMP<=49 (O = 8.0000) – respectively 100<=EMP<=149 (O = 2.3636) (Fig. 3) (Šimek & Cempírek 2021). Thus the highest – respectively lowest – proportion in 2010 was detected just in the above given size categories, which is also obvious in Fig. 2. We conclude that in 2010 B2B implementation was highest – respectively lowest – just in case of the companies with the above specified employee counts.

The odds ratio was calculated for each individual company size category (stratum) (Fig. 3) (Šimek & Cempírek 2021), according to the formula $\psi_{CAT} = \frac{O_{2010}}{O_{2006}}$ and the auxiliary hypothesis was formulated: H_0: "The odds ratio within the given stratum is equal to 1" ($\psi_{CAT} = 1$, where ψ_{CAT} stands for the odds within the given company size category), which is analogous to the hypothesis: H0: "The categorical variable 'year' and the categorical variable 'B2B implementation' are independent within the respective company size category". This hypothesis was rejected only within the 3 categories as follows: EMP<=49; 50<=EMP<=99 and 250<=EMP<=300 (Fig. 3). We can conclude that the year-on-year (2006 vs. 2010) difference in B2B implementation, which was statistically proved in the basic test above (Šimek & Cempírek 2021), was also confirmed (separately) only within the above 3 categories of the company size (stratum).

The highest (and statistically significant as stated above) – respectively lowest – odds ratio were obtained in the stratum of EMP<=49 (ψ_{CAT} = 13.3333) – respectively 100<=EMP<=149 (ψ_{CAT} = 0.8509). We conclude that the greatest – respectively smallest – difference in B2B implementation (Šimek & Cempírek 2021) was ascertained just in case of the companies with the above specified employee counts.

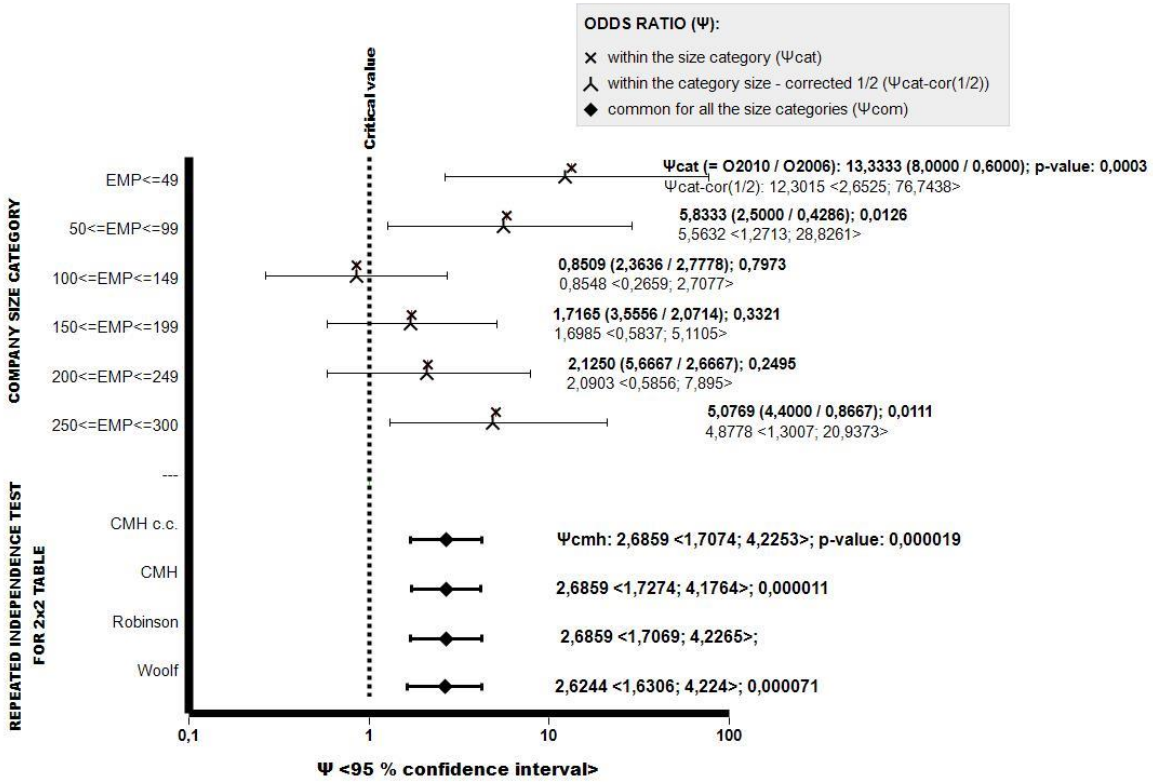

***Figure 3**: B2B implementation – stratification – post-hoc testing (2006 vs. 2010). Source:* Šimek & Cempírek (2021)

The authors conclude that the difference in B2B implementation proved as stated above was not limited to a period close to the 2008-2009 economic crisis, but extends even to a longer period of the years 2014 and 2018 following the 2008-2009 crisis (Šimek & Cempírek 2021). This proves the supposition that the intensified competitive environment caused by macroeconomic instability leads to a higher implementation of B2B. If we – per analogy – transfer this conclusion to the present time of the current COVID recession, we come to a conclusion that B2B represents an efficient "tool" for increasing and keeping competitiveness for logistic firms.

5 EXTERNAL AND INTERNAL B2B ANALYSIS

The logistic company's management must determine whether the net profits of the merger outweigh its total costs (Samal 2019) as part of its decision-making phase on B2B integration. While time is to be seen as a form of expenditure, the integration's cash flow must also be considered. The business management may then devise a particular marketing mix based on these evaluations, enabling the company to adapt its offer to the demand of its prospective consumers (Vijay 2000) and create a subsequent marketing plan (Lilien 2016).

When choosing to incorporate B2B integration, a logistic business must understand the impact associated with this phase, namely fairly high financial costs, especially at the start of the project. There is also a security risk associated with electronic data sharing with foreign bodies, as well as the risk of data exchange incompatibility, lack of agreement between the parties to the intended integration about its terms, and, last but not least, the very ambiguous regulatory precedent that governs B2B integration. As with prospects, it is important to assess not only the ability of (potential) partners, but also that of (potential) rivals of the group and their strategic priorities (Corey & Wilson 2009) – this applies to rivalry in all forms, which is particularly extreme in this period of coronavirus economic contraction, particularly in the field of logistic activities.

CONCLUSION

Market players may use e-business and data sharing platforms to improve their strategic position in a number of ways. The far more critical of these are the ability to expand the number of possible clients, the ability to reach new, even fiercely competitive, markets or product categories, and the ability to develop new and/or sustain established commercial relationships with company partners, whether they are customers or vendors. B2B has been a very important and even fundamental part of current market systems, with a wide variety of economically viable applications, according to the sources consulted in this report. According to the inevitability of this entrepreneurship, we also infer that B2B deployment is a fantastic and long-horizon viewpoint, particularly for companies actively engaged in logistics (logistic companies). This really is particularly relevant during times of macroeconomic uncertainty and turmoil, whether a depression or a long-term economic downturn, when maintaining and/or developing a strong competitive position is critical for any business enterprise with an impact on its economic "sustainability." This is confirmed the research carried out by the authors, which ascertained that macroeconomic instability is increasing the number of logistic companies with B2B implemented. This proves that B2B incorporation is a very useful and efficient way for logistic firms to gain an advantage over their rivals and it has the potential to improve the company image in the "eyes" of its current or potential corporate clients.

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FAIR BALANCE BETWEEN DATA PROTECTION AND INNOVATION: SMART CITIES

Polina YEMELIANOVA, Khrystyna HLADUN

ABSTRACT

While most countries are currently facing accelerated urbanization and rapid population growth, new technologies are being developed in order to strengthen control and relieve the daily life of fast-growing communities. A well-known concept of 'Smart City' is a result of recent IoT development which has created a unique network integrating people and technologies via the Internet.

In order for IoT to successfully improve people's lives, it needs to process private data, which may raise a general concern among citizens of smart cities. In particular, the paper provides examples of smart mobility cases. The law should be able to protect people's privacy and at the same time assist technological development. The reason behind such a critical need for protection is the negative impact of advanced technologies on primary human rights. The examples of such controversial effects will be shortly outlined further.

This paper is aimed to seek a fair balance between data protection and innovation. By overviewing some data protection mechanisms, a question of law development in technologically advanced countries will be raised. The idea of two mutually exclusive approaches – individual-centred and public-focused – is outlined, although the chance to find a rational balance is not left out of the equation.

KEYWORDS

Data Protection, Smart Cities, Law Regulations, Urban Mobility, IoT

INTRODUCTION

While almost 8 billion people live on Earth today, nearly 9.8 billion expected to inhabit our planet by 2050 with 68% of those living in urban areas (UN, 2019). Therefore, urbanization, defined by the United Nations as a process of society's and its members' lifestyle shift from rural towards urban one, has been one of the primary considerations of the recent decade. As far as cities are some kind of ecosystems, which include numerous structures and even more substructures, they have to be managed accordingly. Modern cities, especially in developing countries, being challenged by the fast-growing population concentration and unavailability of resources to invest in the public sector, are in need of better, optimal solutions. Moreover, these solutions have to seek for the benefit of governmental processes as well as society good.

At the same time, while living on the edge of new technologies, current-generation Z does no longer express delight around such words as 'innovation', 'smart', 'big data' etc. Internet of Things is becoming more and more powerful striving to relieve people's everyday life, although, at the same time, penetrating the most vulnerable areas of their lives – private data. It is perhaps worth outlining the definition of the well-known 'Internet of Things' thing. Broadly speaking, IoT can be defined as a network of everyday objects equipped with smart intelligence (Xia, Yang, Wang, & Vinel, 2012). By integrating every object via embedded systems, IoT may increase the ubiquity of the Internet (Xia, Yang, Wang, & Vinel, 2012) as well as put people's private life under threat.

Given that humanity has managed to reach a level of technological progress, when the question of novelty is not a priority anymore, but it is about how we efficiently use

technologies. According to previous researches, the concept of ‘smart cities’ necessarily linked to extensive usage of Internet of Things technology in the urban management system.

Understanding that smart cities can actually end up sharing personal data with other organizations (Pearson, 2018), makes a reasonable question appear inside every head: ‘Maybe technologies yet are not smart enough to be safe for everyone or is that law that needs in-depth development?’

An interesting phenomenon we face these times: it occurs that law evolves much more slowly than the IoT (Bayo, 2016). Therefore, a strong need for balance has arisen. It is important to understand that the law does not strive to harm technological progress, but it does aim to protect humanity.

Therefore, this paper will raise the question of a fair balance between data protection and innovation. Firstly, a short overview of why data is so important for smart cities will be presented. Secondly, some examples of smart cities implementations will be critically described. Then, data protection mechanisms will be shortly discussed, and possible guidelines for overcoming the current gaps will be provided.

1 SMART CITY. DEFINITION, PARADIGM AND ROLES

A definition for the ‘smart city’ can sound like “A city can be defined as ‘smart’ when investments in human and social capital and modern transport and communication infrastructure fuel sustainable economic growth and a high quality of life, with a wise management of natural resources, through participatory governance” (T. Nam, 2011). In other words, although the definition of ‘smart’ may vary from scholar to scholar, it can be assumed that smart city is a key to efficiency increase in every aspect of public and private service delivery for the befit of citizens, as Europe 2020 is the EU’s strategy for boosting growth and jobs across the region to create a smart, sustainable and inclusive economy (EU, 2010).

The main objectives of smart cities worldwide are:

- transformation of the energy consumption patterns and an overall environment purification through emissions reduce approach by means of multimodal mobility opportunities;
- public safety ensured by data application to real-time crime mapping development (for instance, HunchLab app created as a New York solution for preservation for a crime);
- transportation system quality and endurance, which could both improve the process of commuting and accessibility of means of transportation for all audience.

Another long-term goal of SCM is to address poverty to a certain level, operationalize waste management by applying novel technologies (e. g. inhabitants of one of the districts in a South Korean city take advantage of trash stations next to their houses that are supported by sensors, which automatically send garbage to the recycling centre when the required amount of trash disposed of is being collected). In addition, city lightning can also be leveraged by smart solutions, when street lights can play the role of wireless internet hotspots, security cameras and, interestingly, sensors for air quality assessment. A first-ever case of such a technological street in one of the post-soviet developing countries, Ukraine, provided pedestrians with lightning, the brightness of which depends on the people movement intensity. Such an approach can both save energy and provide safety to public (Air quality monitoring station, free Wi-Fi and "smart" lightning: a first smart street in Kyiv, 2019).

Along with a definition, there was developed a paradigm to put the light on the dimensions of smart cities concept. One article (Jung Hoon Lee, 2013) differs four components of such a city: digital city, intelligent city, ubiquitous city, information city. The first one, which implies the process of gathering and processing governmental, public and private data through telecommunication, ICTs and innovation, is particularly interesting for the current paper.

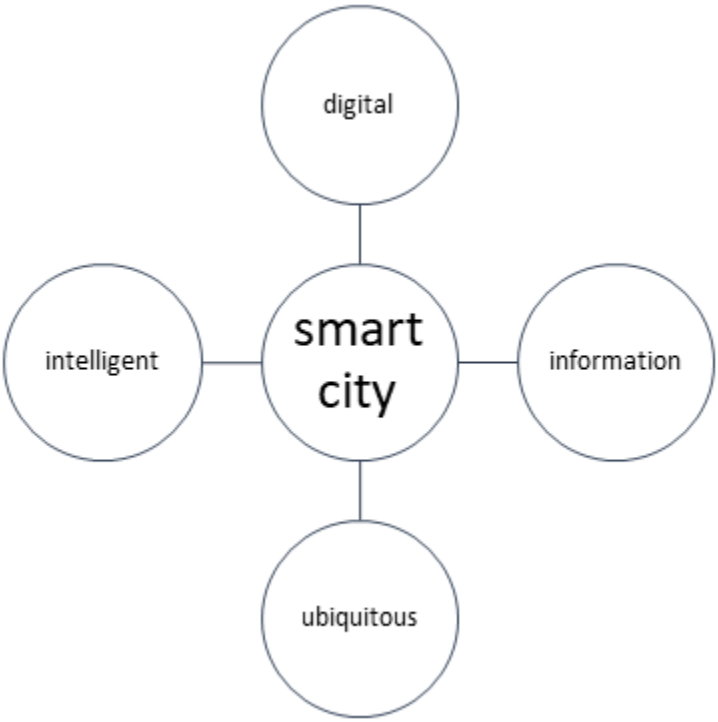

Figure 1 *Components of a smart city (Jung Hoon Lee, 2013)*

Smart mobility or transport system within a smart city concept is chosen by authors because, as transportation itself, it presents a considerable challenge in post-soviet and most developing countries and requires better management. The question of transportation, moreover, is not only deeply connected with natural energy overuse and ecological concerns, but also the money and time resources spent from the end-users side. In turn, 'smart' transportation is claimed to increase accessibility and personalization for passengers, while service providers can leverage data to mitigate the risks (Personal data in transport: exploring a framework for the future, 2018).

2 SMART MOBILITY

Previous literature analysis (Lyons, 2016) proposes a definition for smart mobility as a «connectivity in towns that is affordable, effective, attractive and sustainable». This connectivity is enabled by data, which is being constantly transferred by stakeholders in real-time, which assumes that this data can be used by governmental and private representatives in order to perform responsive management (F. Pinna, 2017).

Despite the ambiguity of the concept, the main idea of smart mobility system emphasizes the next processes: making benefit of technology to generate, share and collect information and knowledge, which can influence the decision-making process (e.g. vehicles, infrastructure and services quality enhancement; improvements for all stakeholders: passengers/users, transport system service providers, manufacturers, etc.). In other words, it is mostly focused on tracking real-time traffic, parking, delivery sharing service information (Seng Yue Wong, 2017). This kind of data (collected automatically), unlike manual surveys ('traditional' way of data collection), can be used for simultaneous analysis of changes in the public transport ecosystem; furthermore, it can be combined with natural conditions, which makes it useful in transport planning decision-making (Khatun E Zannat, 2019).

In this particular context, the huge amount of data, which is being transferred daily, is referred to as Big Data. Big Data can be also defined through the 5V model: volume (a large amount of information from numerous sources), velocity (refers to the speed of data transfers), veracity (the correctness and accuracy of information), variety (refers to the different types of data collected), value (the process of extracting valuable information). Investigation of the given attributes can reveal the near-to-real behaviour of users (C Chen, 2016) based on which the tactical, operational and strategical step can be proposed.

According to the semantic literature research, conducted by (Khatun E Zannat, 2019), all information coming from various resources can be divided into three categories:

a. smart card data (cards, that are required to be tapped in after the entrance into a mean of transportation – normally a bus, a subway, a train etc., so that information on time, station, location, the frequency can be identified and saved; examples of such cards are Kyiv Smart Card, Krakowska Karta Mieska, TCL);
b. mobile phone generated data (two main types of mobile data are differentiated – sensor-based data and cellular one. The last type of data is provided via telecommunication providers) (Z Wang, 2018);
c. GPS and AVL where the last one stands for 'automatic vehicle location' (this kind of data enable understanding of time, location, service status of transport modes as well latitude and longitude of geo-location).

Open Data Institute indicates that journey data can indeed go beyond the numbers and reveal the identity of the person behind the device/car/smart card/anything else (Personal data in transport: exploring a framework for the future, 2018). Collected data can tell where we usually go to drink the first cup of coffee every morning, where and with whom we commute every day. As far as it gives us a general understanding of a user, it is viewed as personal data.

While the smart approach represents a novel and a forward-looking (at first glance) way of urban processes organization, the reality is different from the existing conception: real-world cities either lack the financial capability to initiate digital and intelligent solutions for the development of an integrated transportation system or face potential risks regarding data privacy, which will be discussed in the next chapter.

2.1 Fuel for smart technologies

Same as a car does not make any sense (and comfort) without fuel, smart technologies are useless without big data. It is, however, important to understand that the data itself does not make the city smart, but provides the city's intelligence (Geffray & Auby, 2017).

Although the goals of smart cities are intended to drive economic growth and improve the quality of life, there still are some areas of concern: ownership, processing, use and security of data (Pearson, 2018). Indubitably, as cities develop they will gather more and more personal information in the name of making a city smarter which can make people defenceless against improper use of their private data.

3 SMART CITIES: A PROTECTION OR A THREAT TO HUMANITY?

It is believed that smart technologies aim to ease and improve the lives of the city's inhabitants; however, the reality may appear to be different. To get a critical approach to whether a fair balance between data protection and innovation is needed, it would be reasonable to look at good and bad examples of smart cities applications:

- Los Angeles. The LED Streetlight Replacement Program has generated savings in energy and maintenance costs: energy use has been reduced by 63.1 per cent and

carbon emissions have been reduced by 47,583 metric tons a year (Bureau of Street Lighting, 2020). It is a shining example of how green technology can be also smart;

- Singapore. A smart response to COVID-19 – Spot – a semi-autonomous robot dog can be occasionally spotted in a local Singapore's park. It was developed to minimize physical contact. Remotely controlled, Spot uses cameras and locally developed video analytics to estimate the number of people in the park and a sound system to broadcast messages (Gill, 2020);
- Hangzhou. Thanks to City Brain (Alibaba's project) traffic jams were reduced by 15 per cent in the first year in use (Beall, 2018). It does not only monitor traffic, retrieve data from the transportation bureau, public transportation systems, a mapping app and hundreds of thousands of cameras, but also detects road accidents and tracks illegal parking live (Beall, 2018);
- Belgrade. Thousands of surveillance cameras covering more than 800 locations in the city and enabling face recognition will make every resident's move known to the government (N1 Belgrade, 2019). While government officials state it is for the citizens' safety, experts have another opinion. For the video surveillance looks more like a new way to control than a new way to increase safety (N1 Belgrade, 2019);
- Xinjiang region. According to New York Times, China is stepping into a 'new era of automated racism': an advanced facial recognition technology is used by authorities to track and control the Uighurs, a largely Muslim minority, which is the first known example of a 'government intentionally using artificial intelligence for racial profiling' (Mozur, 2019). Smart technology tracks exclusively Uighurs based on their appearance and keeps records of their movements for future search and review (Mozur, 2019). Thus, faces of all Uighurs who leave Xinjiang are stored in one national database (Mozur, 2019).

Are there any examples of decisions made in favour of privacy than smart technologies? For instance, Toronto has abandoned the smart city project because it lacked transparency (Cecco, 2020). Another big city, San Francisco, has recently banned facial recognition as it 'is incompatible with a healthy democracy and that residents deserve a voice in decisions about high-tech surveillance' (Doffman, 2019).

It is a well-known fact that smart technologies are currently being adopted in many cities worldwide bringing tremendous benefits to people, the economy and ecology. Based on the analyzed above examples, a reasonable conclusion can be made that such state-of-the-art technologies can pose a threat to democracy by transforming from security software to ethnic profiling software in the hands of authoritarian governments. Therefore, there is a need for updated data protection regulations that can provide a fair balance as well as ensure the right to privacy in such a 'smart environment'.

4 DATA PROTECTION MECHANISMS AROUND THE WORLD

Some countries have tried to reach a fair balance by providing various legislations to regulate data flow. It is, perhaps, worth providing the most outstanding examples of how big data is protected worldwide:

- International. Drafted almost 20 years ago, Budapest Convection on Cybercrime is the first international treaty addressing cybercrime and binding all countries who sign it to make their domestic legislations more advanced in the question of cybersecurity (Convention on Cybercrime, 2001). Generally, the Convection states that at the national level 'Each Party shall adopt, in respect of traffic data […] such legislative and other measures as may be necessary to: ensure that such expeditious preservation of traffic data is available regardless of whether one or more service providers were involved in the transmission of that communication […]' (Convention on Cybercrime, 2001).

The given below map represents the counties that signed the Convention – they are coloured in green. The ones in red colour did not sign it.

Figure 2 *77% of all countries did not sign the Budapest Convention on Cybercrime. Own source.*

- EU. When it comes to EU law, the right to privacy was firstly mentioned in art 8 of the European Convention of Human Rights: 'Everyone has the right to respect for his private and family life, his home and his correspondence' (ECHR, 1950). Perhaps, the most significant and relevant legislation on the discussed topic is General Data Protection Regulation (GDPR). In art 7 much attention is given to consent, however, it should be remembered, that consent is not the only legal ground for data processing, nor does it have any special priority (Edwards, 2015). Moreover, if consent is impossible or expendable to obtain in EU Data Protection terms, data controllers may easily choose to avoid it entirely (Edwards, 2015).

An interesting case may be Google Spain v AEPD and Mario Costeja González (2014) which raised a question of a so-called right to be forgotten which was thereafter included in art 17 of GDPR. Thus, every person has a right to obtain immediate erasure of personal data if certain circumstances apply such as, for example:

- the data are no longer needed for the purposes they were collected;
- the data subject withdraws consent;
- the data subject objects to the data processing (however, there must be no legally overriding reasons for the processing);
- the personal data have been illegally processed (GDPR, 2018).

Generally, there are many other ways how smart cities can secure private information: anonymizing data, minimizing unnecessary data collection and deleting data as soon as possible (ACLU, 2017). First and foremost, what is important to understand is that smart applications such as facial-recognition programs are not created by governments nor police agencies neither – they are developed and sold by private companies, who use private law regulations to protect their interests (Joh, 2019). In fact, companies tend to hide information about their products by referring to intellectual property concerns (Joh, 2019). Thus, many people may not even know for sure whether they are surveilled or not.

The Budapest Convection states that 'each Party shall take the measures necessary to ensure that a legal person can be held liable […] (for a) criminal offence established in accordance with this Convention for the benefit of that legal person […]' (Convention on Cybercrime, 2001). However, in fact, some technologically advanced countries, such as the Russian Federation and the Peoples' Republic of China, have not signed the Convention (Losavio, Chow, Koltay, & James, 2018). Consequently, a conclusion can be made that data protection mechanism greatly varies from country to country. When in developed countries, where democracy is flourishing, the level of personal data safety depends on the level of

technological advancement, in other countries (mostly with autocratic past) this level usually depends on governmental decisions, not the public's needs.

5 DISCUSSION

Analysis of the existing cases and previous theoretical research propose several matters to be taken into consideration. First of all, there is a rising presence of smart (mobility) solutions for cities and regions and these solutions are aimed at both helping and controlling (or helping to control?). While smart solutions, created to "help" citizens by reducing traffic jams (case of Alibaba, see Chapter 3), others are focused more on answering the "how-to-control-society" questions. It can be seen from the attempts to introduce the facial detection mechanisms incorporated into the systems of public transportation. Some might claim that it can be perceived as an effort to ensure higher security service. Still, considering the speed gap between law establishment and technological progress, it is worth mentioning the possibility of hypothetical risks posed to personal data.

Secondly, personal data becomes a particularly questionable issue due to the absence of a unified and updated data protection regulation standard in the first place: the vast majority of countries (77%) has not signed the Convention on Cybercrime, what makes it vague and complicated to investigate (online) data protection violation in those regions (in case there are such investigations at all). Such conditions are advantageous for all sorts of authority misuse in terms of data access and its usage.

In addition, the system of market economics and capitalism, in general, is another aspect to keep in mind. As far as the technologies created to collect data are mostly developed by private agencies, they do not necessarily comply with the norms of striving for the "common good", meaning that they have motives and tools to uphold their private interests. Moreover, these technological smart applications are often operated by private companies as well, which empowers them [companies] to exploit public and personal data in unknown ways, which will never be uncovered due to intellectual property protection regulations. It leads to an assumption that the Law can be a double-edged sword in this situation.

When gathering personal information, companies do not usually anonymize it. This can pose a threat to people's private data. Furthermore, it is problematic for the average person to withdraw his or her consent, as it requires a lot of time to find this option. Due to the fine print and ambiguous language, it is also difficult for the average Internet user to read and understand how personal data will be used. These observations make it logical to propose the following ideations regarding the actions to adjust data- and law-related practices which are outlined in the Table 2 below.

***Table 2**: Defined proplems and possible solutions*

Problems	Possible solutions
1. Legal regulations are outdated.	1. Initiate legal upgrade. 2. Educate the public on personal data protection mechanisms. 3. Minimize data collection.
2. 77% of all countries did not sign the Convention on Cybercrime.	
3. Data protection and usage are controlled by private companies' regulations.	4. Set up an initiative to oblige private companies to report about personal data collection and usage.
4. Data is not usually anonymized.	5. Anonymize data.
5. It is difficult to withdraw consent and understand how personal information will be used.	6. Make consent withdrawal easily available accessible; simplify the language.

Source: own research.

CONCLUSION

For people living in the modern world, it is important not only to benefit from smart technologies but also to know that their privacy will not be invaded. Although the fact that the law evolves slowly than technologies causes a misbalance, people are the only ones who can fix it, because, ideally, they must decide how they are going to use technologies.
Naturally, law and smart cities develop for the benefit of humankind. The only difference is that law is focused on individuals, while smart technologies – on the public. Therefore, what people must be ready to, is that once smart city technologies are adopted, it will be nearly impossible to avoid being tracked (Green, 2019). The urban poor and minorities are the most vulnerable to smart city technologies because they must accept being tracked in exchange to free Wi-Fi access (Green, 2019). Such a tendency proves that eventually, data can become a new currency in smart cities. Therefore, this paper indicates the relevant problems and possible solutions that can help to overcome this gap.
Mankind is now at the point of deciding in which times new generations will live: the times of 'data rush' or democratized urban life? Only by engaging people about privacy concerns, giving them a choice to reject surveillance, a democratic smart city can be developed and a fair balance between data protection and innovation can be reached.

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Станція моніторингу повітря, безкоштовний Wi-Fi та «розумне» освітлення: у Києві відкрили першу smart-вулицю || Air quality monitoring station, free Wi-Fi and "smart" lightning: first smart street in Kyiv. (2019, June 20). Retrieved from Kyiv city administration: https://kyivcity.gov.ua/news/stantsiya_monitoringu_povitrya_bezkoshtovniy_Wi-Fi_ta_rozumne_osvitlennya_u_kiyevi_vidkrili_pershu_smart-vulitsyu/#:~:text=20%20%D1%87%D0%B5%D1%80%D0%B2%D0%BD%D1%8F%20%D1%83%20%D0%9A%D0%B8%D1%94%D0%B2%D1%96%20%D0%BF%D1%80%D0%B

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