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CONTENT

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Hispania Motives and their Function in the Chronicle of Gregory of Tours

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Abstract

The study analyses the importance of the Hispania discourse in the Ten Books of Histories (Historia Francorum) by Gregory of Tours on the "Frank state ideology". The Frank chronicler uses the topics of the Visigoth Kingdom and the Iberian Peninsula on three interpretational levels (antique, heretic, and orthodox) and in several contexts – the most important being the dynastical, state, and religious. In all cases, Hispania, or rather the Visigoth Kingdom, plays the role of an "unconquered" foreign area or an area under Frank dominance. The function of such an approach and the creation of tradition is clear: to affirm that the Franks were the chosen ones in God's Plan of Salvation and to affirm their superiority. However, it is important to state that this focus was common among chroniclers in the Middle Ages; the chronicle does not deviate from the characteristics of a "state chronicle."

Key words: Middle Ages, Franks, Visigoths, Arianism, Gregory of Tours, Clovis I, Chilperic I, Alaric I, Reccared I, Liuvigild, Amalarich, Athanagild, Isidore of Seville, Leander of Seville, imperium romanum, Maurikios.

Introduction

The Frankish Empire, which was founded in Gaul based on Ancient Roman heritage, quickly became the dominating force in western Europe. However, it was not the only political force; the Visigoth Kingdom in Hispania was an important neighbour, despite the defeat it suffered. It is therefore interesting and important to investigate how this area was viewed by the Frankish elite, since it was an area with different or even opposing political and religious ideals. Nevertheless, it was imperative to keep in contact with this area for a number of reasons. These reasons are investigated below.

Materials and methods

From this perspective, the Ten Books of Histories by Bishop Gregory[1] of Tours, are amongst the most valuable narrative sources that capture the events in Gaul in the fifth century. They make it possible for us to better understand and discover what strategies medieval rulers chose in certain situations in their environs, and how they dealt with the ethnic, legal, cultural, and ideological conditions of the time. The author himself contributes to the publication's importance the most. He was not only one of the leading diplomats of the Merovingian Frankish state, but also a high-ranking church hierarch that profited from a classical education at the end of Late Antiquity. Although he perceived himself more as Roman than Frank[2], Historia is a publication with clear Frankish tendencies. This dual relationship appears to form the core of a significant problem. Although his contemporary biographer Jean Verdon characterized Historia as a "history of the world", he added that "L'Histoire des Franc is the fundamental source for the Merovingian era." [3] In his opinion, Historia is a state chronicle imbued with the spirit of Merovingian legitimism due to the fact that it incorporates strongly moralizing elements[4]. This, one might say, classical view of Gregory's work, has been behind research undertaken over the last few decades. Wood's and Goffart's analyses focus not on the Frankish dimension, but on the religious and historical dimensions, on the intentions of the Bishop of Tours, as well as on his didactic plan, which dictated his selection of materials and presentation style[5]. Heinzelmann also confirmed this, although his analysis is more in favour of the educational concept[6].

If the extreme positions in this debate are taken out of consideration, then its conclusions can be accepted. However, we have to take into consideration that such an approach to history and its selective usage in didactical discourse is not only a characterization

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[1] Critical edition Gregorius ep. Turonensis, Libri historiarum X, MGH SS rer. Mer.1.1, ed. Bruno Krusch et Wilhelm Levison, Hannover 1956.

[2] Alheydis Plassmann: Origo gentis. Identitäts- und Legitimitätsstiftung in früh- und hochmittelalterlichen Herkunftserzählungen. Berlin: Akademie Verlag 2006 (= Orbis mediaevalis. Vorstellungswelten des Mittelalters, Bd. 7), p. 120.

[3] J. Verdon, p. 77.

[4] Ibid., p. 115 an.

[5] It is important to note that it was Giselle de Nie, Roses in January: discontinuity and coherence in the 'Histories', in: Views Form a Many-Windowed Tower. Studies of Imagination in the Works of Gregory of Tours, Amsterdam: Rodopi 1987 (Studies in classical Antiquity, Bd. 7), p. 27-70, who suggested such reflection trend being possible. Also Walter Goffart, From to Historiae to Historia Francorum and Back Again: Aspect of the Textual History of Gregory of Tours, in: Religion, Culture and Society in the Early Middle Age: Studies in Honor of R.E. Sullivan, eds. Thomas F.X. Noble and John J. Contreni, Kalamazoo: Medieval Institute Publications 1987 (= Studies in Medieval Culture 23), p. 55-76 as well as, The Narrators of Barbarian History (A.D. 550-800). Jordanes, Gregory of Tours, Bede and Paul the Deacon, Princeton: Princeton University Press 1988; Ian Wood, Gregory of Tours, Bangor Gwynedd, UK: Headstart History 1994; Adriaan H.B. Breukelaar, Historiography and Episcopal Authority in Sixth-Century Gaul. The Histories of Gregory of Tours interpreted in their historical context, Göttingen: Vandenhoeck und Ruprecht 1994 (Forschungen zur Kirchen- und Dogmengeschichte, Bd. 57); Kathleen Mitchell, Ian Wood (ed.), The World of Gregory of Tours, Leiden/Boston/Köln: Brill 2002.

[6] Martin Heinzelmann Gregor von Tours (538–594). „Zehn Bücher Geschichte". Historiographie und Gesellschaftskonzept im 6. Jahrhundert, Darmstadt: Wissenschaftliche Buchgesellschaft 1994, primarily p. 32 an.

connected to Gregory. This, for the simple reason that he wrote in a norm typical for the majority of writers at the time. Gregory definitely intended to write "world history" by combining religious and worldly histories into one whole; he saw the Franks as the successors of the Romans with regards to ruling the future, which is why he assigned them the central role. He also understood the educational function of his work, achieving this goal through the easiest method possible, by comparing the Franks to their neighbours. The Visigoth Hispania and its Merovingian kings maintained frequent and diverse contacts, which is why it played such an important role in Gregory's concept.

Results and Discussion

The objective of this paper is therefore not only to define more precisely what the position of the Hispania area was in the various value hierarchies of the Frankish writer, but also to contribute to a more detailed characterization and understanding of the function of his narrative. The primary methodology is text analysis of his work, or rather excerpts in which the Hispania issue is discussed, as well as semantic interpretation of various forms of the Hispania discourse, thereby taking into consideration and creating political and cultural contexts with their potential pro-Frankish functions.

The Visigoth Kingdom was in a complicated and ambiguous situation in the second half, and towards the end of the sixth century. After decades of complications and uncertainty, the reign of King Liuvigild finally brought stability and the unification of the Iberian Peninsula. Unlike the Frankish setting, this significant parallel process was taking place on the basis of an intensifying Romanization of the state. The Romanization was not only reflected in the administrative model of the kingdom, but also in the cultural and political self-identification of Goths[7], who still held onto the principles of the heresy of Arianism. It is only in the final decades, and after the ascension of Reccared to the throne, that the sought after turn in church policy finally took place[8]. Gregory, who was a Gaul-Roman, could on the one hand, admire the Hispania Kingdom, but on the other, could not have tolerated a heretic king.

Gregory writes in his work about the Iberian Peninsula on three interpretational levels. The shortest is ancient Hispania. Gregory naturally perceives it to be a part of the empire, as one of the provinces[9], which became the homeland of the barbaric Vandals and Suebis. Gregory presents both tribes as wild hordes who, during the rule of King Gunderich, plundered Gaul[10] and then moved onto Hispania in order to destroy it further with their

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[7] An older study is interesting: Dietrich Claude, Gentile und territoriale Staatsideen im Westgotenreich, in: Frühmittelalterliche Studien 6 (1972), p. 1an., newer than Alexander Pierre Bronisch, Die westgotische Reichsideologie und ihre Weiterentwicklung im Reich von Asturien, in: Das frühmittelalterliche Königtum, hg. Franz-Reiner Erkens, Berlin: de Gruyter 2005, p. 161 an.

[8] In detail described in: Roger Collins, Visigothic Spain 409-711. Oxford 2004: Blackwell, p. 38 an. From the Spanish point of view: Historia de España, ed. Manuel Torres López et al., Tomo 3, España visigoda : -414 711 de J.C, Madrid: Espasa-Calpe 1963, p. 322 an., further E. A. Thompson, Los godos en España, Madrid: Alianza Editorial 2011, p. 43 an.

[9] Gregorius ep. Turonensis, I.46, p 30 or II.9, p. 56.

[10] Časově lze zařadit někam na počátek rodu 407 viz Helmut Castritius, Die Vandalen. Etappen einer Spurensuche. Stuttgart: Kohlhammer 2007, s. 49 an.

rivalry. However, the matter of faith is much more significant. The Bishop of Tours primarily points to the Arianism of the Vandals, stating that "a Virgin devoted to God, who was honoured by all the people because she came from a well-known and respected Roman family" fell victim to Arianism. King Thrasimund tried to make her give up her one true faith by all means possible – including violence – but she chose the death of a martyr[11]. As a result, Hispania fell into second place: a country robbed of its one true Christian faith, an area that due to this fact was located outside the validated civilization and church culture recognized by Gregory.

This image came to full fruition with the introduction of the Visigoths. King Euric, who ruled Toulouse and seized part of Hispania, attacked entire Gaul to "annihilate all places that did not agree with his perverted faith, to cast clerics into prison, and to send bishops into exile or execute them.[12]" Even Gregory does not hide the fact that his description was inspired by the famous letter written by Sidonius Apollinaris to Bishop Basil[13], which means that the description is more of a recited story than authentic information. However, it is important to point out that to the Frankish-Roman elite, Goth Hispania represented an area from which danger could originate not only on the basis of faith, but also from the relationship between church authorities and worldly powers. This is supported by the story of Bishop Perpetuus of Tours, who was dragged off to Hispania as a hostage[14].

It is therefore indisputable – historical research has repeatedly confirmed this[15] – that the focus of the efforts of the elite in the Gaul church to convert the Frankish king Clovis I to the one true faith, marked a fundamental shift in the political and religious conditions of the Germanic West. The tradition captured in Gregory's chronicle also supports this statement. Although the reality differed from how it was described[16], the Bishop of Tours adamantly depicted the order of the conversion as "logical": the christening of the

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[11] Gregorius ep. Turonensis, II.2, p. 39–40.

[12] Gregorius ep. Turonensis, II. 25, p. 70–71.

[13] Gai Solii Apollinaris Sidonii Epistolae et carmina, ed. Christian Lütjohann, Berlin: Weidmann 1887, VII.No.6, p. 108–110

[14] Gregorius ep. Turonensis, II.26, p. 71.

[15] See about topic: Georges Tessier, Le Baptême de Clovis. 25 décembre … Paris: Gallimard 1964; Rolf Weiss, Chlodwigs Taufe: Reims 508. Versuch einer neuen Chronologie für Regierungszeit de ersten christlichen Frankenkönigs unter Berücksichtigung der politischen und kirchlich- dogmatischen Probleme seiner Zeit, Bern/Frankfurt am Main: Lang 1971; Pierre Chaunu, Baptême de Clovis, baptême de la France, Paris: Fayard 1996; Michel Rouche, Clovis. Suivi de vingt et un documents traduits et commentés. Paris: Hachette 1996; Bertrand Fauvarque, Le baptême de Clovis, ouverture du millénaire des saints, in: Clovis. Histoire et mémoire I. Le baptême de Clovis, l'événement, sous la dir. M. Rouche. Paris: Presses de l'Université de Paris-Sorbonne 1997, p. 272–286; Danuta Shanzer, Ian Wood, Avitus of Vienne: Letters and Selected Prose. Translated with an Introduction and Notes. Liverpool: Liverpool University Press, 2002 Further, at least fundamental analyses, although in other or broader contexts: Ferdinad Lot, Naissance de la France, Paris: Fayard 1970, p. 21–26; Justin Favrod, Histoire politique de royaume Burgonde (443-534). Lausaunne: Bibliothèque historique vaudoise 1997, p. 323–360; Reinhold Kaiser, Die Burgunder, Stuttgart: Kolhammer 2004, p. 60–64 Eugen Ewig, Die Merowinger und das Frankenreich. Stuttgart/Berlin/Köln: Kolhammer 1992, p. 23; Reinhold Kasiser, Das römische Erbe und das Merowingerreich, (=Enzyklopadie Deutscher Geschichte, Band 26), München: Oldenbourg 2004, p. 89 an. Summarizing: Václav Drška, Le Baptême de Clovis: imitatio imperii? La stratégie politique des élites ecclésiastiques gauloises au tournant de l'Antiquité et du Moyen Âge, in: Prague Papers on History of International Relations, 13 (2009), p. 9–28.

[16] Václav Drška, Dějiny Burgundska. Nomen Burgundiae ve středověku, České Budějovice: Veduta 2011, p. 30–36.

Frankish king was followed by an unsuccessful attempt to convert the Burgundy Arian ruler Gundoald[17] through pressure brought to bear by the Franks on the Visigoths. Gregory transformed this moment of historical memory into an originally allied pledge made in Amboise between Clovis I and the Visigoth Alaric I. The dominance of the Franks however leaves few doubts: the Arian ruler asked for the pledge "when he saw that king Clovis I constantly conquered the tribes". Even though the contract with the Goths was sealed with a traditional feast, the last sentence written by the chronicler speaks volumes: "Many back then already wished with all their hearts to have Franks as rulers in Gaul.[18]" Gaul had to be rid of heresy, as confirmed by Clovis' motivations for the subsequent war with the Goths.[19] Their defeat and expulsion were the result of a perfect military campaign accompanied by miracles, and was characterized by the model discipline of the fighters, who were not allowed to plunder anything except for water and horse fodder. The battle of Vouillé[20] brought about the destruction and death of Alaric, but not that of Goth Arianism. It left Gaul and moved together with its believers to Hispania.

The former Roman province had definitely become a country that was sinking into heresy. The first four volumes of Gregory's Historia were written during Liuvigild's rule[21], at which point in time it was hardly imaginable that his successor would instigate a radical shift in church policy. We might therefore expect Gregory to have significantly focused on this topic. However, his rhetoric is softer and with more varied contours. There are two fundamental reasons for this. Firstly, it was the aforementioned Romanized approach to the ruling Visigoth that prevented its people, or rather its elite, from completely moving away from members of the Gaul-Roman nobility. Secondly, it needs to be taken into consideration that the noble Visigoth royal family could have been an important partner to the Merovingian family in dynastic politics. The first chapter of volume III of Historia confirms this, the contents of which are once again structured to comply with Frankish interests. The Visigoth king Amalaric took the initiative by asking for the hand in marriage of Clotilde, the sister of Clovis' sons, because he was well aware of their skills and military power[22].

The Frankish virtus and robur are a sign of at least equality to the older Visigoth Kingdom, which is thoroughly transformed in Gregory's diction into the kingdom of Hispania[23]. Although it cannot be definitely proven, it is reasonable to theorize that the subtext of the

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[17] Gregorius ep. Turonensis, II.31–34, p. 76–84. Kaiser, Die Burgunder, p. 152 an.

[18] There, II.35, p. 84.

[19] There, II.39, p. 85: „Valde molestum ferro, quod hi Arriani partem teneant Galliarum!'"

[20] There, II.39, p. 86–88. K bitvě u Vouillé nejnověji Ralph W. Mathisen, Danuta Shanzer (Eds.): The Battle of Vouillé, 507 CE. Where France Began (=Millenium-Studien. Band 37), Berlin: De Gruyter 2012.

[21] Wood, Gregory, p. 1–4.

[22] Gregorius ep. Turonensis, III.1, p. 97–98.

[23] Gregory did not call Amalric the king of the Visigoths but gave him the title of rex Hispanie (ibid.). It is therefore not a personal view of the government that was still valid for the Franks (see Václav Drška, Divisiones regni Francorum. Královská moc a říšské elity franské říše do vzniku císařství, Ústí nad Labem: Acta Universitatis Purkynianae (= Studia Historica 11) 2010, p. 15 an.) but a romanticized view of regum as a territory connected to royal power. It is in accordance with the fact that King Miro was not called rex Suevorum by Gregory but rex Galliciensis (Gregorius ep. Turonensis, V.41, p. 248). See also Claude, p. 25–35.

information suggests the Goths were an example of an accomplished unified state. The events date back to the first decade of the sixth century, shortly after Clovis' death. The Frankish border in southern Gaul had not been stabilized yet and the Goths had not yet been completely forced out[24]. Despite, or maybe because of this, the Merovingian princess was generously endowed and sent to her groom. This serves as evidence of the fact that despite their defeat at Vouillé, the prestige of the Visigoths in the Franks' eyes remained at a high level.

On the other hand, Clotilde's suffering, in a marriage that was not harmonious, finally ended with an intervention by her brother, Childebert I; the death of the Arian Amalaric on the threshold of a church of the one true faith[25] clearly shows the downside of the Hispania-Gaul discourse: in matters of faith, the Frankish kingdom served as its model and future. Childebert's military pressure on the Visigoths therefore continued, but never became as successful as before. It is well known that the Frankish ruler collected a lot of loot; Zaragora, which he laid siege to, was however saved due to the piousness of its inhabitants. The Franks fled the wrath of St. Vincent and divine retribution. In this passage, Gregory very openly chooses the parallel between the endangered town and Ninive that Jonas rendered doomed and which was spared by the Lord because its ruler and its citizens showed true remorse[26]. His opinion thereby reflects the ambiguous perception of the Hispania-Goth presence in comparison with the Gaul-Frankish presence. On the one hand, there is critique of the conditions under the Visigoths: "the Goths had the despicable habit of decapitating kings who they no longer liked with a sword and proclaiming a new king who they did. [27]" On the other hand, he understood that there were still a lot of orthodox Christians living there, who were suffering under Arian dominance and that did not deserve having their troubles intensified by the Franks.

The text has an evident didactic function because it depicts Childebert's failure as a punishment for the previous sinful plan of baseless attack. On the contrary, the imperial (Greek) army celebrated by punishing King Agila for his excessive style of rule. Not even the Greek success is absolute and has one relative value: the moment Agila was eliminated and replaced with Athangild, the situation changed and "the king raged a lot of wars against the Greek army and usually won, tearing the cities that they conquered out of their hands. [28]"

It is generally assumed that Athangild's rule differed from that of previous rulers by being more Catholic friendly; even Isidore from Seville understood it to be the end of past

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[24] Eugen Ewig, Die fränkischen Teilungen und Teilreiche (511-613), in: Spätantikes und fränkisches Gallien. Gesammelte Schrifren (1952-1973), Beihefte der Francia Bd. 3/1, hg. Hartmud Atsma, München 1976, p. 121–125.
[25] Gregorius ep. Turonensis, III.10, p. 106–107.
[26] Ibid., III.29, p. 125–126; Jon 3,1–10.
[27] Gregorius ep. Turonensis, III.30, p. 126.
[28] Gregorius ep. Turonensis, IV.8, p. 140.

tyranny29. Gregory appreciated this, but also noted that Hispania remained punished for its separation of the people in faith and also by worldly separation: it differed from Gaul dominated by the Franks in the fact that the Greeks and Goths contested its rule. Similarly, it is necessary to observe the theological discussion between Gregory and one of the bishops from Hispania, who visited the court of King Chilperic I in Gaul in 580 as an emissary of King Liuvigild. The dispute between our writer and Agila does not only prove the brilliance and the superiority of the Tours hierarch over the heretic, but primarily demonstrates the instrumentarium of the line of reasoning of the one true faith and its perceived superiority over the Arianism line of reasoning. The story quite characteristically ends with the conversion of this man. The dispute about the Holy Ghost between our chronicler and an emissary from Hispania, most probably an Arian cleric named Oppila, four years later, serves a similar function30.

If the space set aside for stirps regia is discussed, then some of its female representatives can be seen as a sort of moral model for the third generation of Merovingian kings – Gregory's contemporaries – who the writer had a very critical opinion of, in particular of Chilperic31. The equality of both royal families was upheld by the marriages of the daughters of both Frankish kings to Visigoth princes. Gregory once again creates an intentional concept when he writes that King Liuvigild left the kingdom to be divided between both of his freshly married children32, even though we know that in reality these were merely promotions to create joint rule, motivated by the political situation on the Iberian Peninsula33. The Frankish tradition was to become a model for the previously unified Goth reign.

Even the regulatory behaviour of the Visigoth elite had its limits, or rather was bound to the cultivation of the Frank-Gaul environment. Although Goth princesses were able to mirror their husbands, the initiation of such abilities was left to the Gaul prelates. The situation was different in Hispania. The story of the persecution of believers in the one true faith dating back to 580 was instrumental here. Everything was allegedly organized by Queen Gunsvinthe, the wife of Liuvigild, who was punished by God with partial blindness for her Arian eagerness. Her opposite was Sigebert's daughter Ingunda, the wife of the Visigoth prince, Hermenegild, who not only managed to withstand all the pressure

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29 Luis A. García Moreno: The Creation of Byzantium´s Spanish Province. Causes and Propaganda, in: Byzantion 66 (1996), p. 101–119. Isidori Iunioris episcopi Hispalensis historia Gothorum Wandaloeum Sueborum ad a. DCXXIV, in: MGH AA 11 Chronica minora saec. IV. V. VI. VII, ed. Theodor Momsen, Berlin: Weidmann 1894, p. 286.

30 Gregorius ep. Turonensis, V.43, p. 249 an. and VI.40, p. 312–313. The argument that this actually discusses the failure of King Chilperich because he was not able to convert Oppila to the one true faith – defended by Heinzelmann p. 48-49 - does not seem very convincing to me. The dispute was not lead against the king but in front of the king, who was a mere observant, and it can also not be assumed that such a thing could even be possible. I think that Heinzelmann's argument depends too much on the presumption that Chilperich, in contrast to Emperor Tiberius, is seen in Gregory's eyes as an inferior ruler.

31 Heinzelmann, p. 42–46.

32 Gregorius ep. Turonensis, IV.38, p. 170: „Ille quoque inter eos regnum aequaliter divisit..." More precisely aequaliter divider, was clearly the most visible principle of the first Frankish divisions. Drška, Divisiones, p. 15 an.

33 More in Collins, p. 50–63.

to convert to Arianism, but also managed to convince her husband to convert to Catholicism34. We know that Bishop Leander of Seville also played a significant role in Hermenegild's conversion35, through his cooperation with the Frankish princess, and that the entire situation resulted in the son rising up against his father. The story partially resembles that of Clotilde, who successfully converted her husband Clovis and targeted the first aggressive moves by her sons towards her native Burgundy. Once the female representatives of the Burgundy royal court had brought the one true faith to the Franks, the mission was entrusted to the daughters of the Merovingian kings, and although the story is certainly rationally based, its didactic discourse cannot be doubted. It also corresponds with the fact that Gregory tried to assert that his kings were protecting the believers of the one true faith in Hispania. The topic is interconnected with building dynastic alliances and the provision of the Frankish kings with the opportunity of being mirrors for their future Visigoth relatives. It is for this reason that Chilperic I, whilst negotiating the wedding gift for his daughter Rigunth, who was to become, but never became, the wife of Prince Reccared, showed an interest in the position of the believers in the one true faith in Hispania and asked for details about them from his messengers. They answered that the Spanish Catholics remained strong and true to their faith, but that "the king tries to make them uncertain thanks to his new fabrications because he thinks cunningly about the graves of our martyrs and the churches of our faith. 36" The contrast between a king as the protector of the faith and a king as the pursuer of the faith is very clear and appropriate here; Chilperic I was however also the protector of his relatives: for example Liuvigild sent him presents because he feared that the Merovingians could attack Hispania and take revenge due to the injustice committed on his niece Ingund, who quickly fell into his hands during Hermenegild's uprising37.

Until the defeat of the Goths, the theme of a potential attack on Hispania was always latently present. This was openly presented in 584 when Childebert II, after defeating the Lombards, thought about crossing the Pyrenees, but ultimately did not do so. Gregory does not state the exact reason; he only suggests that Emperor Maurice asked the Franks to primarily focus on Italy38. From this, it can be deduced that the Bishop of Tours needed to convince his readers that the superiority of his people was not only spiritual, but also present in the worldly sphere. In addition to this, it is indisputable that there was a second motive also present – the contrast between the Frankish-Greek alliance and the emperor's military presence in the Iberian Peninsula. For our chronicler, the Empire was an institution that symbolized the highest form of universalism, and at the same time just a sovereign reign39. This statement is even more enhanced by the text that follows a few paragraphs later in which the grim conditions in the Visigoth Kingdom are depicted. He

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34 Gregorius ep. Turonensis, V.38, p. 243–244.

35 Helmut Castritius, Hermenegild, in: Reallexikon der Germanischen Altertumskunde, Bd. 14 (1999), p. 423–425.

36 Gregorius ep. Turonensis, VI.18, p. 287.

37 Ibid, VI.40, p. 310.

38 Ibid., VI.42, p. 314. Ewig, Die Merowinger, p. 46.

39 Heinzelmann, p.48, Breukelaar, p. 226 an.

describes how Hermenegild, in alliance with the Emperor and the Suebi king, thought about killing his own father without "considering bringing about the judgement of God, if he thinks like that about his own father, even though the father was a heretic. [40]"

Gregory then laconically states that Liuvigild let his son Hermenegild be killed, which led Chilperic's brother, Guntram, to think about taking action in Hispania[41]; the Merovingian were definitely not devoted supporters of the murdered prince[42], which is why his motivation lay in pragmatic politics, namely the use of the chaos in Hispania and the takeover of Septimania. The theme of Frankish success is still connected with the theme of danger originating in Hispania. Gregory claims that Liuvigild sent an urgent letter to Queen Fredegund, Chilperic's wife, informing her about the alliance between Guntram, his nephew Childebert II, and his mother Brunhilde. Fredegund, who had become a widow shorty before, then really tried to get rid of Childebert[43]. The military campaign was therefore an answer to such deadly wickedness, but not only to it; Guntram declared in front of the troops: "Let us first subject Septimania to our rule, it is close to Gaul and it is undignified that the power of the horrible Goths should spread all the way to Gaul. [44]" The campaign was primarily supposed to bring about security; the way Gregory describes it, it was successful, but accompanied by cruelty and excess against Christians and church objects, which was criticized by clerics, and which in the discourse of our writer is also the cause of only relative success. While Guntram's army was conquering Septimania, Reccared invaded the area around Toulosse and caused severe damage there. In Gregory's eyes, it was supposed to be revenge for the anti-Christian actions of Guntram's army. Unfortunately, peace with the Goths could not be established because the damage they had caused was too great and demanded atonement[45].

Gregory wrote the ninth book in 587-590[46], after Reccared's conversion to the one true faith. The book is more open to the topic of Hispania, whose position changes for the third and last time. Firstly, in the worldly sphere. The new king reconciled with his stepmother Gunsvinthe for a very pragmatic reason: the widow-queen was the mother of Brunhilde, with whose son, Childebert II, and his uncle Guntram wanted to have a friendly relationship. The dynastic topic is therefore closely connected to Hispania-Frankish relations, but completely differently than before. It is no longer the source of an ambivalent discourse that is the cause of tensions, but one that should help to establish friendship and peace between the two kingdoms[47]. The last echo of the previously held position that helps to intensify this contrast is the memory of a false trader with holy remains arriving from Hispania. However, Gregory does point out that this event

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[40] Gregorius ep. Turonensis, VI.43, p. 314–315.

[41] Ibid., VIII.28, p. 391.

[42] Ewig, Die Merowinger, p. 46.

[43] Gregorius ep. Turonensis, VIII.28-29, p. 391–392.

[44] Ibid., VIII.30, p. 393.

[45] Ibid., s. 395–396 a VIII.35, p. 404 and VIII.38, p. 405.

[46] Wood, Gregory, p. 3–4.

[47] Gregorius ep. Turonensis, IX.1, p. 414–415. „Pacem habete nobiscum, et ineamus foedus, ut adiutus praesidio vestro, cum necessitas poposcerit, simile nos condicione, intercedente caritate, muniamus," The messengers were saying this at the courts of Guntram and Childebert.

happened seven years earlier; he characterizes this man as being proud and speaking an uneducated tongue with "a disgusting and broad pronunciation" and being unable to say something reasonable, a fraudster demanding Chilperic's support[48].

The shift in emphasis culminates in the fifteenth and sixteenth chapters. He first describes Reccared's decision to convert to the one true faith. Gregory highlights two moments in this process. The first is the unification of the people previously divided by faith and the establishment of the desired political state from the theological point of view. The second is the fact that not only the king converted, but also the entire kingdom, which was achieved on the basis of joint negotiations between the bishops of both parties. Both sides were able to present their arguments, whereby the king supported the side that he deemed most trustworthy. The most important issue that weighed in this decision was the fact that the Arian church was unable to give evidence of performing miracles[49]. The Bishop of Tours therefore not only viewed Reccared's conversion as a victory for the one true faith, but also as the fulfillment of God's Plan, which at that point had brought the people of Hispania under God's protection and mercy.

The following chapter is a classic example. Reccared's messengers come to Guntram to inform him about the decision of the Visigoth king. They also offer a peace treaty because the king "is bound to them in friendship and love and now also in faith. [50]" However, Guntram declined because he would not get gratification for his niece Ingund. The messengers therefore had to return to the court of Childebert II, where they had to apologize for the injustice that his sister had suffered, but also to seek pledges for high financial compensation and other forms of compensation according to the Frankish ruler's wishes. At the same time, they also asked him if their lord would wed his other sister, Cholodinde. Childebert is much nicer although his final decision is based on him consulting his uncle[51]. The information about the current hierarchy in the Merovingian house is important but not fundamental; the presentation of the dynastic hierarchy between the Visigoths and the Franks is much more important. The classic theme of family alliances shows that the period of tension and ambiguity might be over, but that the period of equality had also come to an end: if the church triumphed in the fifteenth chapter, then in this chapter, the Frankish state and the most senior member of the reigning family, won.

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[48] Ibid., IX.6, 418.

[49] Tamtéž, IX.15, s. 429. Podobné téma rozvíjí i Leander ze Sevilly v homilii a sjednocení ve víře na 3. toledském koncilu roku 589 viz Concilios Visigóticos e Hispano-Romanos ed. J. Vives, T.M. Martinez, G.M. Diez, Barcelona/Madrid 1963 (España Cristiana Textos 1), s. 140–144.

[50] Gregorius ep. Turonensis, IX.16, s. 430: „....sicut in fide se adserebat unum, ita et caritate se praeseret unitum." K termínu caritas klasicky Reinhard Schneider, Brüdergemeine und Schwurfreundschaft. Der Auflösungsprozeß des Karlingerreiches im Spiegel der caritas-Terminologie in den Verträgen der karlingischen Teilkönige des 9. Jahrhunderts, Lübeck/Hamburg: Matthiesen 1964 (Historische Studien, H. 388)

[51] Gregorius ep. Turonensis, IX.16, s. 430–431.

Conclusion

The Hispania-Goth theme might not be one of the key topics in Gregory's Historia, but it is also not a marginal one. The discourse across three spheres, which in its second and third parts splits into other nuances, proves the opposite. The Bishop of Tours focused quite a lot, but also selectively on the Iberian Peninsula. His stance on the topic was based on the concept recent research refers to as fulfilling God's Plan, and which W. Goffart transformed, with a certain amount of careful skepticism, into a thesis claiming that this fellowship of saints and martyrs was not dominated by the institutionalized church, but by the imperium.[52] It is therefore the fellowship of Christ that ascribes the Franks with the role of fulfilling this higher intention.

The circumstances in Hispania therefore serve the author in several ways. They are a warning about how far dynastic conflicts can go; they highlight the value of unity that can overcome even worldly division. The unity of faith is such an absolute imperative to the Bishop of Tours that it ultimately equates to the importance of Visigoth political unity. Gregory of course sees it, but does not understand it as relevant in an Arian environment. An appreciation of this potential is only possible after Reccared's conversion; the most important function of the Hispania-Gaul confrontation does not cease to be valid, namely the repeated confirmation of the superiority of the Franks: dynastic, political, and faith. Reccared's conversion and the conquering of the Iberian Peninsula by the one true faith is not only the fulfillment of God's Plan, but also the triumph of the Franks at the time of their biggest crises and a promise of a better future. In this sense, Gregory's work remains a "state" chronicle.

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[52] Walter Goffart, Conspicuously Absent: Martial Heroism in the Histories of Gregory of Tours and its Likes, in: Kathleen Mitchell, Ian Wood (ed.), The World of Gregory of Tours, Leiden/Boston/Köln: Brill 2002 s. 365-393 a srv. Thomas F.X. Noble, Gregory of Tours and the Roman Church, in: Tamtéž, s. 145-161.

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The Contribution of Foreign Direct Investments to the Convergence of Regions in the Czech Republic

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Abstract

The debate about the economic impact of multinational firms on a host country has been taking place for many years. Part of this discussion involves the effect of foreign direct investment (FDI) on the unemployment rate and economic growth. Analysis of FDI development, unemployment rate and the real domestic product (GDP) was carried out within the regions of the Czech Republic over the last decade. Comparative method and correlation analysis was applied to investigate the degree of dependence between the FDI level and the convergence of the poorer regions towards the more developed ones in terms of the examined characteristics. Results of the comparative analysis indicate that the effect of FDI on unemployment and GDP is insignificant. Statistical dependence between foreign investment inflow and economic growth has not been demonstrated; neither has the correlation between FDI and unemployment been proved. Insensitivity of the monitored variables on FDI development can be regarded as a serious problem for the "effectiveness" of this type of incentive policy.

Keywords: foreign direct investment effectiveness, unemployment, real output, convergence.

Introduction

The European Employment Strategy (EES) first appeared in 1997 as a response to a deep recession accompanied by rising unemployment and restrictive measures. The Member States of the European Union (EU) in its context committed themselves to the establishment of a set of common employment policy objectives, in particular, concerning job creation and quality improvement. At present, the EES is a part of the Europe 2020 growth strategy implemented as a part of the annual cycle of closer policy coordination between the EU Member States and EU institutions (European Commission 2016).

Many economists regard the fundamental European problems as the originator of the increase in unemployment – unemployment has been seen as the result of structural

rigidity known as „eurosclerosis"(Giersch 1985). The prominent manifestation of eurosclerosis is the rigid legislation that does not allow people flexibility in changing jobs and the burdening of entrepreneurs with excessive bureaucracy and taxes; this in turn prevents employment growth and contributes to the growth of long-term unemployment (Van Rie and Marx 2012).

The causality between the strict regulatory measures of the labour market across countries of the Organisation for Economic Cooperation and Development (OECD) and unsatisfactory changes in unemployment development has been discussed by many contemporary economists (e.g. Cahuc et al. 2013; Hadjimichalis and Hudson 2014; Dietrich and Möller 2015; Caporale and Gil-Alana 2014.). The main object of the criticism is the enforcement of laws on minimum wages, termination and retrenchment policy, labour taxation and a high degree of bureaucracy. The regulatory interventions of this type ultimately always lead to higher unemployment, lower productivity in manufacturing and the growth of labour costs. The proposals on how to "soften" the negative impact of regulation, at least partially, is presented in Bertola et al. (2007) and Bertola (2016) – the suggestions concern the partial deregulation of the labour market by increasing the flexibility of relations between employee and employer in terms of promoting part-time jobs, work from home, short-term placements, etc.

The fiscal measures targeted at job supply are the contemporary trend of European employment policy. In a real economic policy this trend projects into promoting investment in vocational training, activating labour market policy and moderating wage policy (including non-wage labour costs) within the so-called flexicurity (the principle, which is based on the need to improve the adaptability of both the workers and the companies to a rapidly changing labour market and labour market segmentation). The strategy aimed at activating labour market policy allows for access to incentives and subsidies from national and international funds for companies within foreign direct investments (FDI), among others. From the perspective of EES the main goal of FDI is its contribution to the labour market, i.e. in relation to new job creation by attracting foreign investors, especially into areas with high unemployment (Barros and Cabral 2000). Generally it applies that the support of investments in entrepreneurship is beneficial a) if the unemployed workforce is being involved in the process and / or b) the technological possibilities of the economy will be improved.

From the perspective of economic theory an investment incentive is a form of selective state support, which affects the market allocation of resources, thereby distorting the market. The economic theory is being mismatched in view of whether the investment incentives are beneficial or not, or whether the market distortion is desirable or not (Ferguson 2015; Plehwe et al. 2007). The positives are associated with the production of positive externalities in the host countries in the form of higher employment, higher wages, technology transfer, production and productivity growth and export increase. The access to financial resources to poor economies that would allow their economic upswing is also viewed positively (Zilinske 2015; Zhai 2014). The criticism highlights negative externalities in the form of distorted costs and a negligible, if any, impact on the

unemployment decline due to the displacement of existing firms, which do not receive subsidies.

The effectiveness of incentives in terms of foreign direct investments in relation to the labour market will be explored in more detail in the framework of selected regions of the Czech Republic. In this context, the relationship between the development of the unemployment rate, the real product and the development of foreign direct investments over the last decade will be analysed. Based on the analyses the hypothesis is assessed as to whether foreign direct investments contribute to the reduction of disparities in the unemployment rate and in the real product, and therefore contribute to the convergence of "poorer" regions towards the "richer".

Materials and Methods

The interregional comparison is performed in terms of the total volume of received foreign direct investment (FDI) in mil. CZK (ČNB 2016), in terms of development of regional unemployment indicators (MPSV 2016), and in terms of the development of the real gross domestic product (Český statistický úřad 2016). The method of comparison is complemented by a statistical correlation analysis carried out according to conventional methodology and by the analysis based on a model $Y(r,t) \sim A(r) \cdot B(t)$. The model is based on the assumption that the proportions among the regions are approximately constant over time. Such proportionality can also be traced in Figures 1 to 3 (see the following section). The variable $Y(r,t)$ is the value of the indicator in the year t for the monitored region r. The variable $A(r)$ represents the parameter of the region r, $B(t)$ is a parameter of the year t. For the purpose of uniqueness the geometric mean of parameters $B(t)$ is fixed and laid equal to 1. Thus, for the data from R regions after T years $R+T$-1 of "free" parameters are obtained; each region is characterized by one parameter. After taking the log of the model the following additive relationship is obtained; to estimate logarithms of the parameters the method of least squares can be used:

$$\ln(Y(r,t)) \sim \ln(A(r)) + \ln(B(t)). \tag{1}$$

Within the least squares method the 95 % confidence intervals for each parameter are expressed, with the help of which it can be compared whether the regions vary considerably in terms of unemployment, GDP and FDI.

The completeness of the analysis and its subsequent evaluation of FDI impact on a specific region requires taking into account that the amount of received FDI reflects both the level of quantitative economic characteristics, and the level of the so-called "soft" factors. The quantitative factors of the inflow of direct foreign investments into the economy include in particular the economic growth, the level of domestic investment, the openness to foreign trade, the level of human capital, infrastructure, taxation and subsidy policy, etc. The "soft" determinants of the foreign investments play a key role in the selection of a region in the host country; they include e.g. regional geoFigureical characteristics, sociological factors, the development production factors market, the relationship between institutions and the business community, quality of infrastructure and the

"significance" of the region, among others (Fallon and Cook 2010; Váchal et al. 2016; Hadjimichalis 2006).

Changes in the labour legislation were implemented during the monitored period, which could have reflected in the unemployment rate. The effect of these changes is difficult to quantify and is therefore neglected in the analysis. The unemployment rate is assessed by means of the indicator "The share of unemployed people" expressing the proportion of unemployed job seekers aged from 15 to 64 years of all residents in the same age range. Hidden unemployment, which is not covered in the indicator, is not considered in the analysis.

Results of comparative analysis of the impact of FDI on unemployment and the gross domestic product

In terms of the inflow of foreign direct investments measured over the period 2004-2013, Prague has the dominant position; its cumulative FDI volume reached more than 50 % of the total FDI inflow. It is followed by the Central Bohemia Region (SC), Moravian-Silesian Region (MS) and South Moravia (JM) with shares: SC ≈ 12 %, MS ≈ 7 %, JM ≈ 6 %. Other regions (Usti Region (US), South Bohemia (JC), Pilsner Region (PL), Liberec (LI), Hradec Kralove (HK) etc.) take shares of 4 % or less. The lowest investment inflow was to the regions of the Carlsbad (KV ≈ 1 %), Olomouc (OL ≈ 1.5 %), Zlin (ZL ≈ 2 %) and Pardubice (PA ≈ 2 %). The cumulative development of the volume of FDI received by the end of each year is captured in Figure 1; due to the exceptional position of Prague it is not included.

Figure 1: Development of supported cumulative FDI in terms of selected regions of the Czech Republic for the period 2004-2013 in mil. CZK
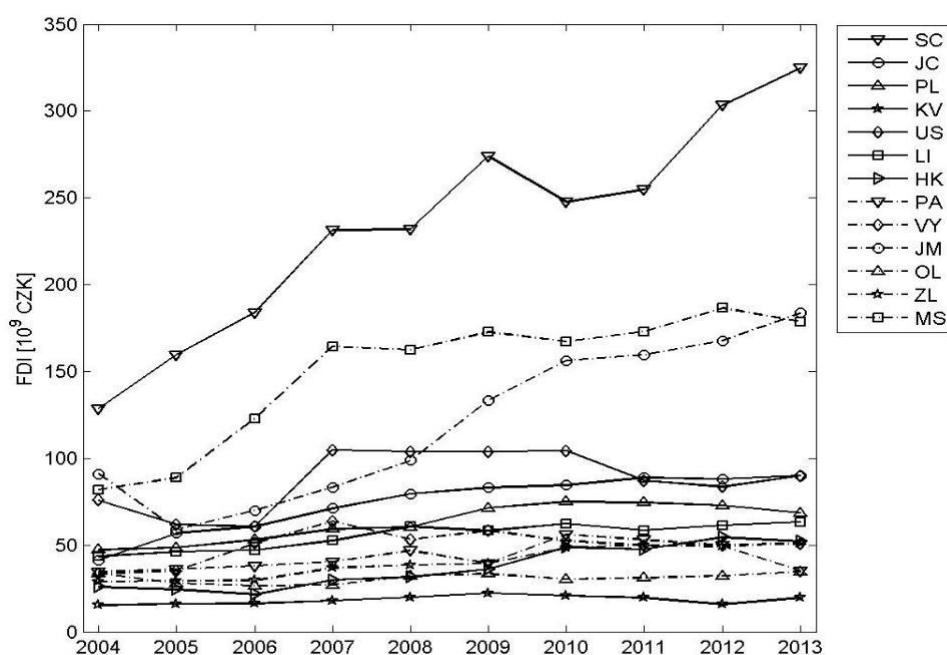
Source: ČNB (2016), Authors

Figure 1 allows us to classify regions according to the aggregate volume of FDI into three categories (except Prague). The greatest group of FDI among selected recipients includes the Central Bohemia Region, which in terms of the development of real GDP achieves the largest growth (see Figure 2) with relatively low unemployment rate (see Figure 3). The medium group of recipients includes the Moravian-Silesian Region and South Moravia; despite a considerable proportion of FDI they are characterized by a high level of unemployment and below average output. The regions with the lowest investment inflow differ significantly: the Carlsbad Region with an above-average long-term unemployment rate belongs to the bellow average GDP producer. Conversely, the Zlin Region with below average unemployment is one of the most productive and the Pardubice Region with low unemployment is a region with an average real product. The development of the real output and unemployment rate in Figures 2 and 3 is captured from 2005, i.e. one year later compared to the observed development of FDI. The purpose of the time shift is to capture at least to some extent the potential impact of FDI on the monitored variables GDP and unemployment.

Figure 2: Real GDP development in the regions of the Czech Republic during 2005-2014, volume indices (year 1995 = 100)
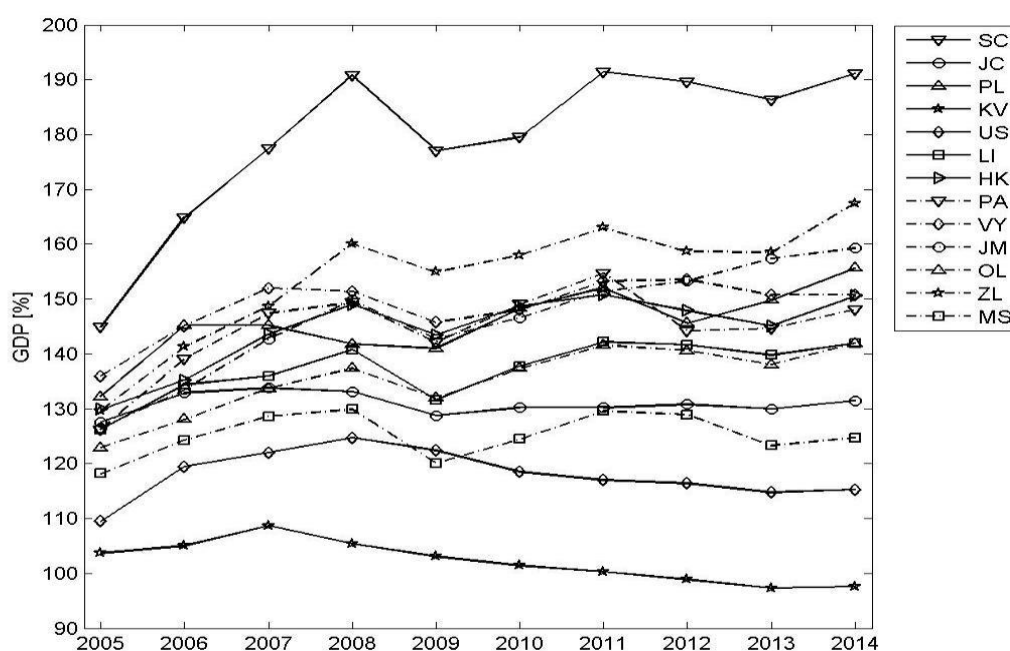
Source: Český statistický úřad (2016), Authors

The behaviour of the unemployment rate in the period 2005-2015 can be described to some extent as "homogeneous" in the sense that all the monitored regions followed the same "proportional" development, i.e. the curves almost do not intersect and maintain the same order. The difference in unemployment rates between 2005 and 2015 declined; it grew in regions with initially low unemployment (SC, JC, PA) by nearly 0.5 % and

decreased by more than 1 % in the regions with the initially highest unemployment (US, MS).

Figure 3: Proportion of unemployed persons (in %) in the surveyed regions of the Czech Republic in 2005-2015
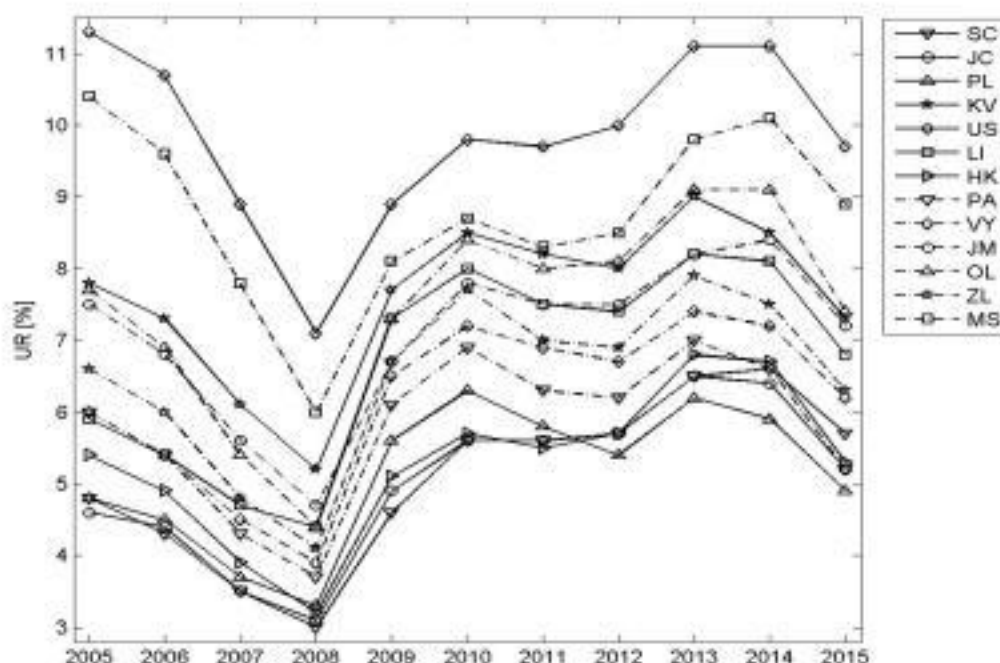
Source: MPSV (2016), Authors

The time series characterizing the development of the cumulative FDI, GDP and unemployment rate during 2004-2015 capture a steady growth of FDI and GDP and a decline in unemployment until 2008, in most monitored regions. From 2008 to 2009 the most striking manifestations of the global financial crisis are obvious; all the regions have experienced a significant decline in GDP, the FDI inflows approached zero, and unemployment grew most rapidly. After 2009 all monitored variables fluctuated until 2013. From 2013 an economic recovery is apparent being manifested by the GDP growth and the decrease of unemployment. This development is typical for all monitored regions to a different extent.

The results of the analysis based on a quantitative model and the correlation analysis

Quantitative resolution of regions in terms of unemployment and FDI development, including confidence intervals, is performed according to relation (1) for the selected regions of South Bohemia, Usti Region, Central Bohemia Region and Pilsner Region within the monitored period.

The parameter estimation according to (1) characterizing the unemployment rate of the South Bohemia Region is 5.0641 (4.7981; 5.3448), for the Usti Region it is 10.0287

(9.6845; 10.3728). The parentheses contain the 95 % confidence interval obtained from the method of least squares. Regarding the parameters characterizing FDI in these regions, for the South Bohemian Region 72.4922 (64.1759; 81.8861) applies and for the Usti Region it is 85.9625 (76.1009; 97.1019). In the case of the Central Bohemian Region the estimate of the unemployment characteristics is 5.0854 (4.8183; 5.3673), for the Pilsen Region the estimate is 5.1699 (4.8983; 5.4565). The parameter characterizing the level of FDI for the Central Bohemian Region is 225.8358 (199.9283; 255.1006), and for the Pilsen Region is 62.1905 (55.0561; 70.2494).

First, the statistical correlation analysis was performed on the basis of comparison of the computed parameters characterizing the level of the unemployment rate, FDI and GDP in the region. It was aimed at tracing dependence of these indicators across the regions. Results of correlations carried out from 13 values characterizing the 13 regions showed a strong negative correlation between unemployment and GDP (-0.637) and a negligible correlation between FDI and unemployment (-0.006). The correlation between FDI and GDP lies on the borderline of significance (0.482). In this case, it is necessary to take into account the effect of the FDI values of the Central Bohemian Region, which act as a leverage point because of the significantly higher FDI level compared to other regions. Excluding this effect from the analysis, the correlation between FDI and GDP for the remaining 12 regions is insignificant (-0.055).

A more detailed correlation analysis is based on the comparison of the time series within the monitored period. Specifically, an analysis has been carried out of statistical dependence of annual FDI growth in the period 2004-2013 and the subsequent annual changes in the unemployment rate and GDP from 2005 to 2014. While the parameters characterizing the regions can be considered as independent of each other, the values within the region form an autocorrelated time series. Thus, the correlation coefficients can be formally calculated; however, the assessment of their significance is only approximate.

The correlation results are similar to the previous simplified analysis: the relatively strong negative correlation between GDP growth and the unemployment change (-0.364) has been confirmed; the dependence of GDP growth on FDI increments shows a weak correlation (0.104). Without the influence of the Central Bohemian Region it is insignificant (0.013). The result of the comparison of FDI increase and changes in unemployment, including FDI of the Central Bohemian Region, shows a weak positive correlation (0.178); without the values of FDI of this region the correlation increases slightly (0.224). However, in this case, a negative correlation, i.e. the impact of higher FDI to the reduction of unemployment, should be expected.

Results discussion

The economic development of the region is largely associated with the unemployment development; the period of economic expansion is accompanied by a fall in unemployment, conversely in recession. This relationship is evident from the course of

the development of unemployment and GDP in Figures 2 and 3 in the case of almost all regions during the monitored period. This contradictory trend was confirmed by the simplified and detailed correlation analysis, which showed a strong negative correlation between unemployment and GDP, or respectively between the change in the unemployment rate and the change in GDP.

The contribution of FDI to the economic growth, or respectively to the unemployment decrease is, however, conflicting (see Figures 1, 2 and 3). This can be demonstrated in many examples in the context of the analysis performed. For instance, let us compare the development of unemployment in South Bohemia (JC) and the Usti Region (US), which takes place simultaneously but in opposite dimensions (JC: one of the lowest unemployment, US: the highest unemployment overall) and the cumulative development of FDI, which is basically identical for both regions (see Figures 1 and 3). The mismatch between the development of unemployment and the almost equivalent FDI inflows is confirmed by the quantitative model. In the case of FDI the confidence intervals overlap significantly in both regions; therefore it can be concluded that the regions do not significantly differ in this respect; however, in terms of unemployment development there is a noticeable difference.

The Central Bohemian Region (CS) and Pilsner Region (PL) are the examples from the opposite spectrum. The FDI growth is considerably different here, but the unemployment development in both regions follows a similar pattern. Confidence intervals for FDI in both regions do not overlap, which confirms a significant differentiation, yet the trend of unemployment is similar, which is reflected by the intervals intersection.

The analysis of the interrelationships in the sense of statistical correlations of FDI growth and changes in the unemployment rate or changes in GDP value pointed to the insignificance of these relationships; this finding is supported by the examples listed above. This "insensitivity" can result from the fact that the basic characteristics of the regions (economic, population, geoFigureical, historical, sectorial, cultural, etc.) are given so strongly that the state-support direction of FDI does not significantly affect the convergence of the poorer regions. Another reason may be the lack of competitiveness of unsupported companies. State-subsidized entrepreneurship has demonstrated the decrease of overall costs, by means of which the supported companies are more competitive regarding wage levels and market prices compared to firms not so advantaged. In extreme cases it can lead to the extinction of unsupported firms with the result of a zero total balance of new jobs. Insensitivity of the monitored variables "the unemployment rate" and "GDP" on the FDI development in the regions of the Czech Republic can be considered as a serious fundamental problem for the "effectiveness" of this type of incentive policy.

Conclusion

The issue of the benefit of foreign direct investment support to the national economy has been discussed at theoretical and empirical level. Theoretical perspective was based on

the findings of scientific literature; the foreign direct investment support in relation to the labour market and economic growth is perceived ambiguously. Positives are referred to externalities in the form of higher employment, higher wages, technology transfer, production and productivity increase, growth of export and the opportunity to access financial resources. The foreign investment policy critics counterbalance with the negative externalities in the form of distorted costs associated with state support and the negligible or zero effect on unemployment and economic growth.

The empirical perspective is based on the analysis of time series from 2013 to 2015 of the characteristics of foreign direct investments, unemployment rate and real output in selected regions of the Czech Republic. The purpose was to evaluate the effect of foreign direct investments on the convergence of the "backward" regions (in terms of high unemployment and below average output). Analyses results did not support the hypothesis of effectiveness of foreign direct investments on the regions convergence.

In the monitored period the development of unemployment and GDP indicators retains a more or less stable proportion between the regions irrespective of FDI development. The connection between the development of unemployment, or respectively GDP and FDI development in terms of statistical correlation is insignificant. The inflows of FDI had a minimal impact on unemployment and GDP development. If this is a fundamental phenomenon, then such "insensitivity" means that this "macroeconomic tool" aiming at convergence of regions is inefficient. Moreover, it can be assumed that unregulated and uncontrolled inflows of foreign investments would further deepen disparity among the regions in terms of unemployment and GDP production.

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Intergenerational Learning through the Use of ICT as a Tool with which to Reduce Early School Leaving among Immigrant Pupils

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Abstract

The purpose of this study is to present intergenerational learning through the use of ICT (Information & Communications Technology) as a tool with which to reduce early school leaving among immigrant pupils. The first part builds on a review of current literature and contemporary assumptions about learning and intergenerational learning as a particular form of learning. The second part of the study presents the findings from a review of policies on reducing early school leaving among immigrant pupils in Europe. The conclusion focuses on putting forward recommendations for practice with regards to the use of ICT for intergenerational learning in order to improve the educational performance of immigrant pupils.

Key words: intergenerational learning, ICT in education, early school leaving, young immigrant pupils, older generation.

Introduction

People have been interested in learning since ancient times. The first attempt to take a closer look at learning was based in philosophy and related to knowledge, which was considered the result of learning. In his Theaetetus dialogue, Plato argued that knowledge is a true belief or conviction justified by earlier experiences and reflections. The Cartesian concept of the mind as an autonomous individual, and the concept of John Locke's 'tabula rasa', create opposition to the scientific thinking on the individual and society. This therefore introduced a strict division between humans – as individuals and society – and collectives. It was then soon noted that the environment creates a basis for the formation of human qualities and means of survival. The need therefore arose to create synergies between the body and its habitat as a mechanism for integration in order to explain and regulate how the individual should behave. The answer to this need

was the phenomenon of learning. Peter Jarvis (2006), a prominent researcher and expert on adult learning, argues that learning occurs through the stimulation of the human senses by the external environment, both natural, physical, social and cultural, and this contributes to the integration of the individual with the world.

In recent years, education has gone through many transformations in order to meet the requirements of contemporary economic reality and social problems. Among these changes, the dominant tendency is a focus on learning processes that are more favourable and convenient to the individual. Learning can be seen as an approach to solving individual and social problems, such as leaving school early, unemployment and social exclusion.

The overall purpose of this study is to present the phenomenon of intergenerational learning in general education through the use of ICT (Information & Communications Technology) as a tool with which to reduce early school leaving among immigrant pupils. The first part builds on a review of current literature and contemporary assumptions about learning and intergenerational learning as a particular form of learning. The second part of the study presents the findings from a review of policies on reducing early school leaving among immigrant pupils in Europe. The last part of the paper focuses on making recommendations with regards to the use of ICT for intergenerational learning in order to improve the educational performance of immigrant pupils. To do this, we posed the following research questions: (1) What is the educational potential of intergenerational learning as a tool with which to reduce early school leaving (ESL)? (2) What are the reasons for early school leaving among immigrant pupils? and (3) What are the recommendations for educational practice aimed at reducing early school leaving? To address these questions, the literature sources for our review included academic papers and books, as well as research findings presented in international reports and educational policy documents. As part of our critical approach to the review, we organized our research into a series of four readings, or analytical stages. The first stage involved pre-reading the abstracts and summaries of articles, as well as introductions to books, to get a quick idea of the main thrust of the text. The second stage involved reading and re-reading the text. This included making notes of the main points and their function within the text to support the subsequent analysis of the content and the arguments put forward. The third stage involved examining, categorizing and summarizing our notes in order to develop a clear understanding of the text. The fourth and final stage of the analysis involved the evaluation of the main idea of the text, the structure of the arguments, the context, and its contribution to the paper.

The inspiration for this paper came from research work we conducted as part of the international ICT-Guides Erasmus+ project, funded with the support of the European Commission and the Polish Ministry of Science and Higher Education. The ICT Guides project is focused on intergenerational learning through ICT. It targets some of the most vulnerable groups in Europe – newly-arrived immigrant children (having lived from 0-5 years in their new country), aged 12-16, as well as older, native citizens of 65+ years.

Both groups are at greater risk of social exclusion in Europe (Migration integration statistics on those at risk of poverty and social exclusion, Eurostat; Europe 2020 indicators for poverty and social exclusion, Eurostat). The idea of the project is to support co-learning and cooperation between young immigrants and older citizens through basic ICT courses developed by immigrants for older people. Young immigrants teach older people how to use computers under the assumption that the course will create meaningful structures and content, whereby each pupil feels empowered, which in turn leads to progress in their schooling and prevents early school leaving.

The educational potential of intergenerational learning

Over the centuries a number of different concepts of learning have been developed which can be traced to the psychological and pedagogical fields. Within psychology, learning is the emergence of a relatively permanent change in the behaviour of the individual (behaviourism), or assimilation of messages indicating the process and adaptive nature of learning (the cognitive approach). Even if learning occurs in relationship to its surroundings, it has the character of an internal mental process occurring in the mind of the individual learner, resulting in changes in behaviour or the acquisition of new knowledge, skills and habits. Within pedagogy, the focus is more on the humanistic nature of learning and its relationship to schools. In this field, learning is associated with a specific type of attitude to knowledge and to life, which requires personal commitment and initiative. Pedagogical learning is more powerful in relation to its original psychological counterpart. It is also frequently accompanied by the intention of achieving a particular purpose, for example, associated with contemporary educational problems: behavioural problems, lack of motivation for learning, lack of desire for self-development, addiction prevention and early school leaving. Such learning is accompanied by the use of various symbolic systems, such as language, concepts and theories.

Both disciplines were predominantly connected with school learning, but in recent years, the situation has changed. Education in European countries has gone through many transformations in order to meet the requirements of contemporary socio-economic reality, in particular emigration and unemployment among young people. This has brought about many changes in the way people think about education. More and more often, young people are supposed to be equipped with creativity, unconventional thinking, thoughtfulness, a tolerant attitude towards others, resourcefulness and engagement in the common good. Discrepancies have therefore arisen between 'school' knowledge and 'real life' skills, which draws attention to the informal learning in relationships with other people in society, the family or workplace. That different requirements are made of young people and the elderly is a consequence of an ageing society, which is another educational issue that has simultaneously arisen. Learning is therefore not the only activity undertaken deliberately by people in formal education to assimilate knowledge or acquire skills. According to the world's leading educational researchers, learning is a mechanism of general human development, a kind of

continuous response to events in order to achieve a sense of control over various aspects of life (Biesta et al. 2010).

Today, the term 'learning' has become fashionable and increasingly commonly used. There are many epithets, definitions and concepts of learning. Each new theory (cf. Illeris 2009) or concept of learning is, in the intention of its creators, aimed at overcoming the limitations in the theories that came before it.

The term 'intergenerational learning' has been used within different contexts, which can be seen in numerous publications (Bengtson, Biblarz and Roberts 2002; Bengtson, Furlong and Lufer 1974; Brannen, Moss and Mooney 2004; Brown and Ohsako 2003; Doumas, Margolin and John 1994; Jacker 1992; McClusky 1990; Mazor and Tal 1996; Newman and Hatton-Yeo 2008; Noël and De Brouckère 2001; Storm and Storm 2001; Tapscott Frick, Wootton and Kruh 1996; Thomas 2009). For the European Commission, intergenerational learning and the intergenerational transfer of knowledge and skills is the primary factor in achieving the objectives of the Europe 2020 Strategy[1]. According to Gert J. Biesta "most definitions of generation tend to follow Mannheim, but even so, most generational categories tend to be rather broad, and their boundaries are fuzzy" (Biesta et al. 2010).

Generally, under intergenerational learning it can be assumed that: "A generation consists of a group of people born during the same time period and who are united by similar life experiences and a temporarily coherent cultural background. People belonging to the same generation have the same location in the historical dimension of the social process." (Antikainnen et al. 1996).

Biesta draws attention to the relationships between learning and generations having a long history in educational thinking, especially in terms of intergenerational transfers of knowledge and values. Recently, the role of this form of learning has become more important because of social and international changes:

"Particularly in migrant groups, intergenerational exchanges appear both to help maintain existing collective identities while simultaneously enabling adjustment to a new context. A recent qualitative sociocultural study of child/grandparent-learning among Sylheti/Bengali-speaking families in east London explored ways in which grandparents served as "founts of knowledge" that had been passed on from the past, including key social and communicative competences that older adults had not previously accessed, such as familiarity with new technologies." (Kenner, et al. 2007).

Intergenerational learning involves two generations learning together, to achieve the benefits of education. In the course of this activity, which stimulates people to learn and develop different communication strategies, specific learning outcomes occur. The elderly, in contact with youth, recall the ideals to which they aspired in the past. In addition, older people are stimulated intellectually by younger people. For the young

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[1] The Europe 2020 Strategy supports smart, sustainable and inclusive growth. Its aim is to improve the EU's competitiveness, while maintaining the EU model of a social market economy, and to significantly increase the efficiency of utilization of its resources (http://ec.europa.eu/europe2020/index_en.htm).

people, their often unrealistic view of the world, in contact with the older persons' view, is subjected to strong correction (McClusky 1990). As part of intergenerational learning, the following aspects particularly stand out (Brow and Ohsako 2003):

- Learning from each other – different generations share their experiences, which garners new knowledge, skills and competences;
- Learning with each other – common learning about the world, society, historical events, learning facts rather than objectives, which for some reason are important to the members of both generations;
- Learning about each other – the exchange of experiences, and the sharing of outlooks, values and aspirations.

Early school leaving among immigrant pupils in Europe – policy and research

Early school leaving was recognized in 2010 by the European Commission (European Commission 2010a) as one of the main challenges faced by European societies, mostly because of the recognition of the role education plays in social and economic growth. In the Europe 2020 strategy, the EC set a target of reducing ESL to less than 10% by 2020 (Commission Communication Europe 2020, 2009).

In the European Union, the profile of early school leavers varies considerably according to the highest education level achieved, to their status on the labour market, and to their ethnic origin. While the reasons for ESL are highly individual, as a social phenomenon it follows certain patterns. Becoming an early school leaver is a process, not a one-off event, and its causes are not purely educational. There are different factors behind ESL, ranging from the pupil's immediate social sphere to the wider society around them, from country to country and also within regions. There is no single reason for it and no single solution. However, what is common to all scenarios is the fact that employability depends strongly on the level of qualification achieved at all educational levels, both in formal and informal environments.

Marie Lally divided the potentially common reasons why young people leave school early into four groups (Lally 2012). The first includes personal reasons: low self-esteem, substance abuse, undiagnosed or ineffectively-supported learning difficulties, lack of motivation. The second group includes social reasons, such as anti-social behaviour and poverty – pupils living in areas of lower socio-economic standing may opt out of school due to high participation costs. Family reasons are the third group listed by Lally. These include conflicts in the family, changes in the family such as death or separation, and poverty that needs to be combatted by as many family members as possible. Family reasons are connected with the economic reasons, resulting in pressure on young people to leave school earlier and start earning money. The fourth and last group of potentially common reasons are related to school. These are low levels of literacy and numeracy, leading to poor performance and as a consequence to low self-esteem or behavioural problems, age differences – for example in situations where the pupil is older or younger

than their classmates – negative relations with teachers leading to bad behaviour or suspension on a regular basis, and poor achievement leading to lack of motivation.

The European Commission notes that low socio-economic status, lack of parental support, low levels of parental education and insufficient skills in the language of the instruction all contribute to the premature giving-up of education (OECD 2012; European Parliament 2011; Eurydice and Cedefop Report; European Commission 2011b; European Commission 2010; European Commission 2013a). Low socio-economic status here means families living in 'disadvantaged areas' with high unemployment, or in remote areas and small cities (as compared to living in medium-sized or large cities), which increases the chance of becoming an early school leaver (Eurofound 2012). Another factor contributing to ESL is gender. Male students are over-represented amongst early leavers in general education (Eurydice and Cedefop Report 2014).

Another factor in the profile of early school leavers is insufficient attention to the needs of migrant pupils, such as teaching methods, followed by ethnic discrimination that in some educational institutions may further impede students' chances of success (Luciak 2006). As a consequence, a lack of educational support for pupils with migrant or minority backgrounds can lead to educational disadvantages and the potential risk of early leaving.

In a study conducted by the European Commission into educational support for newly-arrived migrant children (European Commission 2013b), emphasis was placed on the need to improve, at a European level, the possibility of monitoring European education support policies for native and different groups of immigrant students, prioritizing the recommendations of immigrant inclusion policies. On a national level, it is essential to ensure equal opportunities for immigrants' integration into formal education. Initial language barriers and a lack of prior schooling prevent immigrants from succeeding at school, which also leads to early school leaving. Another recommendation emphasized the need to give schools and municipalities a reasonable level of autonomy, to better address the specificities of local needs. In this way, schools can more quickly and effectively adapt to local challenges and conditions. Another crucial factor for immigrant students to participate and perform well at school is host language proficiency. Language support should therefore take an important place in migrant education policy. Beyond language support, it is important to highlight several other pedagogical and organizational strategies as being particularly relevant to improving teaching and learning in socially, culturally and linguistically diverse schools. Finally, governments need to develop a comprehensive system for the monitoring and evaluation of implemented policies and the achievements of immigrant pupils (European Commission 2013b).

In trying to identify good practice for tackling ESL in Europe in the last ten years, the need for a mixture of prevention, intervention and compensatory measures has become

evident2. Preventative strategies seek to tackle the problem before the first symptoms are visible. They look at the pre-conditions for successful schooling and the design of education and training systems. Examples of preventive good practice can be found locally, in communities and schools. In many cases, projects involve work between the schools and the education authorities, social services and parents or families of early school leavers. Prevention of ESL is relevant to all ages of learners, not only to children in primary schools, but in many cases to adults too. In addition to early school leavers and their parents, identified good practice for prevention can be sourced from teachers and trainers working with youth at risk of ESL.

Intervention aims to avert ESL by improving the quality of education and training and providing targeted support to pupils or groups of pupils at risk. Two recipient groups of intervention measures are early school leavers with immigrant backgrounds in economically and socially deprived areas, and pupils with disabilities or disorders. The methodology used in most of the projects aimed at prevention of ESL are based on a transition plan, between primary school and secondary school, to ensure school continuity. Some intervention strategies are built on the early detection of support needed for learning. In most cases, the projects are designed to identify the difficulties young people face, and devise supportive strategies that enable learners to re-engage with their education and improve their academic performance.

Compensatory strategies are focused on creating opportunities for those who have left their education or training prematurely, but want to gain the qualifications they missed by doing so at a later stage in life. They aim to reintegrate young adults in formal and informal education, and use a methodology based on the ideas of reintegration to formal education. Examples of compensatory good practice, which are similar to prevention measures, are based on work between schools and municipal social services institutions.

ICT tools in intergenerational learning

When considering intergenerational learning, the voice of all partners involved is equal, or even – in a special way – the role of young people is emphasized (Storm and Storm 2011). This is a kind of 'rebound' from a time when the young listened mainly to their elders – parents, grandparents and teachers – because their elders had a monopoly on knowledge. The essence of intergenerational cooperation and learning has changed with the advent of Information and Communication Technologies (ICT), which enables the processing, gathering and transmission of information in electronic form3.

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[2] This research was conducted in 2012-2013 as part of the ESSE – Early School-leaving & Second Chance Education Project.

[3] The narrower concept of Information Technology (IT) connects it with computers and software, but not communication technologies and related networks. The development of both technologies makes them more consistent and is the driving force behind civilizational, social and economic development. Under ICT we can place hardware, software, communications equipment, Internet, network equipment and equipment for data transmissions, office accessorises, telecommunication services, IT services, the Internet, mobile phones, electronic media: radio and satellite TV.

ICT plays an important role in determining everyday life, lifestyles and relationships between people, and is applied in many fields (economics, management, social work, education), thereby taking into account the individual needs of users, regardless of time and place. It promotes the dissemination of information and knowledge by separating content from a physical location, where geographical boundaries do not constitute an obstacle to the flow of information. Allowing remote communities to integrate, making information, knowledge and culture potentially available to everyone, is a distinctive feature of ICT. According to UNESCO:

"Information and Communication Technology (ICT) can contribute to universal access to education, equity in education, the delivery of quality learning and teaching, teachers' professional development and more efficient education management, governance and administration. UNESCO takes a holistic and comprehensive approach to promoting ICT in education. Access, inclusion and quality are among the main challenges they can address. The Organization's Intersectoral Platform for ICT in education focuses on these issues through the joint work of three of its sectors: Communication & Information, Education and Science".

The role of ICT in education has been highlighted in several studies and reports. ICT is viewed as a "major tool for building knowledge societies" (UNESCO, 2003). It is believed that proper ICT usage encourages learners to think, create and solve problems in new, unconventional and innovative ways. In this sense, ICT should be seen as a modern aid which supports learning. According to the British Educational Supplier's Association (BESA): "...ICT in UK State Schools research, over half of UK schools anticipated that more than 53 per cent of teaching time would incorporate ICT by this year, and this growth is expected to increase to 57 per cent by 2017. The Learning through Technology Zone has been developed to address the importance of technology in education, with a series of free-to-attend seminars and an opportunity to try and test the latest and most innovative classroom technologies. In the Learning through Technology theatre, Microsoft and Tablet Academy will be hosting a programme of workshops, designed to help teachers develop their skills and keep up with tech-savvy students! For teachers seeking guidance on the BBC micro: bit, and ideas on how it can be used in the classroom, the BBC micro: bit session will provide an introduction to the handheld, programmable computers that are being given free to every Year 7 (or equivalent) child across the UK. Another practical, hands-on session, will teach delegates the fundamentals of Minecraft and explore ways in which it can be used in the classroom. Participants will become familiar with the Minecraft Edu environment and receive hands-on training on everything from building objects and creating a new world to setting up a secure classroom server. In other sessions, teachers can also find out how FlashSticks help increase engagement and retention for students learning new languages (including EAL), or discover the benefits of LEGO Education's solutions, WeDo and Mindstorms, which can be used to empower learning across the whole curriculum".

Although ICT issues are a feature of formal learning in schools, they are primarily part of informal learning outside the school: Learning spaces, physical and virtual, together

form a structured environment in which to learn. However, learning in the twenty-first century requires a new space, one which will connect learning in school, home and in the community, and one which will increase flexibility and will support learning beyond the physical dimensions of school buildings and outside of traditional school hours in the school day.

Taking this into account, ICT can meet both the young and the elderly's expectations of time, style and content, providing a new, outstanding intergenerational learning space. In the case of young immigrants, ICT tools enable them to have their first contact with local society. They can be used as the groundwork for future collaboration and give immigrants the feeling of being a part of the local community. Immigrants can reduce their sense of being lost in a new place through the use of ICT devices as communication and entertainment tools. Knowing their elders' biographies, younger immigrants might better understand the path of a human life. It is of special significance that they know and understand their new social and cultural circumstances. Intergenerational learning is therefore in fact a kind of learning about other people, and about other people's lives: "Generational relationships (...) provide one element in the complex ecology of narratives and narration by which people tell the story of their lives. It can also be seen as comprising part of the varied web of relationships that constitute position and shape dispositions. (...) Narrated generations often, then, possess a clear educational dimension. It is not just that people feel bound by shared experiences of particular periods of schooling; they also highlight differences from other generations' experiences" (Biesta et al. 2010).

For young immigrants, intergenerational learning using ICT can be a mechanism for acquiring the values shared in local society, for example educational aspirations, personal and professional development, tolerance, respect for others, diligence and honesty. In this sense, intergenerational learning is a way in which to encourage pupils towards education, supporting them in overcoming some of the barriers and limitations.

The use of ICT is widely recognized as having an impact on different aspects of society, including education, training and employment, and contributing to universal access to education and equity in education. ICT positively influences pupils' motivation, the engagement of low achievers, school performance, and more efficient learning processes (Blamire 2009). In a UNESCO report from 2013, extensive evidence was presented that shows that ICT improves affordability, accessibility and adaptability in education. Using ICT in education allows students to effectively access digital information and supports student-centred and self-directed learning, produces a creative learning environment, promotes collaborative learning in a distance-learning environment, offers more opportunities to develop critical thinking skills, improves the quality of teaching and learning, and supports teaching by facilitating access to course content (Fu Jo 2013).

In the case of local older people, ICT lets them feel important to somebody, and to play an important role in their country. Collaboration using ICT means is seen as being supportive of active and successful ageing. Contact with young people gives them energy and motivation to overcome the limitations of old age.

The digital, virtual nature of many ICT products means that educational activities can be provided at zero or reduced costs. ICT makes it possible to recover, sort, filter and disseminate information. Another advantage of ICT is that it facilitates the elimination of intermediaries, allowing users to obtain and use services directly from the original provider, thereby reducing the role of the middlemen. Through the creation and development of networks, ICT can overcome cultural and language barriers. Individuals and social groups can live and work in any part of the world and participate in the creation of local or even global educational activities, regardless of nationality or cultural and social background. There has also been a qualitative change in the discussion about technologies and their function in the development of key competencies. Today, we do not ask whether technology is changing our habits, lifestyle and way of learning, but how to develop the necessary skills – especially those related to the building of social capital. New technologies are developing core competencies in people, but only on the condition that they redefine the time, place, form and content of their educational classes, their aids in the digital world, and their access to and the functioning of educational resources. As a result, a new dimension to education has been created.

ICT learning is a personalized process, creating conditions that enable each person to achieve goals at their own pace, matching the pace and learning strategies to their individual abilities and needs. In a time of multiple choices, ICT gives people responsibility for their own learning. This principle is based on the assumption that 'one size fits all' is ineffective and that learning is more tailored to an individual´s needs than traditional educational tools allow for. Everyone should define their learning strategy independently and take responsibility for the process of achieving their goals.

Learners are experts in the field of learning and motivation, but academic advisers, tutors and coaches also allow them to mine their intellectual, emotional, physical and spiritual strengths. ICT itself influences the definition of learning that is understood not as the process of gathering skills and knowledge, but as an attitude to human life in which the meaning of human initiative is emphasized. It includes the mastery and initiation of new skills, attitudes and indispensable values to life in a world full of change.

Intergenerational learning with the use of ICT is both a conscious and unconscious process of development resulting from human existence and the psychophysical capabilities of humans, which starts in the last stage of prenatal development and potentially continues throughout life. It affects all aspects of human functioning (biological, social and cultural), including all means of learning (e.g. learning by trial and error, imitation, through discovery and action, entertainment, from one's own and other persons' lives) and the conditions under which it takes place (age, environment, motives, capabilities), which leads to a definite amount of knowledge, skills, habits and values, and ultimately to a better understanding of one´s self (internal order, identity and autonomy). This kind of learning stands in sharp contrast to 'institutional' learning which takes place under simulated conditions (for example, in classrooms).

Learners treat their learning partners personally, despite their age or the role they play in the learning process. This results in the fact that the role of teacher can be played by anyone – friends, family, employees, neighbours or other members of local society. Moreover, there is interchangeability in the roles of teacher and learner, which is an element of anti-authoritarian and non-directive pedagogy (Śliwerski 2006; Śliwerski 2005). This assumes that the changing world requires a change of thinking about education, especially in order to verify the methods of education (Śliwerski 2005).

Recommendations for working with early school levers

There are a number of recommendations that can be made from examining intergenerational learning using ICT as a tool with which to reduce early school leaving among immigrant pupils. Firstly, in order to support early school leavers, their participation in activities in which learning content and detailed learning outcomes are clearly recognized at the beginning of the school course or project needs to be encouraged. The learning content, methods and styles should, however, be identified by youth spontaneously through intergenerational cooperation during the learning process.

Secondly, in intergenerational learning supported by ICT tools, the focus should be on the development of communication skills. Competencies in speaking and writing encourage interactions with others, the expansion of vocabulary and trust in one's command of language. When accompanied by language competencies, the learning process in general requires the development of skills such as planning, organisation and evaluation of one's own results. Another useful skill is analysing and synthesizing information gained from different sources, for example from the internet. Another important area of learning with others is cooperation and the ability to see different kinds of social relations. This creates the conditions for individual and group activities that benefit others, making them more independent in the pursuit of the individual and common good and preparing them to become members of a social community.

Thirdly, intergenerational learning has educational potential and can therefore be used as a mechanism for implementing the idea of empowerment[4]. Intergenerational learning is conducted in the form of informal learning that is undertaken on a voluntary basis. It is therefore an indication of the benefits learners need in order to encourage them to learn. These benefits can be goods (telephones, IPods, etc.), or consultation and advice needed in order to resolve current problems. All this helps to arouse positive emotions

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[4] Empowerment (social strengthening) is part of the present thinking about social action and social work. In the face of cultural changes and mass immigration, the idea of empowerment has grown and become the direction of action in social policy and social work. It builds on social cooperation and reveals positive environmental factors as sources of change and improvement. The aim of this idea is to strengthen and support individuals and social groups in difficult situations or suffering from deprivation. Moreover, experts pay attention to the fact that empowerment is an idea, orientation, concept, strategy, effect of influence, or a social construct, rather than something that is problematic and hard to understand or think about. This idea is presented as not having any application procedures, and these circumstances make it difficult for practitioners to work by it (Adams 1996).

which is, according to a theory developed by K. Illeris, one of the dimensions of learning. Using ICT tools effectively in intergenerational learning helps to overcome limitations resulting from a lack of self-confidence, language competence, or age and health. This has an impact on the factors that must be weighed up when considering the use of ICT as a tool for learning. For young immigrants, an essential role is played by sensory stimulation, whereas for the elderly ICT tools should be functional and easy to use.

Finally, a facilitator of intergenerational learning needs to provide a convenient place for their meetings and continuously monitor the implementation of the teaching in order to adapt the educational offer to the spoken (conscious) and unspoken (unconscious) expectations of the learners.

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An Analysis and Evaluation of the Real Earnings Management Constraint Mechanism from the Perspective of Corporate Governance

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Abstract

This paper present the results of empirical studies into the construction of an effective constraint mechanism from the perspective of corporate governance. It includes an examination of the effects of various factors on real earnings management, such as ownership structure, the characteristics of the board of directors and supervisors, and executive compensation. The results show that equity balance, board size and executive incentives have a positive impact on the real earnings management behaviour of listed companies. In addition, an analysis is undertaken using the factor analysis method of the proxy variables which have a significant effect on the real earnings management constraint mechanism. A comprehensive constraint efficiency model is subsequently constructed, tested and evaluated to confirm that the conclusions drawn are effective.

Key words: Real earnings management, corporate governance, constraint mechanism.

Introduction

The separation of ownership and management in modern enterprises, a lack of transparency with regards to managers´ input, and poorly defined contracts are issues that contribute to the generation of the principal-agent problem. Agents may rely on the advantage that they have in the form of information to perform reverse selection to the benefit of a company´s owners, but to the detriment of a company´s market value. This is not only because there is a conflict of interest between the principal and the agent, but also an asymmetry in demand for company earnings information. For example, the management of a company may be more likely to show opportunistic behaviour if contracts are poorly defined, whereby any inconsistency between the shareholders´ and management goals could be exploited to maximize their own interests through the manipulation of company earnings. This behaviour not only misleads stakeholders with

regards to the performance of a company and its future development, but also misleads investors into making wrong investment decisions. This has the potential to produce conflicts of interests between owners and managers, and aggravate the relationship between large and small shareholders. Within this context, corporate governance is recognized as an effective tool through which to reduce the risk of managers becoming corrupted, to reduce the adverse selection behaviour of agents, and to protect the interests of investors.

In general, there are four aspects to the corporate governance structure of a company that are important, namely shareholder structure, the characteristics of the board of directors and board of supervisors, and management incentives. Under this framework of corporate governance, which includes the ownership structure and the independence of both boards, as well as the distribution of the rights and obligations of the administrative authorities, the interests of managers can only be maximized under the premise that they maximize the company's value because the two are tied to each other. As a result, the business incentives of executives, as well as the earnings management behaviour, which may be harmful to the value of a company, can be positively affected by the impact of the corporate governance mechanism.

The litmus test for how effective the corporate governance mechanism is in terms of real earnings management behaviour is determined by several factors, a number of which, either alone or in combination with each other, have a significant inhibitory effect on behaviour. These factors include the balance of ownership, the shareholding ratio of the board of directors, executive compensation, etc. This paper puts forward a mechanism for effectively restraining the real earnings management behaviour of listed companies. As part of this development process, the efficiency of the restriction of a single constraint was tested, of which the results were used to form the basis for the construction of a comprehensive model for the evaluation of the efficiency of the constraint mechanism itself. In so doing, the aim was to improve the transparency of the accounting information and the corporate governance structure, provide policy recommendations of theoretical and practical significance, and to contribute to the expansion of research into real earnings management constraint theory.

The rest of this paper is divide into seven parts: literature review and theoretical analysis; sample selection, data sources, research models and methods; measurement results and analysis of real earnings management; test results and analysis of the effectiveness of the real earnings management constraint mechanism; comprehensive evaluation of the effect of real earnings management; and conclusions.

Materials and Methods

Corporate governance is a set of rules and regulations under which the power within a company, responsibilities and conduct are arranged. It is a restrictive mechanism, the goal of which is to protect shareholders and other stakeholders, as well as resolve the benefit assignment problem (Li Weian 2009). Corporate governance therefore plays an important role in a company's earnings management.

Bushee (1998) states that institutional investors can to a certain degree exert pressure on earnings management by demanding reductions in R&D spending to prevent decreases in earnings. Similarly, Bange and De Bondt (1998) found that large institutional investors and CEOs who hold stock exert pressure on management to reduce expenditure on R&D in what is viewed as earnings management opportunism. Cheng (2004) and Roychowdhury (2006) also came to the same conclusions. Respectively, empirical research conducted by Gnanakumar (2008) on a sample set of 6759 companies into the characteristics of boards of directors and audit committees, found that the proportion of independent directors was the only restraining effect on real earnings management. The influence of the size of the boards and/or audit committees, as well as the separation of the roles of chairman and general manager were negligible.

Li Qin and Li Wenyao (2007) suggest that companies should improve their system for appointing independent directors, establish audit committees and make improvements to their performance evaluation systems, as well as other measures, to restrain real earnings management. Zhang Zhihua and Jin Lianhua (2010) conducted empirical research on A-shares listed companies for the period 2003 to 2007, thereby using the degree of ownership concentration, board independence, board size and executive compensation as proxies for corporate governance, and found that real earnings management can be constrained by a sound corporate governance mechanism based on supervision and motivation. Lin Fang and Xu Hui (2012) conducted empirical research into the relationship between equity balances and real earnings management and found that the balance of ownership can to some extent effectively reduce real earnings management in terms of product costs and profit manipulation.

Principal-agent theory, contract theory and asymmetric information theory were created on the basis of the modern enterprise system. The problems associated with real earnings management are rooted in the principal-agent conflict, asymmetric information and poorly defined contracts. It is for this reason that the establishment of a fine-tuned corporate governance mechanism is generally recognized as an effective way to reduce this conflict, promote the two-way flow of information, encourage and restrain the agent, as well as maximize the interests of all the shareholders.

The following proxy variables were selected to represent the corporate governance mechanism: ownership structure; the characteristics of the boards of directors and supervisors; and the executive compensation incentive mechanism. These factors were also further refined. Previous empirical studies have found that some individual factors of the corporate governance mechanism have a significant effect on restraining real earnings management behaviour. These factors include the equity structure governance mechanisms (which includes the balance mechanism for shareholdings and institutional shareholdings), the board of directors (size of the board, number of meetings, shareholding ratio), the board of supervisors (shareholding ratio), as well as the equity incentive mechanism (executive compensation and executive shareholdings). All of the proxy variables mentioned above have significant correlations with real earnings management. Equity balance and institutional shareholdings can be used as a balance

mechanism for shareholdings - directors' and supervisors´ shareholding ratios - and executive shareholdings can be recognized as a form of equity incentive. Board size and board meetings express the independence and function of the board respectively. Figure 1 shows the restraint mechanism for real earnings management on the basis of equity balance, board independence, board enthusiasm and equity incentives.

Figure 1. Diagram of the real earnings management constraint mechanism
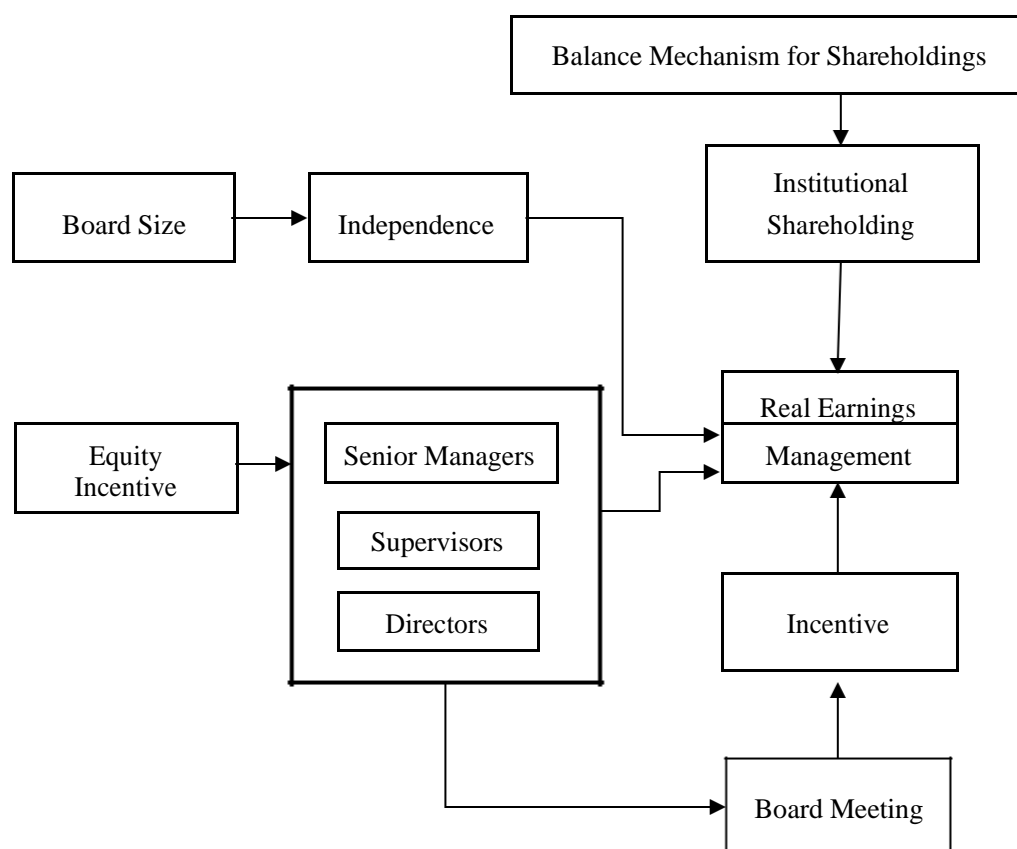
Source: Author

The restrictive function of equity balance is mainly related to the ability of equity arrangements to control shareholders' tunneling behaviour. The development of the capital market has prompted institutional investors to become more actively involved in corporate governance. This has been made possible because institutional investors have the advantage of having the talent, capital and policies at their disposal for them to do so. As institutional investors have continued to develop and grow, so has their active participation in the improvement of the corporate governance of the companies in which they invest. They do so by exerting their right to participate in the management of companies and in the decision-making of directors or managers. However, although the largest shareholder maintains a dominant position within a company, other small and medium-sized shareholders may on occasion rescind their status as "free riders" to protect their own interests. This is particularly the case when the proportion of shares held by the second largest shareholder is high enough; some smaller shareholders are

more likely to come together and form an offensive or defensive alliance with regards to maintaining some form of equity balance. The reason for doing this is that it is a way to achieve mutual supervision and restraint, and prevents the internal grabbing of assets.

The board of directors is at the core of modern corporate governance structures and therefore of the corporate governance mechanism too. It serves as a link between shareholders and managers, and its structure and efficacy are directly related to a company´s success.

A board of directors should be fair and not biased towards the interests of any one party in the process of decision-making, which means a board must be independent from shareholders and managers. Some of the directors must therefore be drawn from outside. The larger the board, the better able it is to accommodate more professionals with financial, financial accounting and management experience. This enables a board to make decisions more professionally and scientifically, and strengthens its ability to identify the real earnings management behavior of the company. Furthermore, the larger the board, the lower the probability that a consensus can be formed between the directors, which reduces the risk of collusion with regards to real earnings management.

Equity incentives for executives, directors and supervisors can actively and effectively support them in the fulfillment of their obligations and responsibilities. Due to the information asymmetry that exists between the principal and the agent, whereby the business executive is the agent, the long-term development goals of a company are often ignored or set aside by executives in the pursuit of their own personal interests. However, the implementation of an equity incentive mechanism can ease the contradiction between the two parties, thereby producing a synergistic effect which motivates the corporate executives to make decisions that benefit the company and other stakeholders. The equity incentive mechanism therefore provides greater support for directors and supervisors in the performance of their regulatory responsibilities, links personal income with the long-term development of a company, and effectively restrains real earnings management behaviour. In addition, the number of board meetings can reflect the extent to which directors participate in corporate governance and how willing they are to take on their responsibilities and obligations. The enthusiasm of a director depends on their personal integrity and an effective incentive mechanism. For example, board meetings may become more active under the influence of equity incentives, directors may communicate more frequently, perform their duties better, and identify risks, including earnings management, more often. Based on this analysis the following hypothesis was formulated:

Equity balance, board independence and equity incentives constitute the main constraint mechanism in listed companies, which forms the most direct constraint on real earnings management behaviour, and directors´ enthusiasm is a supplementary constraint on real earnings management behaviour because it only acts as the platform and transmission media mechanism for restraining the main constraint.

Research Design - The measurement of real earnings management

In addition to the measurements utilized by Roychowdhury (2006) and Cohen (2008a), abnormal operating cash flow, discretionary expenses and abnormal product cost were

also used to measure real earnings management. Abnormal operating cash flow (hereinafter referred to as abnormal cash flow), discretionary expenses and abnormal product cost can be calculated on the basis of normal operating cash flow, non-discretionary costs and normal product cost, respectively.

The method put forward by Dechow, et al., (1995) was utilized to calculate the normal operating cash flow (see regression formula (1)). The abnormal operating cash flow was subsequently calculated as the sum of the normal operating cash flow minus the actual operating cash flow. This reflects the fact that price discounts, selling on credit, relaxation of credit terms and conditions, as well as other promotional activities may result in increased sales and profits for a company, but may also have a negative impact on a company's operating cash flow. In other words, an abnormal decrease in operating cash flow might be generated from sales discounts and other promotional activities, which may increase a company's profits.

$$CFO_t/A_{t-1}=\alpha 0(1/A_{t-1})+\beta 1(S_t/A_{t-1})+\beta 2(\triangle S_t/A_{t-1})+\varepsilon t \tag{1}$$

Secondly, formula (2) was utilized to estimate the value of non-discretionary expenses. The discretionary expenses were subsequently calculated as the sum of non-discretionary expenses minus the actual costs. Any reduction in discretionary expenses such as R&D, management expenses and sales costs within a company therefore reduces overall costs and increases the profits of a company, whereby the opposite is also true when the situation is reversed.

$$DISEXP_t/A_{t-1}=\alpha 0+\alpha 1（1/A_{t-1})+\beta(S_{t-1}/A_{t-1})+\varepsilon t \tag{2}$$

Thirdly, product cost is calculated as the sum of the costs of goods sold and the change in the amount of inventory. The linear relationship between the cost of sales and sales in a given year is given in formula (3), and the linear relationship between the change in the amount of inventory and the amount of change in a given year and the previous year is given in formula (4). Formula (3) and formula (4) are subsequently used to estimate normal product cost (5). The abnormal product cost is the difference between the actual cost and the normal cost of the product. An increase in product cost is mainly the result of an increase in product yield, whereby an increase in production should reduce the fixed cost per unit of product. An increase in the abnormal product cost is therefore likely to increase the profitability per unit of product and therefore a company's profits, whereby the opposite is also true if the situation is reversed.

$$COGS_t/A_{t-1}=\alpha 0(1/A_{t-1})+\beta(S_t/A_{t-1})+\varepsilon t \tag{3}$$

$$\triangle INV_t/A_{t-1}=\alpha 0(1/A_{t-1})+\beta 1(S_t/A_{t-1})+\beta 2(\triangle S_{t-1}/A_{t-1})+\varepsilon t \tag{4}$$

$$PROD_t/A_{t-1}=\alpha 0(1/A_{t-1})+\beta 1(S_t/A_{t-1})+\beta 2(\triangle S_t/A_{t-1})+\beta 2(\triangle S_{t-1}/A_{t-1})+\varepsilon t \tag{5}$$

In the above formula, CFO$_t$ represents net cash flows from operating activities in year t, A$_{t-1}$ represents the total assets in year t, S$_t$ represents the sales revenue in year t, $\triangle$S$_t$ represents the changing amount of sales revenue between year t and year t-1year. $\triangle$S$_{t-1}$ represents the change in sales income in last two years. DISEXP$_t$ expresses discretionary expenses in year t, including the cost of sales and management expenses. COGS$_t$ is the cost of product sales in year t. $\triangle$INV$_t$ indicates the change in the amount of inventory between

year t and year t-1year. PRODt represents the normal product costs in year t, which is made up from the cost of goods sold and the change in the amount of inventory in year t. Abnormal cash flow (R_CFO), discretionary expense① (R_DISEXP) and abnormal product cost (R_PROD) is the difference between the actual amount and the normal amount. These are also the three indicators used in this paper to measure real transaction earnings management. This is because the abnormal reduction in cash flow, abnormal decrease in discretionary expenses, and abnormal increase in product cost provide an indication of whether a company's profits will increase, whereby the opposite is true if the situation is reversed. In other words, if a company wants to make more profit, it would express lower abnormal cash flow, lower operating costs and higher abnormal product costs.

Finally, there are several ways to potentially measure the overall effect of real earnings management on the basis of real transactions. Cohen (2008) states that the three individual indicators that represent real earnings management are unique in terms of their information content, differences in impact of an increase or decrease, and their ability to mutual offset each other., so if sum the 3 indicators directly, it might be lack of comprehensiveness, and miss some information. Therefore, in order to increase the robustness of the outcome, reference is made to the research methods of Liu Qi-liang, et al., (2009) and Li Zeng-fu (2011), who used formula (6) to measure the extent of overall real transaction earnings management (NRM_Proxy). The higher the NRM_Proxy, the more inclined a company is to manipulate profits through real transactions.

$$NRM\_Proxy② = R\_PROD - R\_CFO - R\_DISEXP \qquad （6）$$

In order to avoid the impact of outliers, both ends of the related variables were winsorized by 1% to calculate the earnings management index.

Selection of research samples

In China, the current accounting standards have been in force since 1 January, 2007. These standards are convergent with the international financial reporting standards. The change in the accounting environment may have had an impact on the extent of accrual earnings management and real earnings management (Liu Qiliang, et al., 2009; Lin Fang and Xu Hui 2011), which is shown in Figure 2. It is for this reason that only the data after the promulgation and implementation of the current accounting standards is analyzed in this paper.

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① The indicators include R&D costs, advertising costs and sales and management costs. However, in our country, companies do not specifically disclose R&D and advertising costs, which are included in the costs of sales, management fees and other projects. The index in this paper therefore only contains two items - costs of sales and management costs. ② Because *NRM_Proxy* shows the overall effect of adjusting profits through real transactions earnings management, an increase in *R_CFO* and *R_DISEXP* would reduce profits, and an increase in *R_PROD* as a result of excessive production would reduce the costs of selling goods. An increase in *R_PROD* would therefore increase profits. The index amount is higher, it indicates that the company is likely to increase profits through sales. Therefore, *R_DISEXP* and *R_CFO* should be multiplied by -1, such that *-R_DISEXP* is equal to *R_DISEXP* multiplied by -1. When the index amount is higher, this indicates that the company is likely to increase profits by cutting discretionary expenses. The indicator *-R_CFO* is interpreted in the same way as *-R_DISEXP*.

Figure 2. Sample period diagram
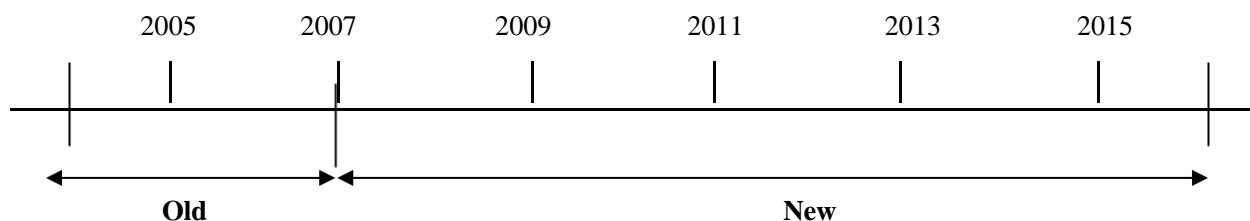
Source: Author

The selected sample period was from 2007 to 2011. The companies in the sample set were selected from A-share listed companies in Shanghai and Shenzhen, for which the IPO took place before 1 January, 2006, and according to the value of the interpretation and control variables involved in the lag year of financial data. The sample set of companies was subsequently screened on the basis of the application of the following exclusion criteria: they were a listed financial and/or insurance company (different characteristics to other companies); the observations were ST or *ST; the financial data and corporate governance data were incomplete; they were a newly listed company (company size and capital structure change according to changes in financing); or the sample did not meet model estimates according to Roychowdhury (2006). Roychowdhury determined that a real earnings management evaluation model requires a sample set to have at least 15 companies for every industry for every year of the studied period. After the application of the screening criteria, the sample set consisted of annual samples of 6,358 companies (Firm-Year). The data was generated from the Tai'an CSMAR and CCER databases. The listed companies were classified into 11 main industrial categories according to the "Guidelines for Industry Classification of Listed Companies" issued by the China Securities Regulatory Commission in 2001. Stata 11.0 software was used for the data processing.

Determination of industry classification of listed companies

For the application of the modified Jones model for the measurement of earnings management, it was necessary to categorize the 6,358 samples according to industrial sector. This was done in line with the aforementioned guidelines①. Due to the fact that manufacturing industry (Code C) is divided into many smaller sub-categories, only those companies that fell within the top two sectors within each sub-category were selected. In total, the sample set was divided into 21 industrial categories - see Table 1.

(Table 1 about here)

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① See：http://wenku.baidu.com/view.

Research model and variables

It was previously established that eight variables can have a significant effect on real earnings management behavior. In view of the fact that corporate governance cannot be defined by any single variable, and the information with regards to the variables may be duplicated, it is possible to use Principal Component Analysis ① to continue the compilation and correlation of the information on the eight variables to determine the common factors that form the constraint mechanism.

When the common factors have been determined, multiple regression analysis models can be developed and applied to different constraint factors at the same time and on the same analysis platform. This process makes it is easy to subsequently analyze, compare and evaluate different constraints and therefore to confirm or refute hypothesis 1.

$$RDET_{it} = \beta_0 + \beta_1 \times Comn + \varepsilon_{it} \qquad\qquad （7）$$

Formula (7) is a comparative analysis of the constraining effects of different constraint mechanisms. In formula (7), $RDET_{it}$ is a proxy variable for the degree of real earnings management (this includes abnormal cash flow（R_CFO）, discretionary expenses（R_DISEXP）, abnormal product cost (R_PROD) and total variable (RM)), Comn represents the common factor which is obtained through Principal Component Analysis, β_0, β_1, β_2 and β_3 all indicate the regression coefficient to be estimated, ε_{it} is the residual error. The definition of all the variables is presented in Table 2.

(Table 2 about here)

Test results and analysis of the effectiveness of the real earnings management constraint mechanism

Determination of common factors

The results of the analysis show that equity balance (Balance), institutional shareholding (Instock), board size (Bsize), board meeting (Bmeet), director shareholding ratio (Bstock), supervisor shareholding ratio (Jstock), executive compensation (Execom) and executive shareholding ratio (Exestock) all have significant relationships to the proxy variables of real earnings management. Given that there may be a certain degree of information duplication, and that the corporate governance mechanism cannot be clearly defined by a single variable, it was necessary to statistically analyze the correlations, determine whether there was indeed any duplication, and verify whether strong multicollinearity existed. Table 3 presents the correlation coefficients for each variable.

(Table 3 about here)

The results presented in Table 3 show that there are highly significant correlations among the eight studied variables, and high degrees of multicollinearity and information duplication. For example, equity balance (Balance) has a highly significant relationship to institutional shareholding (Instock), board Size (Bsize), director shareholding (Bstock), supervisor shareholding (Jstock), and executive shareholding (Exestock) respectively. The

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① Principal Component Analysis (PCA), is a multivariate statistical analysis method for the selection of several important variables by linear transformation. In other words, it is a statistical analysis method to find the characteristic of orthogonal vector representation of data information as little as possible.

Pearson correlation coefficient between supervisor shareholding (Jstock) and director shareholding (Bstock) is 0.537, and between executive shareholding (Exestock) and director shareholding (Bstock) and supervisor shareholding (Jstock) 0.975 and 0.560 respectively, whereby both have a high significance level of 0.001. The results of the correlation analysis shows, that determining the constraint mechanism of real earnings management for each aspect of above referenced eight variables can lead to uncertainty or the drawing of incorrect conclusions, not only because a single variable cannot clearly define corporate governance, but also because the maximum error is caused by the presence of severe multicollinearity.

It is for this reason that it was decided to use SPSS 13.0 to carry out the Principal Component Analysis. By reducing the multicollinearity of the variables through the dimension reduction method, separate information on the corporate governance mechanism could be fully accommodated and integrated into the common factors so that the efficacy of the constraint mechanism of real earnings management could be explored. Table 4 provides an explanation of the variances as a result of the Principal Component Analysis.

Table 4. Explanation of variances

Common Factor	Characteristic Value	Variance Contribution Rate	Cumulative Contribution Rate （%）
1	2.567	32.085	32.085
2	1.282	16.029	48.113
3	1.084	13.544	61.657
4	0.952	11.902	73.559
5	0.815	10.193	83.753
6	0.716	8.948	92.699
7	0.560	7.005	99.704
8	0.024	0.296	100.00

Source: Author

The method for extracting the common factors is different to that of multiple linear regression in that the characteristic value must be greater than 1. As is evident in Table 4, the values of the first three common factors are 2.567, 1.282 and 1.084, respectively. The values for all three are greater than l, and the cumulative variance contribution rate of these three common factors is 61.657%. As a result, the first three common factors can be retained because they effectively contain the total information of the eight proxy variables. These three common factors were set as Coml, Com2 and Com3. Furthermore，in order to give practical significance to the extracted common factor, the initial factor load matrix must be rotated in accordance with the maximum variance orthogonal rotation method. The results after the rotation of the factor load matrix are presented in Table 5. The factor

load coefficients in Table 5 are sorted according to their numerical size, whereby numerical coefficients below 0.5 are not presented.

Table 5. Factor load coefficients after rotation of the matrix

	Coml	**Com2**	**Com3**
Exestock	0.952		
Bstock	0.945		
Jstock	0.739		
Execom	0.702		
Bmeet		0.774	
Bsize		0.679	
Instock			0.764
Balance			0.592

Source: Author

The load coefficients for executive shareholding (Exestock), director shareholding (Bstock), supervisor shareholding (Jstock) and executive compensation (Execom) are 0.952, 0.945, 0.739 and 0.702, respectively. All four show large loads for common factor 1 (Coml). It can therefore be concluded that common factor 1 is successful in providing effective information on the four aforementioned research variables. In addition, executive shareholding ratio, director shareholding ratio and supervisor shareholding ratio motivate executives, directors and supervisors in the form of equity. It can be said that the information generated by the equity incentive mechanism is included in common factor 1. It is for this reason that common factor 1 is therefore considered to be an incentive and restraint mechanism for real earnings management.

The load coefficients for board meeting (Bmeet) and board size (Bsize) are 0.774 and 0.679 respectively. Both show large loads for common factor 2 (Com2). It can therefore be concluded that common factor 2 carried is successful in providing effective information on the two aforementioned research variables. However, board size is a proxy variable for the independence of the board of directors, and board meeting is a proxy variable for functions of the board of directors. That both of these are contained in the same factor is probably an indication that some of the directors are from outside the company. The larger the size of the board, the more frequent the board meetings, the greater the enthusiasm among directors to fulfill their duties and obligations to participate in corporate governance, as well as the more likely the board of directors is to be independent and less likely to be controlled by insiders. It can be said that the independence of directors in the governance structures of listed companies is incorporated in common factor 2. It is for this reason that common factor 2 is therefore considered to be an independent constraint mechanism of the board of directors for real earnings management.

The load coefficients for institutional shareholding (Instock) and equity balance (Balance) are 0.764 and 0.592 respectively. Both show large loads for common factor 3 (Com3). It can therefore be concluded that common factor 3 is successful in providing effective information on the two aforementioned variables. In reality, facts show that institutional investors have played a role in the supervision and balances in corporate governance. It is for this reason that common factor 3 is considered to be an equity balance constraint mechanism for real earnings management.

Calculation of common factor scores

Based on the results of the factor analysis, incentive, independence of directors and equity balance are therefore considered to be the three restraint mechanisms for real earnings management. Furthermore, during the factor analysis it is not only possible to calculate the score for each factor, but also to calculate the factor score in order to quantitatively describe the role of the three restraint mechanisms on real earnings management

From the statistical implications of the original research variables, it can be assumed that if the factor score for the incentive constraint mechanism is higher, the degree of equity incentive is higher i.e. the ratios for director shareholding, supervisor shareholding and executive shareholding are higher. In the same vein, the higher the factor score for the independent constraint mechanism, the higher the degree of independence of the board of directors i.e. the board size is larger and it meets more frequently. Similarly, the higher the factor score for the balance constraint mechanism, the higher the ratio for institutional shareholding and the greater the equity balance. On this basis, a factor score function was constructed to express the real earnings management constraint mechanism. The resulting factor score coefficient matrix is based on calculations carried out using SPSS software.

Table 6. Factor score coefficient matrix

	Coml	Com2	Com3
Balance	0.148	0.025	0.594
Instock	0.443	0.431	0.089
Bsize	-0.103	0.320	0.719
Bmeet	0.069	0.595	-0.453
Bstock	0.936	-0.136	-0.014
Jstock	0.729	-0.123	0.005
Execom	0.180	0.767	-0.021
Exestock	0.945	-0.131	-0.010

Source: Author

The factor score coefficient matrix above was obtained using the method of regression estimation. The factor score function for expressing the real earnings management constraint mechanism was constructed on the basis of formulas (8) to (10) below:

Z1=0.148×Balance＋0.443×Instock－0.103×Bsize＋0.069×Bmeet＋0.936×Bstock＋
0.729×Jstock＋0.180×Execom＋0.945×Exestock （8）

Z2=0.025×Balance＋0.431×Instock＋0.320×Bsize＋0.595×Bmeet－0.136×Bstock－
0.123×Jstock＋0.767×Execom－0.131×Exestock （9）

Z3=0.594×Balance＋0.089×Instock＋0.719×Bsize－0.453×Bmeet－0.014×Bstock＋
0.005×Jstock－0.021×Execom－0.010×Exestock （10）

In formulas (7) to (9), Z1, Z2 and Z3 are used to indicate the factor scores for the real earnings management constraint mechanism.

Empirical test on the effectiveness of the real earnings management constraint mechanism

The factor analysis helped us to determine the three constraint mechanisms for real earnings management, qualitatively measure the roles of the constraint mechanisms, and greatly reduce the repetition of information among the different constraint factors. Formula (7) was therefore subsequently used to empirically test the three common factors. The results of the regression analysis are presented in Table 7.

Table 7. Regression analysis results

	RM	R_CFO	R_PROD	R_DISEXP
Com1	-0.010*	-0.007***	0.004	0.002*
	（0.050）	（0.000）	（0.131）	（0.087）
Com 2	-0.035***	0.009***	-0.020***	0.006***
	（0.000）	（0.000）	（0.000）	（0.000）
Com 3	-0.052***	0.015***	-0.029***	0.008***
	（0.000）	（0.000）	（0.000）	（0.000）
Constant	0.468***	-0.095***	0.278***	-0.091***
	（0.000）	（0.000）	（0.000）	（0.000）
F-Value	187.07	37.67	201.79	150.25
Obs	6293	6293	6293	6293
Adj R2	0.052	0.011	0.056	0.043

Note: (1) two tailed tests were used, whereby ＊＊＊, ＊＊, ＊ indicates a significance level of 0.1%, 1% and 5% respectively; (2) in order to check for multicollinearity, the VIF value was tested - the VIF value was below 10, so there is no multicollinearity among the variables.

Source: Author

Table 7 shows the results of the regression analysis based on the common factors. The data shows that the model passed the significance test and that the F value that is used to test the overall setting of the model is highly significant at the level of 0. It is therefore possible to conclude that the model is effective. As is evident from Table 7, when the dependent variable is R_CFO, the regression coefficient for common factor 1 (Com1) is

negative, whereas the coefficients for common factor 2 (Com2) and the common factor (Com3) are both positive, and all three common factors are highly significant at the level of 1%. When the dependent variable is R_PROD, the regression coefficient for common factor 1 is positive, but is not significant, whereas the coefficients for common factors 2 and 3 are both positive and highly significant at the 1% level. When the dependent variable is R_DISEXP, the coefficients for common factors 1, 2 and 3 are all positive, and all of them are highly significant at the 1% level. When the dependent variable is RM, the coefficients for common factors 1, 2 and 3 are also all positive, and are also all highly significant at the 1% level. The results of the regression analysis show that: common factor 1 has a significant constraining effect on abnormal cash flow, abnormal production cost and comprehensive real earnings management; and that common factors 2 and 3 have a significant constraining effect on abnormal production cost, abnormal expenses and comprehensive real earnings management. The higher the score, the lower the degree of real earnings management, so the greater the role of the constraint mechanism. However, this role is very small with regards to abnormal cash flow.

In terms of the real earnings management of abnormal cash flow, the regression coefficient for common factor 1 is -0.007, which is overall the lowest, as well as the lowest for the incentive and restraint mechanism. This result indicates that abnormal cash flow is restricted the most by the equity incentive and restraint mechanism. Under the specific capital market conditions in China, the equity incentive enriches and improves the methods listed companies have to incentivize directors, supervisors and executives, but that this comes at the risk of a reduction in the extent of real earnings management.

In terms of abnormal production cost and comprehensive real earnings management, the regression coefficient for common factor 3 is the smallest, closely followed by common factor 2. In the terms of abnormal expenses and real earnings management, the regression coefficient for common factor 3 is the smallest, closely followed by common factor 2.

Common factor 3 represents the constraint mechanism of equity balance, and common factor 2 represents the independent constraint mechanism of the board of directors. Both constrain real earnings management behaviour from two different perspectives. Equity balance is the arrangement of equity in such a way that it creates internal mutual restraint and stimulates mutual supervision among major shareholders, which in turn effectively restrains real earnings management behaviour and inhibits internal people from plundering assets by preventing major shareholders being able to control the decision-making of a company. In contrast, the board of directors, given an appropriate increase in the number of independent directors with a professional background, an expansion in the number of members on the board, and more frequent board meetings, can also form an effective constraint on real earnings management behaviour because they actively fulfill their supervisory duties and obligations, and directly participate in corporate governance.

The following conclusions can therefore be drawn: (1) equity balance is the most effective constraint on real earnings management behaviour; (2) an independent board of directors can be a very effective constraint on overall real earnings management; (3) the implementation of an equity incentive for directors, supervisors and executives can be a an effective constraint on real earnings management behaviour.

Comprehensive evaluation of constraining effects on real earnings management

A comprehensive evaluation follows on the constraint efficiency of all three constraint mechanisms.

Evaluation method

Although the constraint efficiency of the equity balance mechanism is higher, and that of the independence constraint mechanism and incentive mechanism are lower, the overall constraining effect of the real earnings management constraint mechanism cannot be defined by the constraint mechanism alone. If we can achieve the effective evaluation of the efficiency of the comprehensive constraints of the real earnings management constraint mechanism, then when we evaluate the real earnings management and the quality of earnings information of listed companies, we can not only use the evaluation results of the comprehensive constraint efficiency, but also use the evaluation of the efficiency of the comprehensive constraints as a reference.

In order to comprehensively assess the efficiency of the real earnings management constraint mechanism, factor analysis of the variance contribution to the three constraint mechanisms was undertaken. in the process of the corresponding rate as a new statistic weight, and as a comprehensive evaluation model of the efficiency of the real earnings management in listed companies.

$$CS = \frac{\varphi_1}{\varphi_1 + \varphi_2 + \varphi_3} \times Z_1 + \frac{\varphi_2}{\varphi_1 + \varphi_2 + \varphi_3} \times Z_2 + \frac{\varphi_3}{\varphi_1 + \varphi_2 + \varphi_3} \times Z_3 \tag{11}$$

In formula (11), CS represents the comprehensive evaluation of the effectiveness of real earnings management constraints, Zl - Z4 represent the factor scores for the three real earnings management constraint mechanisms, $\varphi1$- $\varphi3$ represent the three corresponding variance contribution rates for the real earnings management constraint mechanisms. On the basis of the cumulative variance contribution rates in Table 4, we adapted formula (11) as follows:

$$CS = 0.5204 \times Z1 + 0.2600 \times Z2 + 0.2197 \times Z3 \tag{12}$$

The comprehensive evaluation of the effectiveness of the real earnings management constraints can now be obtained through the comprehensive evaluation model of earnings management constraint efficiency. Furthermore, the effectiveness and evaluation results can be empirically tested to determine whether the model is reliable or not.

Evaluation results

The results of the overall effect of the real earnings management constraint mechanism can be defined by the comprehensive evaluation model outlined above. If the model is efficient, the constraint efficiency evaluation score not only has a significant negative correlation with the real earnings management, but can also effectively identify the different samples of real earnings management. In other words, the higher the constraint efficiency evaluation score, the lower the real earnings management, and therefore the

more efficient the constraint mechanism is. If this can be illustrated it would confirm the validity of the comprehensive evaluation model of real earnings management and the effectiveness of the evaluation outcome.

Firstly, the descriptive statistics for comprehensive real earnings management were grouped. Secondly, the comprehensive evaluation scores for real earnings management based on the two groups were subsequently compared and analyzed. Thirdly, a logistic regression analysis model was constructed to test the relationship between the extent of real earnings management and the comprehensive evaluation scores for real earnings management constraint efficiency. Lastly, the classification sample levels for real earnings management were identified and tested.

Grouping of descriptive statistics for comprehensive real earnings management

When empirically testing the comprehensive evaluation model for real earnings management, it was also necessary to evaluate the reliability of the comprehensive efficiency evaluation model. The average number of RM (which is the proxy variable for comprehensive real earnings management) was used as the criterion by which to divide the total sample into 2 groups: a higher group (U_RM, RM>-0.0020); and a lower group (D_RM，RM<-0.0020). The groups obtained consisted of 3,466 and 2,892 test samples, respectively. The results are presented in Table 8.

Table 8. Descriptive statistics for comprehensive real earnings management by group

	N	Min	Max	Mean	S.D
U_RM	3423	-0.0020	0.8564	-0.1871	0.1739
D_RM	2870	-1.0741	-0.0021	-0.2276	0.2379

Source: Author

As can be seen in Table 8, in the higher real earnings management group, the maximum, minimum and average values of U_RM are 0.8564, -0.0020 and -0.1871 respectively. In the lower real earnings management group, the maximum, minimum and average values of D_RM are -0.0021, -1.0741 and -0.2276 respectively.

Analysis of comprehensive evaluation score for real earnings management constraint efficiency

The constraint efficiency score (CS) for each group was calculated according to formula (11). The descriptive statistics for CS are presented in Table 9.

Table 9. Descriptive statistics of comprehensive evaluation score for real earnings management

	N	Min	Max	Mean	S.D
U_RM	3423	4.1436	14.1425	6.2437	1.2191
D_RM	2870	4.1095	15.2709	6.6234	1.3448
RM	6293	4.1095	15.2709	6.4334	1.2975

Source: Author

As can be seen in Table 9, in the higher real earnings management group (U_RM), the average comprehensive evaluation score (CS) for real earnings management constraint efficiency is 6.2437, whereby the maximum and minimum values are 14.1425 and 4.1436, respectively. In the lower real earnings management group (D_RM), the average, maximum and minimum comprehensive evaluation scores (CS) for real earnings management constraint efficiency are 6.6234, 15.2709 and 4.1095, respectively. In addition, as is shown in Table 10, all of the maximum and average values, and standard deviations for CS are higher in the lower real earnings management group. This is reflected in the mean values for each group (see Table 10).

Table 10. Comparison of comprehensive evaluation scores by group mean

	N	**Mean**	Lower VS Higher	**t**	**Df**	**sig.**
U_RM	3423	4.1436				
D_RM	2870	4.1095		15.17**	256	0.000

Source: Author

As can be seen in Table 10, the mean value of CS is higher in the higher real earnings management group and lower in the lower group. The value of the t-statistic is 15.17 and is highly significant at the level of 0.01. The empirical test results show that the mean value of CS in the higher real earnings management group is significantly different to that of the lower group. It further illustrates that the constraint efficiency of real earnings management has a significant effect on restricting the level of real earnings management in the listed companies.

Test results of logistic regression analysis

To verify the effectiveness of the real earnings management constraint efficiency model, and to evaluate the efficacy of the evaluation results, it was necessary to construct a classified logistic regression model. This was needed in order to not only test the higher and lower groups, but to also test the relationship between real earnings management and its constraint efficiency evaluation score. The logistic regression model is represented by the following formula (13):

$$\text{Logit}(Y) = \beta_0 + \beta_1 CS + \beta_2 Control + \varepsilon \tag{13}$$

When utilizing the logistic model for the regression analysis, the dependent variables were divided into three categories according to the nature of dependent variable and either one of two classifications, namely disordered multi-classification and ordered multi-classification. On the basis of the previous analysis and the two classification models, the whole sample was divided into two sub-samples.

In formula (13), Y is the independent variable, whereby Y has a value of 0 or 1 according to whether the higher (Y =0) or lower (Y =1) real earnings management group is being tested. CS is the dependent variable, which indicates the comprehensive evaluation score for real earnings management constraint efficiency. Additional control variables were also includes in the empirical model, namely company size (Size), debt ratio (Lev), company

growth (Tobins' Q), accrual earnings management (DA), annual (Year) and industry (Industry).

Table 11 presents the results of the regression of formula (13). As can be seen, the regression coefficient of the dependent variable CS was negative (-0.235), the statistic value of Wald X2,which was used for significance testing purposes, is 172.30, and the p-value is 0, which is highly significant at level 0, and which suggests that the variable CS has passed the significance test. In addition, when Y=0, there is a significant negative correlation between the comprehensive evaluation efficiency of real earnings management and the degree of real earnings management. These empirical test results show that, the larger the value of CS, the greater the likelihood that the test sample shows a lower degree of real earnings management.

Table 11. Results of logistic regression analysis

	β	Wald	df	sig.
CS	-0.235***	172.30	0	0.000
Tobin	-0.404***	156.88	0	0.000
Size	-0.071***	10.34	0	0.001
Lev	0.573**	4.81	0	0.028
DA	0.180***	21.54	0	0.000
Constant	4.014***	61.56	0	0.000
Pseudo R2	0.06			
Obs	6292			

Note：***, **, * indicates a significance level of 0.1%, 1% and 5%, respectively (two tailed test) Source: Author

Table 12. Discriminant results of logistic regression model

	N	U_RM	D_RM	Correct rate （%）
U_RM	3423	2858	565	83.486
D_RM	2870	2639	231	91.946
RM	6293			87.351

Source: Author

As can be seen in Table 12, in total, there were 5,497 valid samples determined by the model (a rate of 88.372%). In the higher real earnings management group (U_RM), the total number of samples was 3,423, of which 2,858 samples passed the model's criteria (a rate of 83.486%). In the lower real earnings management group (D_RM), the total number of samples was 2,870, of which 2,639 samples passed the model's criteria (a rate of

91.946%). These discriminant results show that the majority of the test samples can be effectively identified by the logistic regression model.

Based on these empirical results, it can be assumed that the evaluation results of the effectiveness of the overall constraint on real earnings management can be defined by the real earnings management constraint efficiency evaluation score.

Conclusion

The following conclusions can be drawn on the basis of the results of the empirical study.

Firstly, the equity balance mechanism, the board of directors, the board of supervisors and the executive compensation incentive mechanism play an important role in restraining real earnings management behaviour. However, overall, the equity governance mechanism, the board of directors and executive incentive mechanism have a greater constraining effect on the real earnings management of listed companies.

Secondly, an effective mechanism for constraining real earnings management was put forward. Factor analysis was conducted to analyze the proxy variables of corporate governance and to construct a constraint mechanism for real earnings management, which was successfully defined through equity balance, directors´ independence and executive incentives.

Thirdly, a comprehensive evaluation model was constructed on the basis of the results of the factor analysis in order to evaluate the efficiency of the real earnings management constraint mechanism and the validity of model itself. This was done through sample mean tests and logistic regression analysis.

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Table 1. Table of statistical results of industry categories and research samples

Industry code	Industry name	Sample size	Proportion of the total sample (%)
A	Agriculture, Forestry, Animal Husbandry and Fishery	152	2.31
B	Mining Industry	156	2.37
C0	Food and Beverage Industry	292	4.44
C1	Textile, Garment, Fur Processing Industry	266	4.04
C2	Wood and Furniture Industry	25	0.38
C3	Paper Making and Printing Industry	118	1.8
C4	Petroleum, Chemical, Plastics and Plastics Industry	667	10.13
C5	Electronic Industry	279	4.39
C6	Metal and Nonmetal Industry	570	8.67
C7	Machinery, Equipment and Instrument Industry	1015	15.39
C8	Pharmaceutical and Biological Products Industry	413	6.28
C9	Other Manufacturing	55	0.84
D	Production and Supply of Electricity, Gas and Water	278	4.22
E	Construction Industry	155	2.36
F	Transportation and Warehousing Industry	267	4.06
G	Information Transmission, Computer Services and Software Industry	394	5.99
H	Wholesale and Retail Industry	433	6.58
J	Real Estate Industry	231	3.51
K	Social Service Industry	221	3.36
L	Communication and Cultural Industry	36	0.55
M	Comprehensive Class	317	4.82
Total Sample		6358	100

Source: Author

Table 2. Definitions of variables

Variable reference	Variable (in full)	Definition
RDEP	Real Earnings Management	Is a proxy variable for the degree of real earnings management (this includes abnormal cash flow（R_CFO）, discretionary expenses（R_DISEXP）, abnormal product cost (R_PROD) and total variable (RM).
Balance	Equity Balance	The equity balance is set as a virtual variable, where 0.1 < the ratio of first shareholding(Shh1) < 0.5, and the ratio of second shareholding(Shh2) > 0.1, and Shh1 < Shh1+Shh2+Shh3+Shh4+Shh5, the Balance value is 1, otherwise the value is 0
Instock	Institutional Shareholding	Proportion of total shares held by institutional investors
Bsize	Board Size	The number of board members disclosed in the annual reports of the companies in the sample set
Bmeet	Board Meeting	The number of meetings held by the board of directors of the companies in the sample set during the reporting period
Bstock	Directors Shareholding Ratio	The proportion of the total share capital held by the board of directors as disclosed in the annual reports of the companies in the sample set
Jstock	Supervisor Shareholding Ratio	The proportion of the total share capital held by the board of supervisors as disclosed in the annual reports of the companies in the sample set
Execom	Executive Compensation	The natural logarithm for the total remuneration of the top three executives during the reporting period as disclosed in the annual reports of the companies in the sample set
Exestock	Executive Shareholding Ratio	The proportion of the total share capital of the total share capital of the Sample Firms during the reporting period
Industry	Industry Dummy Variable	17 industry dummy variables
Year	Annual Dummy Variable	The valid samples cover a period of 4 years, so there are 3 annual dummy variables.

Source: Author

Table 3. Pearson correlation coefficients for the main research variables

	Balance	Instock	Bsize	Bmeet	Bstock	Jstock	Execom	Exe-stock
Balance	1							
Instock	0.047*** （0.000）	1						
Bsize	0.060*** （0.000）	0.028*** （0.004）	1					
Bmeet	-0.008 （0.417）	0.074*** （0.000）	-0.047*** （0.000）	1				
Bstock	0.103*** （0.000）	0.257*** （0.000）	-0.093*** （0.000）	0.024** （0.016）	1			
Jstock	0.030*** （0.002）	0.213*** （0.000）	-0.035*** （0.000）	-0.005 （0.589）	0.537*** （0.000）	1		
Execom	0.006 （0.530）	0.205*** （0.000）	0.097*** （0.000）	0.202*** （0.000）	0.076*** （0.000）	0.044*** （0.000）	1	
Exe-stock	0.105*** （0.000）	0.267*** （0.000）	-0.091*** （0.000）	0.019** （0.049）	0.975*** （0.000）	0.560*** （0.000）	0.086*** （0.000）	1

Note: double tailed test p value of the coefficients in given in brackets, whereby *, * *, * * * indicates a significance level of 1%, 5% and 10% respectively.

Source: Author

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The Spatial Delimitation of Agglomerations in the Czech Republic: The Case of Northwestern Bohemia

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Abstract

This contribution has a purpose to introduce a method of spatial delimitation of the agglomerations in the Czech Republic. A model territory was chosen in the borderland territory of northwestern Bohemia, which is, on Czech terms, strongly urbanized. In this area, with five larger cities, a high potential of agglomeration with surrounding settlements is supposed.

The data about intercommunal commuting to work, from the Census 2011 were representing the fundamental data complement used for delimitation of agglomerated areas. The algorithm used for defining agglomerations was based on necessity of existence of reciprocal work commuting interactions. It was approached by progressive merging of municipalities with agglomeration, limited by threshold values of preselected relativized commuting criteria.

Except the city of Děčín, the only core of agglomeration that does not lay in the coal field, there were quite extensive agglomerated areas defined. They are not only spatialy closed, but they are even neighbors. Except the Ústí agglomeration, delimited agglomerations are reporting low attractivity, in terms off commuting to work. The most significant regional concentration of inhabitants having a high grade of integration are the Ústí and Teplice agglomerations. This finding is in agreement with the regional spatial planning documentation.

Keywords: agglomeration, commuting to work, northwestern Bohemia.

Introduction

One of the objects of study of geography is the identification and study of territory types. That supposes the existence of similar spatial units, with respect to their geographic or functional organization. In this case a contribution follows on a brilliant study by

Stejskalová (2011) dedicated to landscape structures and functional landscape utilization.

Agglomerations, or more precisely agglomerated areas represent the type of area showing a high rate of territorial built-up, and/or high intensity of connections, functional concentration and autonomy. Agglomerations therefore can be defined on the basis of territorial morphology (only continuously built-up area) or on the basis of the interaction intensity between spatialy closed settlements units.

For delimitation of larger urbanized complexes a complex quantitative methods can be used, which use geographic information systems (Liu, Dong and Chi 2010). These approaches are used in the Southeast Asia, where population and large-scale metropolitan areas have grown.

For the existence of agglomeration, many authors assume the existence of one dominant centre, around which settlement units are grouped, with high connection on its core. High rate of connectivity is quantitatively given by high intensity of commuting to schools and to services (Halás 2012). The agglomeration is defined similarly by Votrubec (1980), who presumes the existence of one main centre, around which the smaller settlement units are clumped, which profit on the atractivity of the dominant centre, thanks to it and in its closed hinterland (in the agglomerated municipalities) the number of inhabitants grows. In the agglomerations, with higher or lower intensity, the suburbanization processes connected to both residential and working functions of the agglomerated municipalities, are proceeded.

Intensity of commuting, in case of agglomerations, is not given only by one way movement of inhabitants from agglomerated municipalities to dominant center, but also in the opposite way. With the reciprocity of links between centre and hinterland has worked, for example, Tonev (2013) to identify local labor markets.

This contribution aims to spatialy define agglomerations in extensively urbanized region of Northwestern Bohemia, using the data about daily commuting to work. The model territory represents, on Czech circumstances a highly urbanized and industrialised area of northwestern Bohemia, passing mainly due to foreign investments by restructuring the economic base (Hlaváček 2009). A similar transformation of the urbanized areas was described also in other eastern European countries, such as Poland (Krzysztofik 2016). Therefore, attention should be paid to these types of lands. Methodically, it is based on mutual effect of center and agglomerated municipalities. The approaches of a group of Czech authors dealing with processes of suburbanization and organization of geographic area of the Czech Republic were incorporated. Some of Czech authors compared their own method-defined agglomerated territories of the higher order (metropolitan areas) with the definition made in official documents of the public administration (Tonev 2017). Also, in this article, the presented research results were compared with existing national planning documentation, on national level.

Materials and Methods

Mulíček and Sýkora (2009) replace the concept of agglomeration with the expression „functional urban area" (FUA), which is formed by core and suburbanized zone. The suburbanized zone is represented by municipalities, of which, daily at least 25 % of employed people living in municipality, are commuting to work in each day. At the same time, at least 1000 occupied working places must exist in the centre. Limited usability of this method can be, for example, documented by allowing the creation of FUA, whose center was a municipality with less than 1000 inhabitants (Dukovany). The reason is the fact, that in the area of cadastre of the mentioned municipality is a nuclear power plant. The impact of Mulíček´s and Sýkora´s work can be seen in the understanding of spatial processes of strongly urbanized areas. City can not be understood in limits given by borders of its cadastre and real spatial dimension of cities and city agglomerations can be identified on the basis of commuting intensity.

Hampl (1996, 2005) also works with the concept of agglomeration by defining the microregional structures of the Czech Republic, based on identification of prevailing flow of commuting to work. Marada and Hampl (2015) used a similar method for spatial definition of microregions of the Czech Republic, but in the addition he also used commuting to schools. Hampl in his monography (2015) admits the seriousness of definition of settlement agglomerations, while himself, as he states, performed merging of municipalities in minimum range. In other words, at least he admits that spatial extent of city agglomerations in the Czech Republic can be assumed to be larger. Kraft, Marada and Popjaková (2014) also point to to the lack of standard methods for defining urban agglomeration areas.

Therefore, we will try to compile a universal algorithm for a definiton of agglomerations, with the use of daily commuting to work data, from Census of 2011. In the begining, there is a need to handle the problem of incompleteness of the data bases, because, as Hampl and Marada (2015) state, the Census in 2011 catched up about 600 000 less commuters to work than in the year 2001, while the size of catched up commuting was in total 1.5 milion cases in the year 2011. Hampl and Marada presumes a flatly uniformed incompleteness of data bases and the file of catched up commuting cases as sufficiently predicative and applicable for defining of the regions.

The algorithm applied for spatial identification of agglomerations exists, similarly as in the work of Tonev (2013), from the aggregation method, when in each merging of new municipality with already agglomerated area, the matrix of currents of daily commuting to work is recalculated, within agglomeration, to agglomeration and out off agglomeration.

The combining parametr has, in light of commuting to work, bi-directional character and forms a sum of two shared values:

- share of commuting out to work from the municipality daily to agglomeration, on total number of daily commuting out to work from the municipality (%);

- share of commuters to work to the municipality from the agglomeration on total number of commuters to work to municipality daily (%).

Similarly as in regionalizations conducted for example by Hampl, here also applies that the enclaves and exclaves are excluded. That is why tested municipalities have to, with their cadastral area, neighbour with already defined agglomeration. It also applies, that total number of all commuters to work to tested municipality (both daily and not-daily) must be minimaly 10. This condition was estimated for technical reasons, because selected method would be singnificantly devalued in cases, when units of individuals are commuting to the municipality. Another reason is an assumption, according to which, with the process of agglomeration is related the process of suburbanization connected to above average intensity of jobs alocation into urban hinterland. To this process, to a large extent, contributes the relocation of jobs from the centre to the hinterland. This also leads to interconnection of the core with its immediate agglomerated surroundings. Municipalities with less than 10 commuters to work into municipality can be agglomerated only in case, that they are neighbour upon agglomerated municipalities only so they do not create enclaves inside the agglomerated area.

Tab. 1: The threshold values of combining parameter (the sum of shares of daily commuting and commuting out on total commuting and commuting out) by total number of commuters to work and the commuting index of tested municipality

Commuting Index	Total Numbers of Commuters to Work					
	10-100	100-500	500-1000	1 000-2 000	2 000-5 000	5 000 a více
0-30	130	125	120	115	110	105
30-50	125	120	115	110	105	100
50-70	120	115	110	105	100	95
70-90	115	110	105	100	95	90
90-110	110	105	100	95	90	85
110-150	105	100	95	90	85	80
150-200	100	95	90	85	80	75
200-500	95	90	85	80	75	70
500 and more	90	85	80	75	70	65

Source: Author

They were determined different threshold values of combining parameter. Maximal value of total share values mentioned above was by multiplying empirical testing of agglomerations in the whole Czech Republic established to 130, and that for municipalities with lower number of commuters to work at total (less than 100) and with higher overhang of commuting out upon commuting, when the value of commuting index is lower than 30, whereas the commuting index represents the proportion between total commuting to work to the municipality and total commuting out to work from the municipality multiplied by 100.

The municipality which has higher number of commuters to work and the higher the commuting index, the threshold value of the combining parameters is lower. The stepping reduction of the combining parameter was as well defined by numerous empirical testing of the agglomerations in the Czech Republic, so that the defined agglomerations satisfy minimally such a definition of the great majority of agglomerations, with which Hampl (2005) has worked.

Results

With the method used, were defined agglomerations, that by their number of agglomerated municipalities are outreaching the spatial scope given by Hampl (2005). Agglomerated areas are geographically closed or adjoined. All the agglomerations are geographically located inside its districts of administration of municipalities with extended terms of reference.

Special case presents the agglomeration of Most-Litvínov. The city of Most with its 67 thousand inhabitants is, by population, more than twice as larger as Litvínov (26 thousand inhabitants), but the commuting attraction of Most (4,2 thousand commuters to work) and Litvínov (2,9 thousand commuters to work) is considerably more balanced than the population predominance of Most. Litvínov is presented by commuting index 133,5 whereas Most only 91,0. It means that more inhabitants are commuting out to work from Most than commuting in. The commuting flow from Most to Litvínov is higher than the opposite. In relation to appreciable cohesion of both cities, which besides the commuting circumstances is given also by the existence of mutual cohesion of public transportation, we are naming this concentration of inhabitants, as the agglomeration of Most-Litvínov.

Pic. 1: Northwestern Bohemian agglomerations by the Census 2011

Source: Census, 2011

By both, the number of municipalities and the population size, from the analysed agglomerations, surpasses the Děčín agglomeration. Děčín as the only core of agglomeration does not lay down in pelvic region. The interactional character of combining parameter did not allow Děčín to agglomerate more than two municipalities. A great importance represented the condition of minimal 10 commuters to the municipality, which did not accomplish to join most of the municipalities to Děčín.

The agglomerations of Ústí nad Most-Litvínov are, according to the population size, two of the most important agglomerated areas. They are comparable with the number of inhabitants. With both, the expanse and number of municipalities, the agglomeration of Most- Litvínov, which, with the agglomeration of Chomutov, reports extremely low values of density of population of non-core zone. The reason are an extensive areas of mining zones of surface, where mining of the brown coal leads to depopulation of settlement immediate surroundings of Most, Litvínov and Chomutov. The settlement units around these cities, although have strong commuting connections tn their cores, however the level of suburbanization of brutal surface mining devastated area is minimal here.

Considerably much higher rate of (sub)urbanization reports the non-core zone of both Ústí and Teplice agglomerations, which is also confirmed by the data of population density. Both spatial concentrations of inhabitants are neighboured together and are by mutual commuting interactions strongly integrated. These two agglomerations are representing the core of strongly urbanized area of Northwestern Bohemia.

Tab. 2: Basic territorial characteristics of Northwestern Bohemian agglomerations by census 2011

Agglomeration	Number of Municipalities	Population	Area (km2)	Density of Population (Population/km2)
Chomutov	18	79 862	345,7	231,0
Core	1	49 784	46,4	1 072,9
Non-core Zone	17	30 078	299,3	100,5
Most-Litvínov	21	112 922	369,3	305,8
Core	2	93 271	127,6	731,0
Non-core Zone	19	19 651	241,7	81,3
Teplice	11	84 659	159,1	532,1
Core	1	50 728	23,8	2 131,4
Non-core Zone	10	33 931	135,3	250,8
Ústí nad Labem	11	113 378	228,2	496,8
Core	1	95 003	94,0	1 010,7
Non-core Zone	10	18 375	134,2	136,9
Děčín	3	56 108	174,1	322,3
Core	1	50 620	117,7	430,1
Non-core Zone	2	5 488	56,4	97,3

Source: Census 2011, Author

Tab. 3: Basic characteristics of commuting to work of Northwestern Bohemian agglomerations by census 2011

Agglomeration	Number of Commuters-in	Number of Commuters-out	Commuting index
Chomutov	**6 221**	**8 344**	**74,6**
Core	4 253	3 497	121,6
Non-core Zone	1 968	4 847	40,6
Most-Litvínov	**9 151**	**10 103**	**90,6**
Core	7 143	6 828	104,6
Non-core Zone	2 008	3 275	61,3
Teplice	**7 927**	**8 757**	**90,5**
Core	5 093	4 281	119,0
Non-core Zone	2 834	4 476	63,3
Ústí nad Labem	**9 764**	**6 975**	**140,0**
Core	7 554	4 130	182,9
Non-core Zone	2 210	2 845	77,7
Děčín	**2 938**	**3 692**	**79,6**
Core	2 702	2 753	98,1
Non-core Zone	236	939	25,1

Source: Census 2011, Author

The commuting conditions indicate that the agglomerations of Northwestern Bohemia have been significantly weakened since the transformation of the Czech economy. I tis generally known that the Ústí Region suffers with longterm unempolyment and above all, with depopulation of its territory. All of the agglomerations, except the Ústí agglomeration, had reported, in the year 2011, an overhang of work commuting out over commuting in. Together, these agglomerated areas reported negative commutive balance of 1.8 thousand people. Absolutely unprecedented is the position of Děčín, as the core of agglomeration. This city with almost 50 thousand inhabitants reported actually very weak aggregated work commute, and thus the number of commuters out to work from Děčín had exceeded the number of commuters into work. A very low value of commuting index had also been reported in the core of Most- Litvnínov agglomeration.

Discussion

The Czech geographical institutions had in last 25 years been focused on the changes in geographic organization of areas with different geographic level, from the perspective of regions, including commuting regions. The authors had conclusively identified the trends of concentration (Hampl and Marada 2015). Concentration processes are pointing to the cores of regions, which are capable of agglomerating the settlements in its surroundings.

The result of conducted delimitation of agglomerated areas could be compared with regional spatialy planning documentation determining, within the Ústí Region, which territories should be preffered in the allocation of development activities. It is assumed, that the determination of development areas and axis should reflect the existing concentration of population and economic activities. The picture 2 presents the territorial agreement of delimitation of agglomerations and both development areas and axis in the analyzed territory.

Pic. 2: The comparison of definition of Northwestern Bohemian agglomerations with the development areas and with development axis.
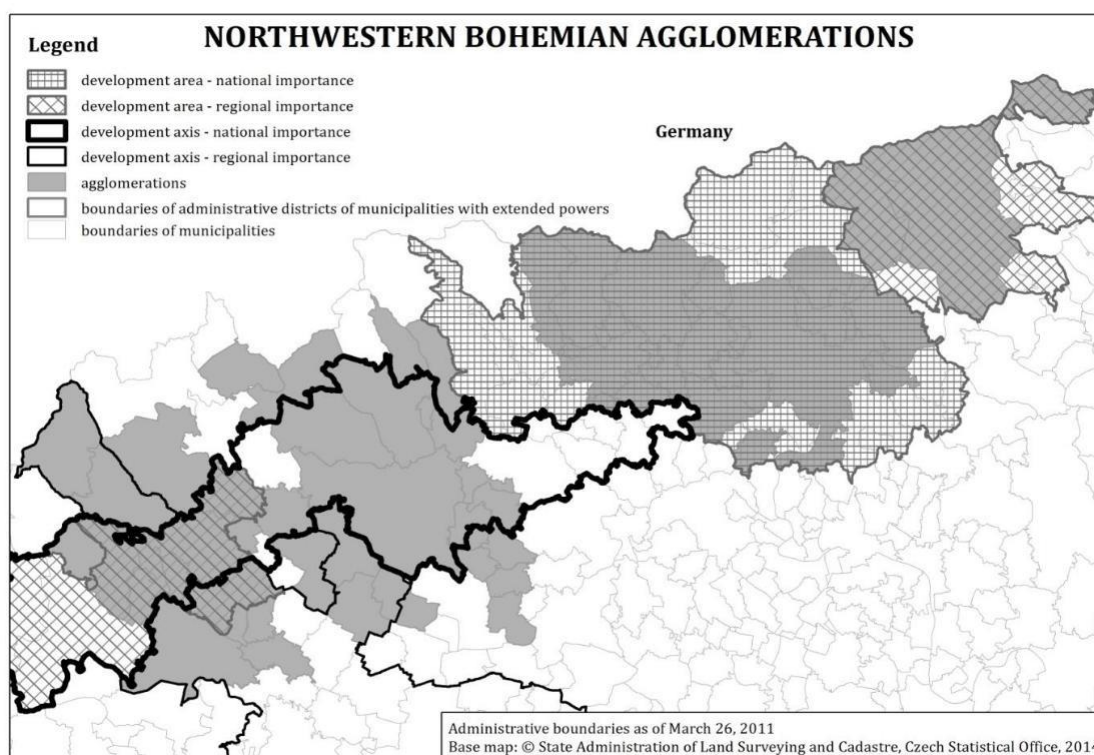
Source: Principles of spatial development of the Ústí region

Almost the entire territory of defined agglomerations is a part of development area or axis. In most cases, it is about regions with preference of national scale. Thorough, 10 municipalities of total 21 in the agglomeration of Most-Litvínov are not included in any of the development area or axis. On top of that, 2 such agglomerations are located also in the Chomutov agglomeration. All these municipalities are, in the regional spatial planning documentation, inclided in specific areas reporting some problems and requiring special attention. Specifically, it is primarily the case of municipalities that are part of brown coal mining sites or in its closed proximity.

Conclusion

The method used for delimiting of agglomerations, based on reciprocation of work and commuting interactions has introduced relatively soft limiting combining parameters.

All of the agglomerations were delimited in larger range, compared to used definition in existing Czech geographic literature.

The largest spatial range had reported the agglomerations on the west of the Ústí Region. Specifically, it is about the Chomutov agglomeration and Most-Litvínov agglomeration. The settlement structure in the Most coal basin has been greatly destroyed and is manifesting in the commuting conditions. On one side, mutual strong interconnection with the municipalities in greater distances from the core of agglomerations exists here, on the other side are these municipalities reporting, on a wider scale, lower attractivity of its labor markets.

The agglomerations of Ústí and Teplice have a higher territorial integration. Their commutive cohesion is also much higher than in case of Most-Litvínov and Chomutov agglomerations. The agglomerations of Ústí nad Labem and Teplice are legitimately identified as the most significant concentrations of inhabitants in the Ústí Region, as a development area of national importance.

The delimitation and analysis of the Děčín agglomeration has brought about a very surprising results. From all monitored agglomerated areas, it has presented the lowest number of both agglomerated municipalities number of inhabitants, despite that the city of Děčín is by population comparable with cities Teplice and Chomutov. A weak position of the Děčín city is involved with its extremely low work commutive attractivity.

Presented conclusions can answer the other academic discussion focused on organization of the geographic area and its dynamics. At the same time, it has been proved that the used approach has a potential for both creation and evaluation of regional strategic documents, having a territorial impact.

Acknowledgement

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Gender Differences in Employee Engagement

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Abstract

Employee engagement is an important factor for all employers who want to build a stable, innovate company that can increase its market share and prosper. Employees who show high engagement are one of the basic prerequisites for such success. A number of previous studies have looked into the issue of engagement, however, they did not focus on gender differences. Some recent studies have provided multivalent conclusions in this respect. The main objective of this article is to identify whether there are statistically significant gender differences. These differences are identified in all basic areas of engagement i.e. atmosphere in the workplace, satisfaction with management and potential staff turnover. The sample set comprised 315 automotive employees working in blue-collar positions. The results were established and verified using the Mann-Whitney U Test, Friedman´s ANOVA, Kendall´s coefficient of concordance and the Wilcoxon signed-rank test (paired difference test).

Comprehensive analysis showed that no crucial, statistically significant gender differences could be identified. However, it was found that women are more loyal to their employer than men, who tend to be more self-confident and independent. Nonetheless, the attitudes of men and women were found to be the same when it comes to engagement.

Keywords: employee engagement, atmosphere in the workplace, gender differences, potential staff turnover, satisfaction with management.

Introduction

At present, the majority of economically advanced countries are enjoying a period of economic growth and falling unemployment. As a result, many employers are facing a shortage of personnel. Employers understand the importance of human resources for the continued development of businesses and organisations and for maintaining competitiveness. Under the circumstances, it is proving difficult for them to find new staff for job vacancies. Hence, their desire to retain existing employees. Within this context, emphasis is placed not only on their motivation, but also on their level of engagement

because employers believe that engaged employees will help reduce the rate of staff turnover.

This trend is apparent across different industries and countries. For example, Mañas-Rodríguez et al. (2016) analysed the psychometric features of the Spanish equivalent of engagement in the academic environment. Yeh (2014) studied the issue of engagement and satisfaction among employees in Taiwanese airlines. Mohan and Nailini (2016) identified factors which influence employee engagement in hospitals. These factors, from the employees´ point of view, included: recognition (Receives recognition for a job performed); job security (Feels secure about the job); concern from management in employees (Believes that management is interested in their employees); pride in their employer (Feels a sense of pride); intention to leave (Does not have any intention to leave for another organisation); and willingness to recommend to others (Proud to tell others about the job).

Although the questions in the questionnaire survey for this research focused particularly on how employees feel at work, how they assess the attitude of their superiors, as well as their loyalty, the inclusion of the issue of job security by other authors is interesting. Yuan and Tetrick (2015), who point out the relationship between performance, job security and engagement, conducted their research in a coal mining company in China. Huang, et al. (2016) suggest that the atmosphere of security relates to satisfaction at work, as well as employee engagement. In their study, they explain this relationship using a social exchange theory. The fact that job satisfaction and employee engagement are completely separate issues has been proven by a number of authors in the past. Alarcon and Lyons (2011), tested models using hierarchical regression. The results showed that the issues have different relationships with individual areas of a person´s working life and that job satisfaction and engagement are two independent variables. One of the latest studies conducted by Janine and Crystal (2017) proved there is a relationship between reward, trust and employee engagement. They came to the conclusion that salaries can no longer be the sole motivating factor for organizations if they want to retain talented employees.

Employee engagement is quite rightly given extensive attention because it is crucial for the effectiveness of organisations (increase in productivity, innovation, customer satisfaction and growth in sales/turnover). Engagement is reliably linked with the performance of an organisation (Roberts 2013). Yalabik et al. (2017) similarly found relationships between engagement, satisfaction and performance. However, they paid little attention to prospective gender differences in individual aspects of engagement. The objective of this article is therefore to identify these differences, if any.

Many organisations want to measure engagement, including job satisfaction and pride in being part of the organisation. The Society for Human Resource Management (SHRM) has established that good working conditions, relationships with colleagues and line managers, as well as the financial stability of an organisation are factors which play an important role (Cohen 2014). Kwon, Farndale and Park (2016) state that engagement at work is influenced by factors on three levels: national culture (macro level); atmosphere

in the organisation (inter-stage); and quality of relationships between employees and superiors (micro level). Cahill et al. (2015) investigated how job satisfaction, employee engagement and satisfaction with work-life balance are influenced by macroeconomic changes. They established that all the monitored factors are influenced by macroeconomic conditions. Apparently, employee engagement is a crucial factor which influences the performance of companies, however, it can also be a particular indicator of macroeconomic changes.

Materials and Methods

As the research studies above show, employee engagement is a complex issue which is made up of a lot of different attributes. Pursuant to the aforementioned findings, three variables were selected for testing: satisfaction with management; atmosphere in the workplace; and potential staff turnover. In spite of the fact that employee engagement issues has been given extensive attention, past research has often overlooked potential differences between the genders. Some partial findings have produced rather unclear and inexplicit conclusions (Mendiratta 2016; Shukla, Adhikari and Singh 2015; Yadav 2016; and others). The objective of this research was therefore to identify whether there are differences between men and women with regards to the selected variables.

The survey sample consisted of 315 blue-collar employees (of which 207 were men and 108 women) working on production lines in four different automotive companies. The questionnaire contained the 15 questions shown in Table 1.

Table 1. Questionnaire questions

1. Would you leave the company if you were given a comparable offer by another employer?
2. Are you currently looking for a new job?
3. Are you recognised for good performance?
4. Is your superior executive interested in you as a human being?
5. Does your superior encourage your development?
6. Do you have a say at work?
7. Have you considered leaving the company in the last 6 months?
8. Are your colleagues willing to perform well?
9. Do you have a good friend at work?
10. Did you have an opportunity to learn something last year?
11. Are you happy with the current employee benefits?
12. Do the employee benefits meet your needs?
13. Are you happy with the atmosphere among your peers?
14. Does the company where you work have a good image?
15. Do you find the level of staff turnover excessive?

Source: Authors

Respondents used a scale of 1 - 5 to answer the individual questions i.e. from complete dissatisfaction up to complete satisfaction, or according to the rate of agreement i.e. from definitely not to definitely yes. For questions 1, 2, 6 and 15 the scale was reversed because

Yes responses reflected a negative assessment. The scores for the individual questions (attributes) were subsequently matched to the appropriate variable:

> Satisfaction with management
> Atmosphere in the workplace
> Potential staff turnover

Since each variable did not include the same number of questions (attributes) and therefore responses (scores), the responses for each group (male or female) were represented by the score obtained as the arithmetic mean of the scores of the responses to the individual questions.

The following tests were used for the statistical processing: Mann-Whitney U Test; Friedman´s ANOVA; Kendall´s coefficient of concordance; and the Wilcoxon signed-rank test. Data were processed in the SW Statistica and SPSS.

Results

The survey focused on whether the assessment of the monitored variables differs in relation to gender.

Table 2. Mann-Whitney Test for the monitored variables according to gender

Variables	U	Z	p-value
Satisfaction with management	10,689.00	0.636670	0.524340
Atmosphere in the workplace	10,454.50	0.942298	0.346041
Potential staff turnover	10,092.50	1.414099	0.157334

Source: Authors

The Mann-Whitney Test did not show any differences between men and women. Hence, it cannot be stated that women assess the variables differently from men. Both groups (i.e. women and men) were subsequently analysed in more detail. Friedman´s ANOVA and Kendall´s coefficient of concordance were applied to the survey results to determine whether the medians of the three monitored variables match or not. The results are shown in Tables 3 and 4 (women) and Tables 5 and 6 (men).

Table 3. Concordance of medians for the monitored variables for "women". Friedman´s ANOVA (N = 108, sv = 2) = 12.33838; p-value = 0.00209

Variables	Average ranking	Sum of ranking	Average	Standard deviation
Satisfaction with management	1.856481	200.5000	3.438889	0.959540
Atmosphere in the workplace	2.263889	244.5000	3.666667	0.758133
Potential staff turnover	1.879630	203.000	3.476852	0.845997

Source: Authors

The ascertained results for the monitored variables indicate that the medians show no concordance. Gender therefore has no influence on the assessment in these three variables. The concordance coefficient with a value of 0.05712 is very small. Paired variables were also tested to establish which variables show the greatest statistical differences. Table 4 shows that there is apparently a statistically significant difference between the variables - satisfaction with management and atmosphere in the workplace and atmosphere in the workplace and potential staff turnover.

Table 4. Wilcoxon test of paired variables for "women"

Paired variables	Number of valid	T	Z	p-value
Satisfaction with management & Atmosphere in the workplace	96	1,415.000	3.336386	0.000849
Satisfaction with management & Potential staff turnover	101	2,470.500	0.355702	0.722064
Atmosphere in the workplace & Potential staff turnover	97	1,625.500	2.70224	0.006887

Source: Authors

The data in Table 4 indicate that women evaluate atmosphere in the workplace statistically significantly better than the other two variables. No statistically significant difference was found between the other two variables, namely potential staff turnover and satisfaction with management.

The same analysis was carried out in the group of "men" as well.

The group of "men" also featured differences in the assessment medians for the three monitored variables, as proved by Friedman´s ANOVA. Kendall´s concordance coefficient of 0.0392 is low.

Table 5. Concordance of medians for the monitored variables for "men". Friedman´s ANOVA (N = 207, sv = 2) = 12.80267; p-value = 0.00166

Variables	Average ranking	Sum of ranking	Average	Standard deviation
Satisfaction with management	1.900966	393.5000	3.385507	0.876667
Atmosphere in the workplace	2.193237	454.0000	3.579710	0.7769391
Potential staff turnover	1.905797	394.5000	3.344605	0.861737

Source: Authors

Men show similar results to women. Men evaluate atmosphere in the workplace statistically significantly better than potential staff turnover and satisfaction with management. Once again, no statistically significant difference was found between the two other variables.

Table 6. Wilcoxon test of paired variables for "men"

Paired variables	Number of valid	T	Z	p-value
Satisfaction with management & Atmosphere in the workplace	185	5,975.000	3.602625	0.000315
Satisfaction with management & Potential fluctuation	190	8,443.000	0.829364	0.406899
Atmosphere in the workplace & Potential fluctuation	181	5,497.500	3.878920	0.000105

Source: Authors

Since the overall analyses of the monitored variables do not suggest any significant differences between the genders, a more detailed analysis was conducted of the individual attributes. The differing assessment by both groups (i.e. men and women) is clear from the boxplot for the question: Are you currently looking for a new job?

Figure 1. Boxplot – differences between medians according to gender
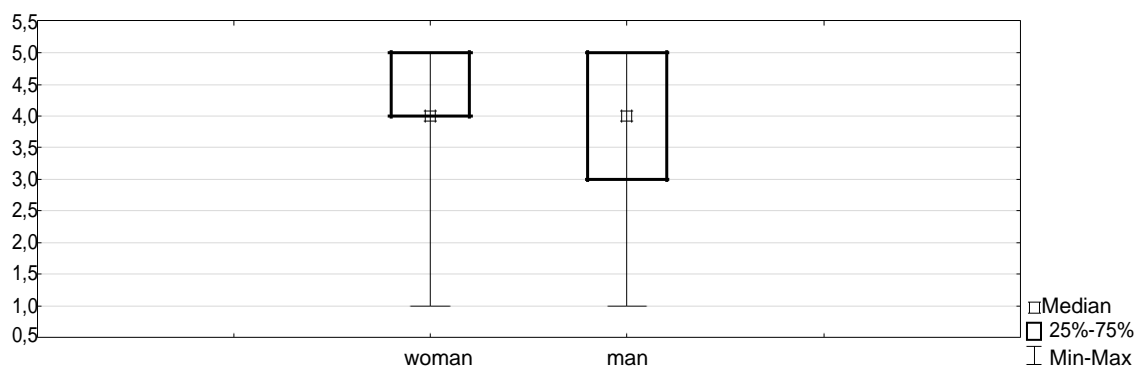
Source: Authors

The Mann-Whitney U Test examined for each question (attribute) whether the responses to the individual questions depended on gender. The test statistics and p-values are shown in Table 7.

Table 7 shows that the responses of men and women only differed with regards to the question: Are you currently looking for a new job? These results could lead to the conclusion that the current working attitudes of men and women to the engagement of front line employees no longer differs. The view of the employer is also seen similarly by both genders. The only demonstrable difference is that women appear to be "more loyal" to their employer. Men are more self-confident and show greater independence.

Table 7. Testing of gender differences with regards to employee engagement

Items	U	Z	p-value
Would you leave the company if you were given a comparable offer by another employer?	10,835,50	0.445734	0.655789
Are you currently looking for a new job?	9,216.50	2.555804	**0.010595**
Are you recognised for good performance?	9,891.50	1.676066	0.093726
Is your superior interested in you as a human being?	10,528.50	0.845853	0.397636
Does your superior encourage your development?	10,729.50	0.583886	0.559297
Do you have a say at work?	10,412.00	-0.997689	0.318431
Have you considered leaving the company in the last 6 months?	9,890.00	1.678021	0.093344
Are your colleagues willing to perform well?	11,167.00	0.013685	0.989081
Do you have a good friend at work?	10,034.50	1.489691	0.136306
Has anyone spoken about your advancement in the last 6 months?	10,849.00	-0.428140	0.668550
Did you have an opportunity to learn something last year?	11,001.50	0.229384	0.818571
Are you happy with the current employee benefits?	11,088.50	-0.115995	0.907656
Do the employee benefits meet your needs?	10,885.50	0.380569	0.703524
Are you happy with the atmosphere among your peers?	10,696.50	0.626895	0.530728
Does the company where you work enjoy a good image?	10,622.50	0.723341	0.469471
Do you find the level of staff turnover excessive?	10,823.50	0.461374	0.644530

Source: Authors

Discussion

The objective of this article was to establish whether there are differences in employee engagement between men and women. So far, this area of research has provided inconsistent conclusions. For example, Mendiratta (2016) investigated gender preferences in employee satisfaction in pharmaceutical companies. He concluded that remuneration - size of the wage and/or additional benefits - is more important to men, whereas equal opportunities in the workplace and freedom to perform their job are more important to women. However, job satisfaction constitutes only part of the more complex issue of employee engagement. Shukla, Adhikari and Singh (2015) examined the total rate of employee engagement. They established that women show significantly higher engagement than men. Their survey was carried out in only one company (Indian Internet Company) and the research sample group was relatively small (90 respondents). Yadav (2016) tested the engagement of academic staff in India. The survey results did not prove any relationship exists between engagement and gender.

Mache et al. (2016) conducted an extensive survey among physicians. The research did not directly focus on employee engagement, but on the relationship between job satisfaction, stress and conflict. They established significant gender differences in the level of stress, conflict and perception of work load. These factors consequently influence job satisfaction. Beattie and Griffin (2014) found that stress in the workplace can be significantly reduced with the help of increased support from superior managers. This aspect is considered by employees in terms of the assessment of the variable "satisfaction with management". More studies emphasise the importance of management support (Lee and Ok 2015).

One of the positive consequences of employee engagement is the lower rate of staff turnover, which is appreciated by employers. Within this context, the research that forms the basis of this article made an important finding i.e. that women are more loyal to their employer and do not look for a new employer as often as men. Similar issues were researched by Bacea and Bordean (2016). They investigated the most important factors which influence the willingness of employees to stay in a company. They concluded that work environment, fair remuneration, meaningful work tasks and jobs and positive encouragement from peers play an important role.

Dash and Muthyala (2016) investigated the level of engagement in Indian IT companies. Their conclusion was that critical areas of engagement were the assessment and development of performance, encouragement from a manager and effective leadership. Encouragement from a manager was more appreciated by women than men, particularly in providing feedback. Satisfaction with management (i.e. giving recognition and rewards, providing feedback) forms an integral part in building employee engagement. A high rate of engagement consequently increases employee retention (Richman et al. 2008) i.e. if total employee engagement is measured, potential staff turnover will be low. The retention of employees is also influenced by the match between their career wishes and the fulfilment thereof, opportunities for self-development and work-life balance (Coetzee & Stoltz 2015). It would therefore be advisable to include these factors in the comprehensive measurement of employee engagement.

Conclusion

Employee engagement is currently prioritised by employers in all advanced countries of the world as it helps increase company performance, launch innovations, provide personnel stability, and eliminates staff turnover. The objective of this survey was to identify whether there are significant gender differences in front line employees working in the automotive industry in terms of the individual aspects of engagement. It was established using statistical methods (Mann-Whitney U Test, Friedman´s ANOVA, Kendall´s coefficient of concordance, and the Wilcoxon signed-rank test) that no statistically significant differences between the genders could be established for any of the monitored variables i.e. satisfaction with management, atmosphere in the workplace and potential staff turnover.

However, a detailed analysis of the individual attributes of employee engagement established that women do not consider leaving their job as often as men. Hence, they show greater loyalty to their employer. Nonetheless, it was proved that there were no significant gender differences related to employee engagement in blue-collar occupations in the automotive industry.

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Product Innovations in the Manafacturing Processes of Special Composites

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Abstract

At present, in order to maintain a sustainable production process and achieve real business competitiveness, attention needs to be paid focused planning of innovations in production systems. Major innovations are the product innovations where significant improvements can be reflected in technical specifications and new materials, that are significantly different from the original products, thus replacing the products and materials that are absent for the needs of different sectors of industry.

In our research, we have focused on product innovations in the field of modification of existing polymeric materials for the preparation of new special composites for various industries. Based on the study of the rheological behavior of polymer mixtures and the determination of the optimal technological conditions of the manufacturing process (melting of polymer mixtures and subsequent spinning), the complex evaluation of the formed supramolecular structure and the characteristics of the fiber-forming composites we have experimentally prepared new types of special composites.

Keywords: product innovations, manufacturing processes, special composites.

Introduction

The manufacturing process is a creative process and its function is the creation of planned utility values. It represents the main activity of the production company. The nature of the manufacturing process is based on the basic aspects of the production process, the product complexity, the impact of human, the environment and the maturity of the technology, the technology used, the assortment of products, the way and the repeatability of the production in the subsequent context of the economic efficiency

of the production process (Kavan 2002; Šaderková 2015; Polanecký and Lukoszová 2016). The manufacturing process influences decisively the efficiency of the business and the competitive ability of its products. The realization part of the production process is the most important stage in the creation of final products with minimization, respectively optimization of inputs and the expected maximization of outputs (Caha 2017; Vochozka 2011; Lindermann et al. 2013).

At present, in order to maintain a sustainable production process and achieve real business competitiveness, attention needs to be paid focused planning of innovations in production systems. Solving this relatively complex problem is to focus attention on the manufacturing process that delivers market prospective products from new materials with minimal adaptation of technological processes and repeatable economically efficient and environmentally friendly production (Rusnáková et al. 2014).

The aim of the paper is to determine the optimal conditions of technological preparation of new innovative product - polymer mixtures by studying the process of melting rheology in the manufacturing process of subsequently formed fiber-forming bicomponent polymers applied to new special composite materials in the context of economic efficiency of production innovations.

Innovation in management production of composites

At present, it is crucial for companies to remain in the global market and to become more competitive in their position through the implementation of innovation policy. Major innovations are the product innovations where significant improvements can be reflected in technical specifications and new materials, that are significantly different from the original products, thus replacing the products and materials that are absent for the needs of different sectors of industry. Replacement of existing materials in the production of final products by new, forward-looking materials contribute to preserving and increasing market share and gaining new markets (Vochozka et al. 2015; Kampf et al. 2017).

It is expected that, from the point of view of a company's market position, product product innovations should achieve the positive image of the company marketing them, thus enhancing the preservation of the competitiveness of an industry in the given industry sector, or earning early profits by acquiring a temporary monopoly of production costs or realization higher prices. New products that have been prepared on the basis of patents and utility models can provide a longer-term competitive exit compared to marketing mix tools such as pricing or advertising. At the same time, it is necessary to point out the disadvantages of first initiators and product innovation implementers, including higher research costs, market uncertainty induced by changing the needs of product purchasers (Yang 1991; Kavan 2002; Vochozka et al. 2015; Yaping et al. 2017).

At present, the field of manufacturing of special composite materials is considered to be key in the view of new, safer, technically more environmentally friendly and economically more efficient applications for various industries (especially engineering, construction,

automotive, chemical, rubber, textile) (Lindermann et al. 2013; Rusnáková et al. 2014; Ružinská 2014b-d; Badida et al. 2016).

The preparation of new products with a range of performance features that outweigh the existing products and materials can be successfully leveraged from research and transfer research into supported activities, which is a compromise in product innovation policy (Ružinská 2014b).

New types of materials for preparing composite materials with a wide range of functional properties (with fortified thermal insulating, sound-insulating, multiplied by mechanical, thermal properties, reduced flammability, modified utility features, environmentally friendly, economic sustainability) and higher added value are currently being preferred, prepared by modifying and optimizing the manufacturing process from an existing assortment of fiber-forming polymers for automotive, civil engineering, woodworking, chemical and other sectors of industries (Lindermann 2013; Ružinská et al. 2010, 2014a-d; Rusnáková et al. 2014).

New trends in fibers development are going towards widening the range of fibers from the classic types of fiber-forming polymers. In fibers industry now increasing attention is paid to the polymeric system type "polymer-polymer", usable in special type of composite materials. Polymer blends where a large number of mixtures with a wide range of performance can be prepared from a limited number of ingredients are becoming more important (Scholz et al. 1989; Steinmann et al. 2001; Zheng et al. 2007; Ružinská et al. 2014a; Staropoli et al. 2017).

Based on the study of the rheological behavior polymer mixtures and the determination of the optimal technological conditions of the manufacturing process we have experimentally prepared new types of special composites.

Theoretical foundations of rheology polymer blends for preparation new type of composite

Polymer blends are multicomponent polymer systems obtained by technological methods of mixing two or more polymers. They form a group of polymeric materials, the relevance of which is recently growing. This is due to the fact that it is possible to produce a large number of mixtures with a wide range of performance from limited number of components (Cook et al. 2005; Gold et al. 2017).

They display a distinctive phase structure, which is always non-equilibrium (at thermodynamic equilibrium must occur a complete separation of components) and is dependent on the method of preparation. Polymer blends are different from base polymers, from which they have been prepared. Preparation of polymer blends belongs to one of the physical modifications, which result in changes in the supramolecular polymer structure and also a change in the original properties of the base polymers occurs. This can lead to improved fiber properties while retaining its other features (Cook et al. 2005; Gold et al. 2017).

Practically the most important method of preparing polymer mixtures is mixing the components in the melt. If mixing lasts long enough, and the system does not take chemical reactions a dynamic equilibrium between breakup and coalescence of particles is created in the mixture. Each operation of mixing must have a process of distribution and dispersive mixing that is a mixing operation must be carried out such that the individual components (Scholz et al. 1989; Staropoli et al. 2017).

Processes of polymer blends can be separated into operations involving formation of mixtures and processing operations, wherein the resulting mixture is extruded or formed into a desired shape. Mixing the polymers via extrusion is one of the easiest methods for preparing blends. This type of treatment is complicated by limited miscibility of polymers, which among other factors, is dependent also on their low configuration entropy of mixing (Cook et al. 2015; Mazidi et al. 2015).

Polymers suitable for the preparation of fiber-forming mixtures (polypropylene/polyamide - PP/PA$_6$) are thermodynamically intolerant systems preventing formations of a homogeneous system. Thus they cause the formation of the boundary as a result of the increase in enthalpy of mixing polymers. The stability of the created phase morphology is highly dependent upon the addition of interfacial agent, ensuring improved dispersibility and improved adhesion at the interface, thus improving the physical and mechanical properties of the polymer system (Ružinská 2010, 2014a-d; Mazidi et al. 2015; Gold 2017).

Deformation and flow of polymers is formed under the influence of external stress. The relationship of these parameters is studied and described by the rheology of polymers. Rheological properties are evaluated in terms of the orientation

of the macromolecules in the flow deformation, which is related to the formation of the structure of the polymer and filament current and the processing properties of the polymer (Part et al. 1990; Tol et al. 2004; Van Hemelrick et al. 2004).

The rheology of polymer blends depends not only on the molecular structure, but also on the properties of the studied systems. Rheological properties of polymer blends are determined by two groups of factors (Han et al. 2007; Staropoli et al. 2017):

- factors related to the flow conditions (temperature, pressure, fluid friction flow parameters)

- factors related to the material itself and its status (molecular weight, polydispersity, chemical composition, additives).

The aim of the study of rheology is to find a unified theory for all kinds of distortions and relationship of strain to the exerted tension. It is an expression of relation between stress and strain rate. This functional dependence to describe the flow of non-Newtonian fluid is non-linear and generally can be expressed by the equation (Han et al. 2007):

$$= . \tag{1}$$

where - represents the shear stress

– non-Newtonian viscosity

- shear rate.

The melts of fiber-forming polymers behave as so called pseudoplastics fluids, the viscosity of which decreases with increasing shear stresses, which is caused by the breaking up of the original structure (due to the orientation of asymmetrical particles and breaking up of agglomerates) (Scholz et al., 1989; Han, 2007).

So-called power law satisfactorily explains flow curves and their behavior in the range of 1 - 2 shear rate:

$$= K . ^n \qquad (2)$$

The exponent *n* in the so-called power law is less than 1 for pseudo-fluids
(for a Newtonian fluids = 1) than in the power law passes to Newton's law of flow and the *consistency coefficient K* is equal to the dynamic viscosity (Han, 2007).

Pseudoplastic liquids are divided into genuine pseudoplastic and structurally viscous liquids. These are fluids with variable viscosity. Nonlinear behavior of non-Newtonian fluids is explained by their structural viscosity. It is the change in viscosity with increasing shear stresses or deformation rate of the structure (Steinmann et al. 2001; Staropoli et al. 2017).

Among the basic characteristics of the rheology of the polymer melts viscosity belongs to one which is affected significantly by the factors such as temperature, polymer molecular weight, molecular weight distribution, shear values, additives in the polymer. Rheological properties of polymer melt mixtures are determined by the nature of the individual components as well as by the process of forming structures in the flow conditions. Rheological characteristics of the mixed melt in comparison to the properties of its components change significantly, and these changes usually are not subject to the rule of additivity (Han 2007; Mazidi et al. 2015).

From several literature sources it is known that for the evaluation of the rheological properties of polymer blends and to study the effect
of interfacial agent to enhance the dispersion and reduction of heterogeneity, as well as the impact on the intermediate stages of the structure and characteristics of the mixtures, it is necessary to select the optimum conditions (manufacturing temperature) for preparing the fibers and their further focus (Cook et al. 2005; Zheng et al. 2007; Ružinská et al. 2014a; Gold et al. 2017; Staropoli et al. 2017).

In accordance with the literature (Pötschke and Paul 2003; Tol et al. 2004; Han 2007; Robertson 2007; Zheng et al. 2007; Mazidi et al. 2015; Gold et al. 2017) we can assume that the increasing homogeneity of dispersion was due to increased technological compatibility of the components of the mixture. The degree of dispersity of the mixture increases because more interactions of macromolecular constituents during deformation are created. This confirms the crucial role of interfacial agents in increasing the tolerance of the polymer mutual thermodynamicaly intolerant system.

Materials and Methods

In experimental part were prepared polymer blends (mixtures) by remelting a mechanical mixture of granules of polypropylene and polyamide, resp. interfacial agent copolymer polypropylene – maleic anhydride using twin screw devices for various experimental determination manufacturing temperatures (from phase structure polymers).

In order to study the impact of the ratio of the components and contents of interfacial agent these series of mixtures were prepared:

Mixtures of various proportions of the components of polypropylene and polyamide 6. Mixtures prepared without interfacial agent were labelled PP/PA6 and mixtures prepared by mixing polypropylene with polyamide 6, modified by 4% copolymer PP-MAH, were identified as PP/PA6M. The following mixtures were prepared without addition interfacial agent: PP/PA6 90/10 and 80/20; PP/PA6M 90/10, 80/20, 70/30, 60/40, 50/50.

Characteristics of used raw materials

For the preparation of polymer blends we used these raw materials:

- polypropylene, granule type TATREN (melt flow index IT = 30g/10 min)
- polyamide 6, silk type (molecular weight M_w = 29300)
- interfacial agent: copolymer polypropylene - maleic anhydride (PP-MAH).

Determination of rheological properties of polymers using GÖTTFERT capillary viscosimeter

Rheological properties were studied on semi-automatic discharge plastometer (capillary viscosimeter) from company GÖTTFERT, type MI 3564. The melt is extruded from the plasthometer by a piston with weights that are placed in top of the device. A photocell measures the stream-time of a polymer of constant volume that is being extruded.

Conditions of the measurements:
Applied shear stresses: $\tau_1 = 3{,}997 . 10^3$ Pa, $\tau_2 = 7{,}368 . 10^3$ Pa, $\tau_3 = 1{,}224 . 10^4$ Pa, $\tau_4 = 1{,}746 . 10^4$ Pa, $\tau_5 = 2{,}103 . 10^4$ Pa, $\tau_6 = 2{,}499 . 10^4$ Pa, $\tau_7 = 3{,}025 . 10^4$ Pa

Time point of the polymer blends: 5 minute

Flow conditioning: 1 minute

Temperature : 250, 260, 270 °C

Diameter of capillaries *(d0)*: 1.10^{-3} m

Capillary length *(l0)*: 30.10^{-3} m

Piston diameter *(d1)*: $9{,}95.10^{-3}$ m.

Determination of densities of pure polymers and polymer mixtures

Within the rheological measurements, we evaluated the density of pure polymers and polymer mixtures as a parameter reflecting molecular structure using the capillary viscometer type GÖTTFERT, type MI 3564.

We used measures of volumetric flow of extruded melt (in the form of cuttings) and by simple conversion we obtained density values according to the relation:

$$= \blacksquare \tag{3}$$

where - is the density of the polymer, - mass flow of the extruded melt, - volume flow of the melt.

Results

Evaluation of rheological properties of polymers using a capillary viscosimeter

Flow properties of polypropylene-polyamide 6 polymer system were evaluated using a capillary viscometer GÖTTFERT with automatic subtraction of the flow time of the melt volume unit. Rheology properties of polymers and polymer mixtures (blends) were evaluated under different processing conditions (processing temperature: 250, 260, 270 °C).

Measurement conditions were selected to be as close as possible to resemble conditions of melt flow in the fiber forming process. During rheological measurements, we used a capillary with a ratio (*L/d*) = 30 to reduce the pressure loss resulting from input factors.

Thirty measurements were carried out at each shear stress value from which the arithmetic average was calculated. From the average value of the measured time, we calculated shear velocity according to the relation:

$$= \frac{32}{_3} = \frac{8\,_1{}^2h}{_3} \tag{4}$$

where d_1 - is the diameter of the piston, d - diameter of the capillary, h – hight of the cylinder of ejected string, V - volume flow of extruded polymer melt, t – time in (seconds).

Shear stress was calculated according to the equation:

$$= \frac{{}^g}{_2 \quad _1{}^2} = 1051{,}89 \cdot \tag{5}$$

where z - is the weight in kg, $_0$ - the radius of the piston, l – capillary length, g – gravitational acceleration, r_1 - the radius of the capillary.

For the evaluation of the flow properties on capillary viscometer we used a mixture of PP/PA6M with a changing content of the dispersed component (polyamide containing 4 % wt. of interfacial agent PP-MAH) in the range of 10 to 50 %. To assess the effect of interfacial agent to flow parameters of the mixtures we evaluated PP/PA6 mixture prepared without interfacial agent containing polyamide 6 in the amount up to 20 % wt.

Mixtures prepared without the interfacial agent, in the abovementioned conditions with more than 20 % wt. of polyamide phase, were very badly workable and practically not forming any fibers. From the results of rheological measurements of mixtures prepared at temperatures of 250 to 270 °C, we compiled flow curves (Ružinská et al. 2014a). Rheological behaviour of pure polypropylene and polymer blends have linear shape corresponding to the power law. Based on the assessment of the rheological behavior of polymer melting, that the flow of the melt has mixed pseudoplastic character similar to pure polypropylene.

The flow properties of mixtures with different organic ingredients can be described by Ostwald de Waele rheological models (Han 2007; Ružinská et al. 2014a, d). Power type parameters of equations for the flow of a mixture containing 10 to 50 % wt. of polyamide component prepared with interfacial agent are shown in Table. 1.

Table 1: Parameters of Ostwald de Waele model (n, K) for pure polymers and mixtures prepared with different content of the polyamide component

SAMPLE	250 °C		260 °C		270 °C	
	n	K	n	K	n	K
PP 100/0	0.64	761.4	0.64	540.2	0.73	307.9
PA6M	0.62	1118.3	0.78	424.6	0.82	294.9
PP/PA6M						
80/20	0.67	974.9	0.64	745.1	0.69	520.9
70/30	0.76	868.9	0.63	877.2	0.67	630.9
60/40	0.79	912.4	0.64	1013.8	0.72	565.9
50/50	0.87	858.6	0.58	1385.9	0.71	682.2

Source: Author

Notes: n – index of pseudoplasticity, K – index of consistency

Figure 1: Comparison of indexes of consistency of pure PP and modified PA6M under different conditions of preparation
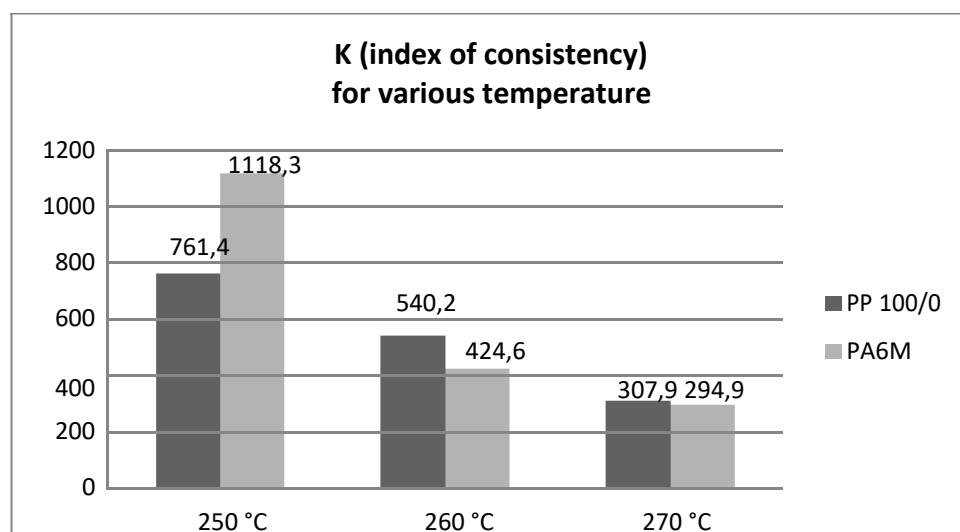
Source: Author

In the Figure 1and Figure 2 are presented comparison of indexes of consistency and pseudoplasticity of pure PP and modified PA6M under different conditions of preparation – 3 various manufacturing temperatures (results from Table 1).

Figure 2: Comparison of indexes of pseudoplasticity of pure PP and modified PA6M under different temperature of preparation
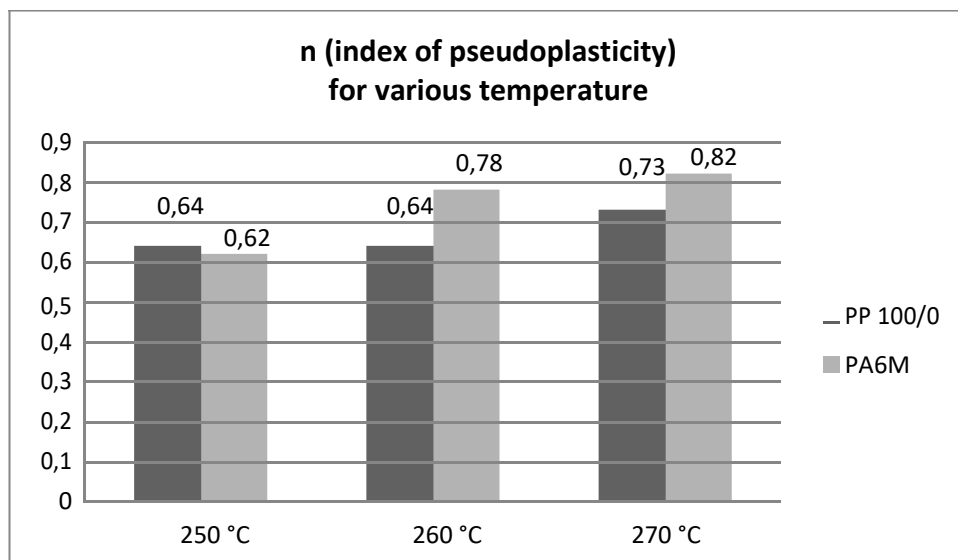
Source: Author

Figure 3: Comparison of indexes of pseudoplasticity of polymer mixtures with variable polyamide portion under different temperature of preparation
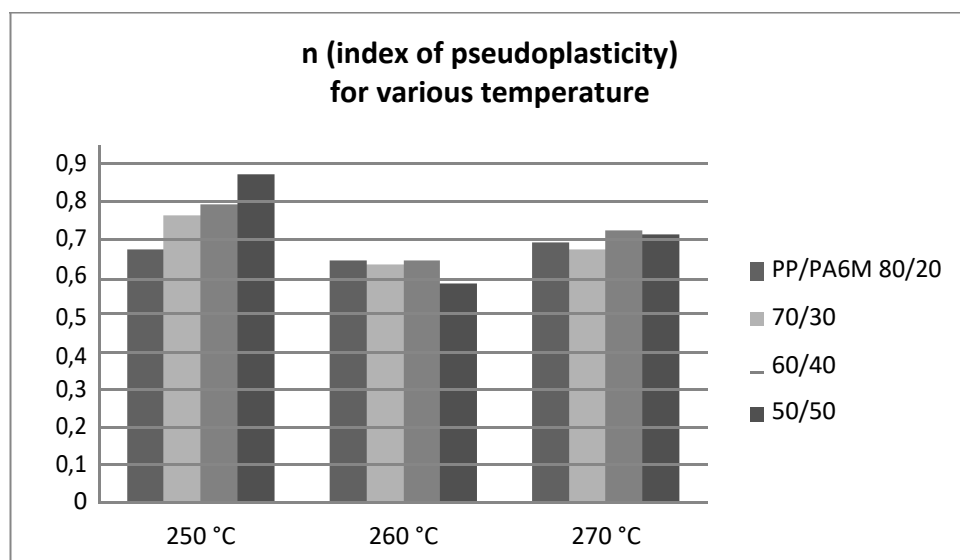
Source: Author

In the Figure 3 and Figure 4 are presented comparison of comparison of indexes of pseudoplasticity and consistency of polymer mixtures with variable polyamide portion under different temperature of preparation (results from Table 1).

Figure 4: Comparison of indexes of consistency of polymer mixtures with variable polyamide portion under different temperature of preparation
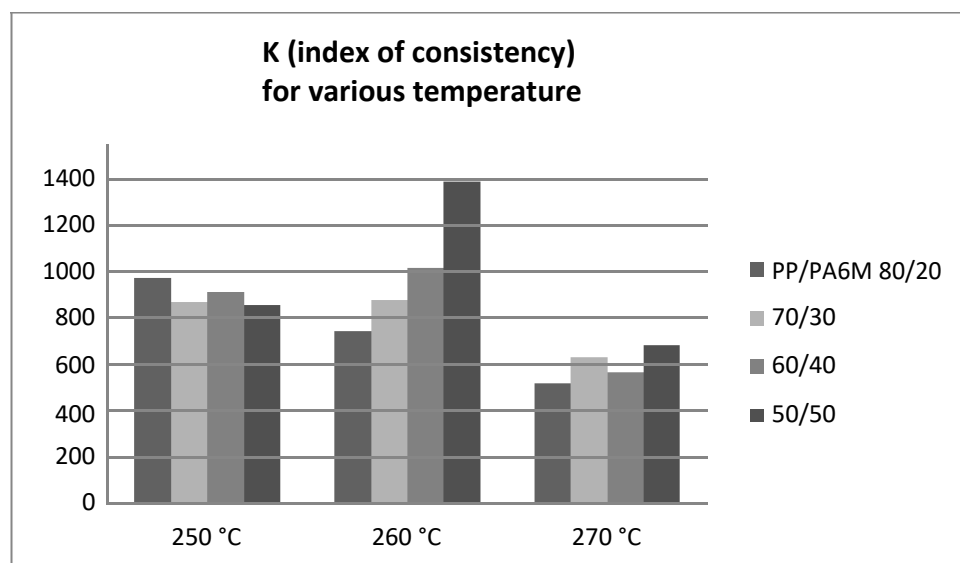
Source: Author

Non-Newtonian flow index values of mixtures do not significantly different from pure polypropylene and a clear dependence on the content of the dispersed component was not shown. The differences, however, occurred at the comparison of values for mixtures prepared by mixing the pure components respectively using interfacial agent.

Table 2: Comparison of parameters of Ostwald de Waele rheological model for the mixture of polypropylene - polyamide 6 (80/20) with the interfacial agent and without the use of intermediate stage

SAMPLE	250 °C		260 °C		270 °C	
	n	K	n	K	n	K
PP/ PA$_6$ 80/20	0.52	717.9	0.57	717.9	0.51	929.4
PP/PA$_{6M}$ 80/20	0.67	974.9	0.64	745.1	0.69	520.9

Source: Author

According the evaluated rheology values in Table 2 it is clear that the decrease of the parameter *n*, that is the largest variation from Newtonian flow was in mixtures prepared without the use of interfacial agent.

In the following stage, we monitored the change in apparent viscosity of the mixtures depending on the composition and content of the interfacial agent. The measured and evaluated results are shown in Table 3.

Table 3. Calculated values of the difference of the actual and additive values of apparent viscosities of polymer mixtures

MIXTURE	$\Delta\eta$			
	260 °C $\tau_1=1,7.10^4$ (Pa)	**260 °C** $\tau_2=2,5.10^4$ (Pa)	**270 °C** $\tau_1=1,7.10^4$ (Pa)	**270 °C** $\tau_2=2,5.10^4$ (Pa)
PP/PA$_6$ 90/10	7.2	3.2	7.2	10.3
80/20	0.6	0.9	4.7	7.4
PP/PA$_{6M}$ 90/10	20.3	3.3	23.6	20.9
80/20	40.5	26.3	40.1	40.6
70/30	55.1	33.6	46.1	47.6
60/40	93.5	57.2	57.6	53.5
50/50	123.5	107.8	80.2	82.7

Source: Author

Discussion

Rheological properties of polymer melt are one of the decisive processing properties of the polymer in fiber forming processes including the structures and properties of the final product. From measured and evaluated rheological characteristics the Ostwald de Wael model (n-index of pseudoplasticity and K-coefficient of consistency and parameters of flow curves – shear velocity and shear strengths) of the experimental prepared bicomponent polymer mixtures showed that the temperature of 260 °C is optimal in the melting manufacturing process of the bicomponent polymer blends from the three usual technological temperatures (250, 260, 270 °C).

This finding confirmed the rheological characteristics of PP/PA$_6$, PP/PA$_{6M}$ 80/20 (Table 1, 2 and Figure 1-4) at the temperature 260 ° C, which are almost identical to the original polymers (PP, PA6), but thermodynamically insensitive and addition of the MAH interfacial reagent (maleic anhydride) is required for compatibility.

The consistency coefficient - K is proportional to the dynamic viscosity of the pseudoplastic polymers and is one of the most important parameters
in the technological processing of the polymerization process. This parameter is conditional to processing temperature and consequently influences all other rheological characteristics. From the measured and evaluated results of the consistency coefficient, it emerged that at the temperature of 260 ° C the composition of thermodynamically most suitable polymer mixtures was balanced. When comparing the two variants of the blends PP/PA6 80/20 and PP/PA$_{6M}$ 80/20 prepared, we prefer a system with the presence of a MAH interfacial agent, which also showed the viscosity values (Table 3).

However, by using the interfacial agent it is possible to prepare PP/PA$_6$ composite fibers in full concentration ratios. PP-MAH interfacial agent increases the degree of dispersion of the dispersed phase in the matrix of polypropylene, by which we get increased thermodynamic compatibility of the polymer components of the mixed fibers.

The addition of interfacial agent improves the degree of dispersity and adhesion at the interface and thus prevents the formation of pores (Ružinská et al. 2014a).

Viscosity values of the mixtures increase with increasing content of the polyamide components, and their values are significantly higher than the additive values calculated from the pure components. Presumably, this is an indication of increasing tolerance of the system due to the high degree of components dispersion. The role of interfacial agent in the formation of the structure of the mixtures, reflected in the flow properties, was examined from the dependence of the apparent viscosity on the shear stress of the mixtures prepared by using intermediate stage respectively mixtures without the interfacial agent. While the apparent viscosity values of mixtures of PP/PA$_6$ (without intermediate stages) are close to the additive values, the apparent viscosities of the mixed melt prepared by using intermediate stage have significantly higher values. (Table 3).

Conclusion

The aim of our research was to determine the optimum conditions for the technological preparation of new innovative product mixtures - polymers by studying the process of rheological melting in the production process of subsequently formed bicomponent fiber-forming polymers applied to new special composite materials in the context of the economic efficiency of manufacturing innovations.

By evaluating the viscosities and rheological characteristics of the prepared variants of the bicomponent polymer mixtures, the conclusions were verified regarding the determination of the optimal technological conditions for the prediction of the manufacturing process conditions of the special composites.

Furthermore, based on the results of our experimental research, thermodynamically the most suitable variants of the material composition of new PP/PA$_{6M}$ polymer blend variants were made, and variants were compared without and with the addition of the interfacial agent – maleic anhydride (MAH). The effect of the interfacial reagent on the rheological characteristics as well as the reduction of the thermodynamic incompatibility of the prepared polymer mixtures on the phase interface was studied to improve the dispersibility of the individual components of the polymer mixtures to predict optimal melting conditions and subsequent spinning in the process of making special composites.

In the previous author´s work (Ružinská 2010; 2014a-d) the supramolecular and morphological structure, mechanical, physical and utility properties of bicomponent polymeric fibrous mixtures have been studied and compared with the original polymers with regard to their subsequent use as the special composites themselves, resp. as an addition to the non-polymeric matrix of the other composites.

Responding to the current need to focus on societal interest in targeted innovation planning in manufacturing processes to maintain the competitiveness of manufacturing businesses, we have focused our attention on designing product innovations by preparing special composites for the needs of different sectors industries.

We believe that product innovations of new, forward-looking materials are a way of promoting strategic production management, and can significantly boost the unique position of a manufacturing company in a competitive environment. Transfer of research results and its subsequent implementation into the manufacturing process will allow for a relatively short time to implement product innovations with the expected results.

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Hedging in Academic Discourse: Native English Speakers vs. Czech and Slovak Writers

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Abstract

The pervasiveness of hedging in Anglo-American academic discourse is determined by the dialogic nature of research articles, which allow scientists to tentatively present their findings and ask colleagues with modesty and deference for their acceptance. Hedging devices allow researchers to express the lack of complete commitment to the truth of the proposition, or unwillingness to state a claim categorically. The comparison of frequencies and functions of hedging devices in individual sections of native English speakers' research articles to those written by Czech and Slovak authors revealed considerable differences in the article structure and the overall aims of individual sections, which is probably caused by the different socio-pragmatic context. Czech and Slovak writers underestimate the use of mainly reader-motivated hedges in all parts of the articles, do not appear to admit the constraints of the research, and seldom show awareness of the relatively minor value of their findings.

Keywords: hedging devices – epistemic modal verbs – lexical verbs – attribution to sources – reference to the first person.

Introduction

Scientists who wish to join the international research community need to be able to write effectively in English if they want to contribute to the construction of world academic knowledge. Many non-native researchers and novice writers, however, struggle to have their articles accepted by reputable journals. Thus, a growing number of universities have been involved in cross-cultural and corpus-based studies of academic discourse to gain grounds for the preparation of their students to master the key genre in academic disciplines: the research article. One of the inadequacies that Hyland and Milton noticed was that L2 writers of academic essays in English do not tend to "convey statements with an appropriate degree of doubt and certainty" (1997) despite being able to produce grammatically flawless texts. This perceived inability to hedge appropriately, viewed as a

lack of pragmatic competence, was considered a serious problem that may have prevented L2 writers from achieving their communicative aims in academic discourse. Consequently, hedging in research articles has been studied extensively. Although Czech and other Central European linguists (e.g. Chamonikolasová 2005; Čmejrková and Daneš 1997; Dontcheva-Navratilova 2013; Duszak 1997) have studied the differences between Central European and Anglo-American academic discourse and discovered that the two academic styles differ mainly in "the way they approach writer-reader interaction" (Dontcheva-Navratilova 2013, p. 12), hedging as such does not appear to be the centre of their attention.

The current study is informed by Bakhtin's influential notion of dialogism under which all verbal communication, including a research article, is dialogic in a way that it refers to previous research in the particular area, and at the same time anticipates the responses of potential readers who are members of the research community. This paper attempts to:

1. Give a detailed overview of hedging devices and their functions in academic discourse

2. Compare native English speaker' and Czech and Slovak academic texts on similar research problems

3. Draw practical implications for the teaching of academic writing in L2 context.

The notion of hedging

According to Fraser:

- Hedging is a rhetorical strategy by which a speaker, using a linguistic device, can signal a lack of commitment to either the full semantic membership of an expression, or the full commitment to the force of the speech act being conveyed (2010, p. 22).

These linguistic devices, called "metalinguistic operators", were first studied by Weinreich (1966) and introduced into linguistic literature by Lakoff, who used the term "hedges" and described them as "words whose job is to make things more or less fuzzy" (1972, p. 194). He also argued that the interpretation of hedges is dependent on context and that the effect of hedging is a pragmatic not a semantic phenomenon. Much of the research of hedging in the 1980s and early 1990s (e.g. Holmes 1984; Coates 1987; Dubois 1987; Skelton 1988; Channell 1994;) was concerned with spoken interaction. The most common hedging devices were either assigned their multiple functions, or specific pragmatic functions (e.g. expressing politeness, conveying purposive vagueness, achieving distance between a speaker and what is said, etc.) were studied in order to reveal the means they employed. The ability of hedging devices to assume various grammatical classes is reflected in Brown and Levinson's (1987) definition of a hedge based on a conversational model:

- A hedge is a particle, word, or phrase that modifies the degree of membership of a predicate or noun phrase in a set; it says of that membership that is partial, or true

only in certain respect; or that it is more true and complete than perhaps might be expected. (p.145)

Studies in scientific discourse conducted by Myers (1985; 1986) focused on various devices used to achieve politeness by mitigating claims and minimizing impositions in order to gain acceptance from colleagues when challenging existing assumptions. Hyland (1996a; 1996b) categorized functions of hedging in academic discourse and provided quantitative data concerning hedging expressions. Vague quantification in otherwise precise journal articles was analysed by Banks (1998).

The recent studies focusing on L2 academic writing appear to vary considerably. They are generally based on the prerequisite that hedging is an important means by which professional scientists confirm their membership in research communities, and its pervasiveness in academic discourse can hardly be understood without considering the socio-pragmatic context of research.

Wishnoff (2000) evaluated the effects of the instruction specifically targeted at the use of hedging devices which was given to L2 university students during the course of academic writing. She found a significant increase in the use of hedging devices in the treated group. Hinkel (2005) compared hedging devices and intensifiers in academic essays produced by native and non-native L2 writers. Alonso et al. asked two groups of Spanish researchers to compare and contrast a hedged and an unhedged versions of the same passage and identify hedging devices in a different passage, coming to the conclusion that Spanish researchers regard hedges as "negative evasive concepts" (2012, p. 47) and fail to recognize them. Sahragard et al. (2016) compared hedging devices in English language research articles written by native English speakers to those written by non-native English speakers in reputable journals in the field of applied linguistics (TESOL Quarterly, System and RELC) to find out that the argumentation of non-native English speakers differs, but they outperform the native English speakers in the number of hedges in all sections of the research articles except for the Introduction section.

Socio- pragmatic context

Why is hedging such a predominant feature of academic writing which is otherwise believed to have "characteristics of precision, detail and accuracy" (Channell 1990 in Banks 2010, p. 17)? Scientific knowledge is viewed as "a set of justifiable beliefs constructed through interactions among members of the scientific community" (Hyland, 1996a, p. 252), and a research article potentially opens up a dialogic space for scientific debate as it generally asks for collective agreement on the findings discovered rather than presenting them as unquestionable truths. In the Anglo-American scientific tradition, the accreditation of knowledge is a social process and much of the reputation of a researcher is in the hands of his/her colleagues. Whenever scientists report new experiments, they ask the research community for acceptance of their discoveries. By adhering to the norms of academic discourse, they show respect for the colleagues whose research they may have challenged, openly admit their awareness of "experimental limitations, possible

exceptions, and alternative explanations" (Hyland 1996a, p. 267), and signal the anticipation of possible opposition. Publishing a scientific paper involves entering into a debate with readers who might decide to accept or reject the claims, and using hedging devices can considerably influence the reader's response. Besides, reputable journals that largely contribute to the validation of knowledge appear to impose stylistic conventions on writers in order to manage their communication.

Hedging functions in scientific writing

Hyland (1996a; b) categorized functions of hedging devices despite describing the individual forms as indeterminate in the sense that they can convey more than one function. The two fundamental functions that could be strategically exploited by writers are content-motivated and reader-motivated hedges.

Content-motivated hedges

Content-motivated hedges "mitigate the relationship between what a writer says about the world and what the world is thought to be like" (Hyland 1996a, p. 256). They help either to express the claims as accurately as possible (accuracy-oriented hedges), or to anticipate possible opposing claims by the readers (writer-oriented hedges).

Accuracy-oriented hedges

In order to present information as accurately and objectively as possible, writers attempt to clearly distinguish the facts from inferred claims, judgements and evaluation with appropriate precision and caution. Consequently, the hedging devices indicate that the proposition is the result of the writer's reasoning, arrived at under certain research limitations and true only to the extent to which it can be proven. Accuracy-oriented hedges are further distinguished "according to whether they involve a qualification of predicate intensity (attribute hedges) or writer confidence (reliability hedges)" by Hyland (1996b, p. 437).

Attribute hedges

Attribute hedges specify "the extent to which the propositional content is precisely expressed, ... indicate variability with respect to certain descriptive terms, ...[and] specify more precisely the attributes of the phenomena described" (Hyland 1996b, p. 439–440). They are mostly expressed by "degree of precision" adverbs, also called "rounders", or "downtoners" (partially, quite, barely), style disjuncts (generally, approximately) or phrases indicating from which standpoint the claim was made (from a practical point of view). Hinkel reported a considerably high use of downtowners in L2 academic essays, but mainly those that are typical of informal register, such as "all, almost, basically, just only, little and few" (2005, p. 42). By contrast, "advanced downtoners, such as merely, relatively, sufficiently were rare" (ibid.).

Reliability hedges

Reliability hedges "indicate the writer's confidence in the truth of a proposition" (Hyland, 1996b, p. 441), which can be established merely by reliance on available facts, inference,

or repeated experience, while the strength of the relationship between the observed and the assumed is subjected to the writer's knowledge limitations. These hedges also signal to the readers how much confidence they can invest in the truth of the statement, taking into account how explicit the writer's hedging against accuracy is. Hyland (1996a; b) claims that epistemic modal verbs (would, may, could, might, cannot), epistemic adjectives (un/likely, possible, most, consistent with), nouns (possibility, probability), epistemic adverbs (apparently, probably, possibly, presumably), and referring to limitations of the research (e.g. the procedure only identifies) are most likely to be exploited as reliability hedges. Contrary to the aims of this function, as Hinkel (2005) pointed out, L2 writers in academic essays tend to avoid using reliability hedges while their essays abound in intensifiers, which may considerably contribute to strengthening the truth value of the proposition.

Writer-oriented hedges

Writer-oriented hedges "reflect the writer's desire to anticipate possible negative consequences of being proved wrong by limiting commitment to claims, thus blurring the relationship between writers and their propositions" (Hyland 1996a, p. 277). They enable the writer to speculate when interpreting the results in a wider context when greater generalization is expected. Consequently, a greater risk needs to be taken in Discussion sections of research articles. Scientists gain credibility for being able to realise the significance of their findings, but they must avoid the damage that may result from overstatement. Moreover, some scientists work in the context "in which productivity is a measure of professional worth and which results in the need for early and frequent publication" (Hyland 1996b, p. 445). As a result, they need to guard themselves from the possibility of error. A writer's responsibility for propositional validity can be concealed by the use of passive constructions (e.g. it is assumed), clausal subjects (it seems, it might be speculated), speculative verbs (indicate, assume, predict, propose), evidential verbs (seem, appear, report), attribution of the source to a wider body of knowledge or an authority (according to...), or impersonal reference to method, model, or experimental conditions.

Reader-motivated hedges

Reader-motivated hedges acknowledge the writer's personal responsibility for the validity of propositional content and invite the reader to participate in a dialogue in order to negotiate the ratification of the claim. In some cases, they exploit overt reference to the writer's personal involvement in the research, which may weaken their claims by allowing them to be perceived as personal opinion; signal alternative interpretations to those stated by the writer, and leave the claims open to readers' personal judgement. Other reader-motivated hedges help to show deference to the views of colleagues and to address the reader as a knowledgeable scientist who is capable of engaging in debate on the issue and assessing how much the paper may contribute to the current state of knowledge in the particular field. From an objective perspective, it is highly advisable not to present the propositions categorically because "categorical assertions leave no room

for dialogue, reject the need for feedback, and consign the reader to a passive role" (Hyland 1996a, p. 258). Reader-motivated hedges may also simultaneously convey other functions, but the core examples that predominantly act as reader-motivated hedges include modal auxiliaries, first person pronouns (e.g. 'our interpretation of the results'), epistemic verbs of judgement (we propose, I believe), epistemic verbs of deduction (we calculate, I infer), an indefinite article that is able to indicate that our claim is one interpretation among many, hypothetical conditionals, personal reference to methods or models, direct questions, reference to testability, or reference to shared goals or knowledge.

Hedging expressions

Hyland (1996a; b) identified hedging devices as polypragmatic, i.e. they can convey a range of different meanings simultaneously. Consequently, one particular device can hardly be assigned a specific function. Moreover, writers exploit multiple functions of hedges in their papers when attempting to achieve an efficient exchange of information. According to Clemen, it is also impossible to create a complete list of hedging devices, because "almost any linguistic item can be interpreted as a hedge, ..., [it] can acquire this quality depending on the communicative context or the co-text" (1997, p. 6). Hyland in his corpus-based study noticed that hedging devices tend to cluster since "almost half the hedges occur in groups of two or more" (1996a, p. 259), which in his opinion reinforces "their epistemic strength" (1996a, p. 274). He supports his claim by stating that "43% of all hedges in the corpus occur with at least one other device" (ibid.) with lexical verbs and modal auxiliaries being the most frequent combinations.

Material and Methods

In order to compare the use of hedging devices in academic writing by native English speakers (NS) and Czech and Slovak authors (CS), twelve articles containing the words "hedge, hedging, or hedging devices" were selected. Native English expert writing was represented by six articles published in prestigious journals and conference proceedings, out of which three articles were co-authored. In this case, special care was taken to include only articles in which there was at least one native English speaker writer. For the sake of comparison, six articles dealing with the topic of hedging to at least some extent were found in two journals published in the Czech Republic. One of them was co-authored and one of them was written by a Slovak author. The following Table 1 shows which articles from which journals were subjected to the analysis.

Tab. 1: Research articles analysed in the study

Code[1]	Author(s)	Source of the article
NS1c	Bartley and Benítez-Castro (2013)	RESLA
NS2c	Chen and Baker (2010)	Language Learning& Technology
NS3	Gabrielatos (2007)	Proceedings of the Corpus Linguistics Conference
NS4	Hinkel (2005)	Applied Language Learning
NS5	Hyland (1996)	Written Communication
NS6c	Lee and Chen (2009)	Journal of Second Language Writing
CS1	Dontcheva-Navratilova (2012)	Brno Studies in English
CS2	Dušková (2015)	Brno Studies in English
CS3	Huschová (2014)	Brno Studies in English
CS4	Kozáčiková (2015)	Discourse and Interaction
CS5	Kozubíková-Šandová (2015)	Brno Studies in English
CS6c	Válková and Tárniyková (2015)	Discourse and Interaction

Source: Author

Although corpus analysis of all 12 articles was initially considered, it was ruled out during the research because the pragmatic function of many hedging devices can often become evident only after a careful analysis of the context. Moreover, many particles, words, and phrases not generally associated with hedging can assume the hedging function only thanks to the surrounding co-text. On the other hand, the selected articles, especially those written by Czech or Slovak authors, contained a large number of devices generally expected to perform the hedging function, but in many cases only semantic functions could be identified, like in the case of the words that have been underlined in the following example: "Both categories usually appear in non-progressive forms" (Kozubíková-Šandová 2015, p. 43).

As a result, the selected articles were analysed manually. First, the individual parts of the articles were distinguished and compared, and the instances of hedging were identified. They were subsequently categorised and counted manually. The frequencies of selected types of hedging devices in individual parts of the research articles were compared and major differences further investigated with a view to suggesting plausible ways to approach the use of hedging devices in order to achieve a close resemblance to the native speakers' model.

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[1] NS = an article written by a native English speaker; NSc = a co-authored article written by at least one native English speaker; CS = an article written by a Czech or Slovak author; CSc = a co-authored article written by Czech or Slovak writers.

Results and discussion

As previous research revealed, hedging as a prevalent feature of academic writing is distributed unevenly in different parts of a research article. Hyland's corpus-based study (1996a) found the highest frequencies in the Results and Discussion sections where researchers are expected to interpret the acquired data in the light of generally accepted presuppositions, present their proposition as debatable, reduce the risk of negation, and invite the readers to enter into a debate on this issue. While the least hedged section was Methods, the Introduction section contained a relatively high number of hedging devices both in Hyland's (1996a) and Banks' (1998) studies.

Apart from varying frequencies of hedging devices in different sections of native speakers' texts, the variation of specific pragmatic functions was also observed in the current study. However, when comparing NS and CS articles, one of the constraints encountered early on was their notably different structure. The native speaker research articles were organized in a relatively predictable way following more closely the norms of the generally accepted Introduction-Methods-Results-Discussion (IMRD) organization, while the articles written by Czech and Slovak authors followed the structure only partly and were likely to differ from each other and the required structure much more. As can be seen in Table 2, NS writers are more likely to adhere to the IMRD structure of academic discourse while CS writers tend to deviate from it.

Tab. 2: Organization of articles under investigation

Group	A	B	C	D
Number of authors	2	5	3	2
Codes	NS2c CS2	NS1c NS3 NS4 NS5 NS6c	CS3 CS5 CS6c	CS1 CS4
Introduction	+	+	+	+
Methods	+	+		+
Results	+	Results and Discussion	Body	Body
Discussion	+			
Conclusion	+	+	+	+

Source: Author

Group A consists of articles that contain all five required sections and the only Czech author in this group also seems to be aware of specific hedging functions in each part, even though the frequencies of hedging devices in her article are considerably lower than the average frequencies in native speakers' texts.

Group B represents the majority of native expert writing, where Results and Discussion sections have been combined, but the hedging functions of both parts remained.

Group C includes the articles that contain a relatively short Introduction section followed by several subsections in which theory and already accepted knowledge is interwoven with newly discovered findings and their explanations. Description of used methods may be included, but it is hardly possible to separate it clearly from the other content. These articles largely neglect the need to appeal to the reader and ask for acceptance of their propositions.

Group D represents the articles whose structure stands somewhere between groups B and C. The clearly distinguished Methods sections in these articles are followed by several subsections which do not seem to enter into interaction with the reader and which are perceived to lack the Discussion section, or the majority of its functions.

Comparison of Introduction sections

Introduction sections in most cases draw on previous research and its findings and tend to negotiate the reasons for acceptance of the current study. This is strongly supported by the hedging devices specifically found in this part. In NS research articles, modal verbs, which otherwise act predominantly as reliability hedges, also assume the function of reader-motivated hedges particularly when the writer involves the reader in the thinking processes and speculations in order to get their full attention as in, for example: "[the students'] improvement could[2] be either very slight or non-existing"(Bartley and Benítez-Castro 2013, p. 46). Reference to shared goals and using first person pronouns may also invite the reader to participate in the dialogue in order to for them gain a full understanding of the problem. Introduction sections usually consist of several subsections and include the overview of the prior research, which is demonstrated by a large number of propositions attributed to other researchers. For example, "Channell (1994), p.90) explains that in English the main discourse function of intensifiers is to play the role of exaggeratives and create hyperbole to avoid referring to the actual truth." (Hinkel 2005, p. 31). The same sections in articles written by Czech and Slovak authors, however, are generally much shorter and often contain an explanation as to why the article was written or the research conducted, as in, for example: "Our topic emerged spontaneously at the intersection of two research perspectives:..." (Válková and Tárnyiková 2015, p. 65). The justifications for selected research problems appear to be unusual in native speakers' academic discourse in cases where the fellow scientists share knowledge of the areas "worthy of study" (Hyland 1996b, p. 435). The significantly low number of hedging devices in CS articles that can be seen in Table 3 reflects the fact that these articles differ considerably from each other mainly due to the individual writing style of the authors in many aspects, one of them being the reference to the first person, of which 11 instances out of 12 were found in one article. The placement of the attribution to the prior research also varies to a great extent, and it often tends to be included in the subsequent, largely theoretical sections or the Methods section.

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[2] The words in the quotes that assume hedging functions were bolded by the author.

Tab. 3: Frequencies of hedging devices in the Introduction sections of the studied articles

Hedging devices	NS articles	CS articles
Modal verbs	34	15
Attribution to sources	30	4
Reference to shared knowledge	11	5
Adverbs	22	7
Reference to first person	10	12
Lexical verb	6	0
Passive construction	5	7
Other	51	2
Total	169	43

Source: Author

Comparison of Methods sections

As argued by Hyland, the Methods section is considered to be the least hedged one, especially as he did not appear to include the passive constructions in his corpus-based analysis despite having acknowledged them as writer-oriented hedges that enable the "authors [to] conceal themselves "(1996a, p. 257). As can be seen from Table 4, when describing the individual steps of research procedures conducted, native English speakers appear to use merely passive constructions to refer to activities carried out by themselves either out of their natural modesty, or in order to adhere to the norms of academic discourse. By contrast, CS writers exploit passive to a much lower extent and occasionally tend to use first person reference and active voice instead, for example: "I assume almost identical language performance of these two samples – native and non-native writers of English." (Kozáčiková 2015, p. 56). This example also implies a common tendency among CS authors to express their expectations of the outcome of the research as well as their astonishment in cases when the expectations were not fulfilled. Based on my analysis, this feature was not identified in NS articles. The overall low numbers of hedging devices in CS texts might be also attributed to the fact that only three out of six authors included clearly separable Methods sections in their articles, thus a full comparability could not be carried out. Moreover, CS Methods sections tend to be either shorter, or substitute some of the functions generally assigned to the Introduction section in NS articles. What the CS articles seem to underestimate most is the reference to the shared knowledge, as in, for example, "as generally reported in literature" (Chen and Baker 2010, p. 32), which may serve as the key device in maintaining the interaction with the reader. Other reader-motivated hedges that have not been identified in CS articles are questions, which allow the writer to consider alternatives and appeal to the reader as an expert capable of solving the problem, thus ensuring his greater involvement. Examples of this include: "Should we count the number of types of bundles ...., or should we count the total occurrence of

bundles ...?" (Chen and Baker 2010, p. 33). Furthermore, CS writers, in contrast with native writers, do not appear to admit their lack of knowledge as openly as NS writers do, for instance: "some of the authors are likely to be non-native speakers, judging from their names and our personal knowledge" (Lee and Chen 2009, p. 284). In addition, they

acknowledge solved and unsolved problems, for example: "RANGE poses problems for the analysis of learner language." (Bartley and Benítez-Castro 2013, p. 53).

Tab. 4: Frequencies of hedging devices in the Methods sections of the studied articles

Hedging devices	NS articles	CS articles
Passive constructions	63	10
Adverbs	10	2
Modals	17	0
Lexical verbs	5	5
Reference to shared knowledge	18	2
Admission to encountered problems	10	0
Questions	5	0
Other	8	1
Total	132	20

Source: Author

Results and Discussion sections vs. Body sections

Table 5 below attempts to compare hedging devices from sections that differ considerably in size and assume only loosely comparable functions. While the hedges in NS papers were gathered only from the Results and Discussion sections and those in CS1 and CS4 articles from approximately similar sections of Body, the hedges in CS3, CS5, and CS6c articles come from the largest parts of the papers situated between the Introduction and Conclusion. Nevertheless, the number of hedging devices is still lower than in NS articles by more than half. The highest frequencies of hedges in these sections in both NS and CS research papers partly confirm findings by Hyland, who found "84% of hedging devices in Result and Discussion sections" (1996a, p. 259) and also showed that their specific functions closely reflected the required rhetorical purposes. NS authors exploit hedges to discuss the drawbacks of the methods used in order to ensure more reader involvement, to mitigate the findings presented, and to offer more general interpretations both within the scope of what is believed to be true and within the accepted evidence from previous research.

Being conscious of possible research limitations, NS writers openly show their concern for whether the selected method or procedure could have had an unexpected impact on the results and speculate to what extent the findings might have been influenced by different variables as in the following example:

"This is mainly because there are substantially more texts in CAWE on EFL teaching methodology in China. The overuse of these particular words is therefore probably not an indication of problems on the part of the CAWE writers." (Lee and Chen 2009, p. 286).

These claims are generally expressed with great caution, so they are very likely to be mitigated by a wide range of hedges. Similarly, the findings tend to be presented in a way that allows some scope for possible exceptions and awareness of them, as in, for example: "To some extent, these findings may evince shortfalls in L2 writers' vocabulary and lexical ranges, when L2 essays seem to recycle the same type of hedges repeatedly." (Hinkel

2005, p. 40). Researchers earn their reputation due to their ability to explain the value of their findings in the wider context of academic knowledge, however they need to avoid overstatements and reduce the risk of being proved wrong by hedging their claims and clustering the hedging devices, for example: "This would appear to imply that students' vocabulary range is as yet quite limited, resulting from an over-reliance on the most common English words…" (Bartley and Benítez-Castro 2013, p. 56). As evidenced below, the CS articles under investigation did not appear to speculate about the suitability of the method of investigation used since Czech and Slovak researchers would hardly admit a problem they had encountered or their lack of knowledge. This is probably because to do so might be viewed as a weakness in Central European academic discourse, which predominantly favours the objectivist conception of knowledge, and admitting uncertainty by the researchers might considerably influence the chances of their articles getting published. The discrepancy between NS and CS articles concerning reference to the presented findings can be attributed to the fact that the reputation of Czech or Slovak linguists is largely established by the ability to describe every detail of the studied language phenomena, include every possible exception to the discovered rule, and persuade the reader of their expertise by dense, sophisticated texts. The studied articles appear to be rich in categorically stated facts that only exceptionally seem to be interpreted in the light of previous discoveries. The occurring instances of reference to the presented findings are largely placed within sentences stating plain facts and are also likely to be followed by facts, for example: "As for my own research, there has been a visible disbalance in the use of to-infinitive clauses by native and non-native writers of English in the selected corpus." (Kozáčiková 2015, p. 56). However, the same reference in NS articles is used to highlight important claims for which the writer attempts to gain ratification, as in, for instance: "our repeated experiments have revealed that the number of recurrent word combinations retrieved might relate to corpus size to a large extent" (Chen and Barker 2010, p. 43). In this way, NS writers clearly state that the tentatively presented knowledge is their personal interpretation of multiple reality which they attempt to negotiate within their research community and thus contribute to the shared knowledge established temporarily on the bases of social constructivism.

Although attribution to sources permeates all sections of the studied academic texts to a much greater extent than is visible in the Tables, for the purpose of this research, only the instances of hedging devices specifically attributing claims to other researchers and their findings were included. I suggest at least two possible reasons for a higher frequency of these hedges in Research and Discussion sections or Body sections of CS articles. First, these hedging devices in CS texts in three cases were gathered from much larger sections, namely the body part between the relatively short Introduction sections and also equally short Conclusions. Secondly, in the Results and Discussion section, NS writers often include reference to sources to which their findings are compared, or from which similar or different results were reported, but not in the form of hedging devices showing explicitly that they avoid responsibility for their claims. They rather check if their findings are consistent with those of fellow researchers, which can be achieved by means of various structures, direct attribution being only one of them.

Further, NS writers tend to refer to themselves in the first person more often in this section mainly to mark the parts of the texts where the writer has decided to take a greater risk in order to ask for acceptance of the stated propositions, as in, for instance: "We will start the discussion with perhaps the most intriguing item: the." (Lee and Chen 2009, p. 286). By proposing the claim as an individual interpretation, for example, "We may infer that the major function of WE CAN SEE in CAWE is to refer to or explain tables or figures, and to organize the discussion." (Lee and Chen 2009, p. 289), thus stressing the proposition as one of many options and showing awareness of alternatives, as in, for instance, "Our investigation thus suggests that Chinese apprentice writers could be given explicit instruction on the pragmatic usage and meaning of ACCORDING TO and its alternatives." (Lee and Chen 2009, p. 291). Some NS writers use this type of reader-motivated hedge to develop the relationship with the readers and maintain the dialogue by referring both to the reader and the writer, such as in the following example: "At this point, we need to remind ourselves of the claim under investigation." (Gabrielatos 2012, p. 12).

By contrast, it remains questionable if the reference to the first person in CS articles is a hedging function as such. It clearly indicates the writer's involvement in the research such as in the following example:

"At the beginning of this section dealing with frequency of cognitive verbs in the corpus of political interviews, I would like to compare the results of this study with those of Prof. Anita Fetzer on a similar topic." (Kozubíková-Šandová 2015, p. 46)

However, in the identified instances, the writers do not appear to assume responsibility for the claim or maintain a dialogue with the reader. They are more likely to a) mark the introduction of a new topic, for example: "To illustrate the spreading of variables within the template, let us compare the following BNC and COCA data." (Válková and Tarnyiková 2015, p. 72); or b) help to express the writer's expectations or personal opinion concerning classification of language phenomena such as in the following examples:

1. "Even though my expectation was that non-finite to-infinitive clauses mainly in their nominal functions can be predominantly found in the introductory parts of the research articles, where aims, methods and objectives are stated, the results have not proved that." (Kozáčiková 2015, p. 57).
2. "I do not regard (6) b as a presentation sentence because it conforms to this scale only in one feature, context-independence of the subject, but not in the presentational meaning of the verb" (Dušková 2015, p. 34).

Many of the hedges are followed by categorical claims lacking hedging functions and devices.

Reference to shared knowledge, such as in the following example: "As already mentioned, the bundles (AT) THE END OF THE and AT THE BEGINNING OF can be considered discipline-specific in literature and cultural studies diploma theses." (Dontcheva-Navratilova 2012, p. 48) seems to be the only feature attempting to invite the participation of the reader in CS research articles, and this might be one of the reasons for its relatively

high occurrence. NS writers do not appear to exploit this feature as frequently in the Research and Development section, probably due to its comparatively weak reader-motivated hedging function, especially as they widely exploit other features.

Tab. 5: Frequencies of hedging devices in the Results and Discussion sections of the studied articles

Hedging devices	NS articles	CS articles
Adverbs	114	44
Modal verbs	83	39
Lexical verbs	72	33
Reference to the presented findings	48	24
Attribution to sources	9	13
Reference to shared knowledge	15	34
Reference to the first person	24	14
Passive constructions	16	3
Conditionals	6	0
Admission to encountered problems	5	0
Admission to the lack of knowledge	6	0
Downtoners	70	15
Total	468	219

Source: Author

Comparison of conclusion sections

Conclusions in the analysed NS academic texts tend to vary in length and put a strong emphasis on reference to presented findings, for example: "As evidenced in this paper (especially section 4.1.) students' interlanguage is often dependent on a repetitive use of vocabulary." (Bartley and Benítez-Castro 2013, p. 61), which allows the writer to briefly summarize the key results for which they are attempting to claim acceptance. They are largely supported by reliability hedges manifested mostly by modal verbs, hedging either the value of the presented research as in the following example: "This paper could have implications for the teaching and learning of vocabulary by EFL learners." (Bartley and Benítez-Castro 2013, p. 61) Possible implications stemming from such research; speculations regarding how the findings might be used in the future, and which aspects of the problem could be investigated further as in the following example, demonstrate other uses of modal verbs as hedging devices: "While these may be small and common words, instructors may need to make a bigger deal out of them, as they connect with larger issues in academic writing." (Lee and Chen 2009, p. 292). These include speculations how the findings might be used in the future:

1.   "We argue that, after careful selection and editing, the frequency-driven formulaic expressions found in native expert writing can be of great help to learner writers to achieve a more native-like style of academic writing, and should thus be integrated into ESL/EFL curricula." (Chen and Baker 2010, p. 44)

2.   "We cannot comment on whether the usages discussed in this paper are still communicatively effective despite being marked, as that is an empirical question that can

only be answered in complex ways through further investigations" (Lee and Chen 2009, p. 292).

Similarly, lexical verbs and adverbs mainly assume the function of reliability hedges guarding the writers against overstatement.

As can be seen from Table 6 below, CS conclusions differ markedly in two regards: a) hedging devices are less frequent, and b) they are comparatively longer and summarize findings in greater detail. Nevertheless, they do not appear to go beyond the scope of the research. Instead, writers tend to condense everything that has already been written into dense texts notable for the presence of reliability hedges largely in the form of modal verbs, lexical verbs and adverbs. In some cases, conclusions seem to be the most hedged sections of the articles, perhaps because they tend to soften propositions that have been stated categorically in the previous sections. Reference to presented findings, for example, "The analysis has revealed that syntactic correlations are rather weak and may prove ineffective in distinguishing subtle differences in the meaning conveyed" (Huschová 2014, p. 102) are likely to be followed by propositions about the possible contribution of the conducted research to the current state of academic knowledge or fragmented facts rather than interpretations. If a generalisation follows, it merely covers a minor area within the researched problem. In some cases, awareness of research limitations occurs as well as suggestions regarding other features to be researched in the future as in the following examples:

1. "The present analysis has, of course, its limitations, which mainly include the limited number of texts in the corpora and the native language of non-native speakers, which was Slovak." (Kozáčiková 2015, p. 62),
2. "Further research into the discourse of novice writers in a non-native language may focus on the appropriateness of use of the functional types of lexical bundles, paying particular attention to multifunctional expressions and to the contribution of lexical bundles to the perception of cohesion and coherence in discourse." (Dontcheva-Navratilova 2012, p. 56).

Tab. 6: Frequencies of hedging devices in the Conclusion sections of the studied articles

Hedging devices	**NS articles**	**CS articles**
Reference to the presented findings	24	6
Modal verbs	42	15
Lexical verbs	10	6
Adverbs	12	12
Reference to shared knowledge	2	3
Others	8	2
Total	98	44

Source: Author

Overall, the NS writers tend to admit the constraints of the research and treat its outcomes with the utmost modesty, assigning it relatively little value in the pool of academic knowledge, sometimes even claiming the findings to be dubitable or uncertain, as the following examples show:

1. "This study has taken a small step in this direction." (Lee and Chen 2009, p. 292)
2. "It is still not conclusive as to whether there is a relationship between proficiency and the number of formulaic expressions used" (Chen and Baker 2010, p. 44).

The research suggests that only two out six CS writers in our sample showed some awareness of research limitations, but only one seemed to express a sufficient amount of modesty concerning research findings, stating that: "the figures are too small to be conclusive" (Dušková 2015, p. 38). The majority of CS writers, however, tend to highlight the importance of their work, or boldly claim their research as unique or exceptionally significant:

"Although the conceptual categories are drawn from earlier research, our approach is innovative in taking into view not only the paradigmatic axis of alternation within the FFs with other left-periphery communicatively regulative language devices" (Válková and Tárnyiková 2015, p. 81).

Conclusion

The present study compares the use of hedging devices in research articles published in English in reputable journals to those published in two journals in the Czech Republic using a sample of 12 articles which, at least to some extent, deal with the issue of hedging. The aim of the study was to draw pedagogical implications for novice Czech researchers who wish to contribute to the world academic knowledge and improve their chances of publishing their findings.

As the structure of academic texts published in the two Czech journals (Brno Studies in English and Discourse and Interaction) seems to vary a lot, the novice writer might succeed in publishing an article in a reputable journal by adhering to an internationally accepted norm (IMRD) more closely and would benefit from knowing how to appropriately hedge a text by largely adopting the specific pragmatic functions of individual sections of native English speakers' research articles.

Czech writers' introduction sections generally require a more frequent use of modal verbs, which act as reader-motivated hedges, negotiating the importance of the study and inviting the reader to take part in the scientific debate. Attribution to sources may help to place the research in the context of previous findings and in line with current research in the particular area.

To maintain the dialogue with the reader in the Methods section, reference to shared knowledge and modal verbs can assume the function of reader-motivated hedges. The fellow scientist can be further involved if the writer admits the constraints of the research, the lack of knowledge, or considering research options. Passive voice should be used as a writer-oriented hedge when describing the research procedures.

The Results and Discussion sections appear to contain the widest range and the highest density of hedges enabling writers to admit limitations, present the findings with caution and deference, and ask for acceptance of the strongest claims they can make based on the evidence from their research. Adverbs, downtoners, modal verbs and lexical verbs are

likely to be the most frequent features which convey multiple functions. Reference to the first person seems to be used strategically here helping the author to achieve a number of goals.

Conclusions tend to be brief, seek to explain the practical implications of the research, and summarize the evidence in order to ask for ratification by peers. Consequently, modal verbs and reference to presented findings should be widely employed here.

Having observed the differences between NS and CS academic discourse, Czech writers could increase their chances of publishing abroad if they viewed their articles as an opportunity for interaction, openly showed their willingness to debate their propositions, and presented their findings with a greater deal of caution and deference. This would also require dismissing the objectivist view that knowledge can be achieved by correctly conceptualizing and categorizing the only single reality independent of the human being studying it. Instead, they should adopt the constructivist concept of seeking interactions with fellow scientists and offering them their current interpretation of the world with utmost modesty.

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Local Impact Assessment in the Czech Republic – the Theoretical Framework of Analysis

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Abstract

The text presents the theoretical framework of Local Impact Assessment presenting it as a new and effective tool of decision-making on the level of local administration. Although controlling elements of Regulatory Impact Assessment were already implemented on the state administration level in 2008, such implementation on the level of local administrations is not being conducted homogenously and often by taking the subjectively selected qualitative as well as legal inefficiencies into consideration. Decentralizing public administration has been a modern trend in economy of public sectors; Local Impact Assessment can be a key tool for effective blending of the public and private sectors.

Keywords: reagulation, local impact assessment, regulatory impact assessment, new public management, public policy, public service, finance.

Introduction

Local Impact Assessment presents a modern regulatory instrument based on the impact analysis of certain regulatory activities at the local level, which increases the efficiency at decision-making processes in local government institutions and during the implementation of regulatory actions. Although Regulatory Impact Assessment takes place during the legislative process at the level of central government, local authorities must deal with actual impacts of the regulation on various economic agents. These impacts may have a fiscal, economic, demographic or other nature. Local Impact Assessment represents an element of decentralized decision-making in public administration, as it focuses on the evaluation of social benefits and costs (externalities) of specific activity in a particular locality (catchment area).

Materials and Methods

The main methodological approach used in the process of impact assessment is an analysis of costs and benefits – Cost & Benefit Analysis (CBA). This universal method is used to evaluate project proposals spilling over into the public sector. It compares positive effects (benefits) on one side and negative effects (costs) on the other. In general, the recommended procedure is an essential element of the impacts analysis on actors, the quantification of the impacts and their conversion to a common comparative basis, ideally financial unit (Boardman et al. 2006; Mishan and Quah 2007, etc.). Based on this procedure, it is possible to extend the CBA by other economic, mathematical or econometric tools such as net present value, discounting formulas, regression analysis, scenario analysis and probit/logit model, etc. This allows a comparison of non-financial benefits to the financial statements and to compare the broader social benefits with the zero option (no action). Implementation of the local CBA element into decision-making of state and local government bodies produces enormous research potential.

A key goal of Local Impact Assessment is to improve decision-making at local levels, especially while processing applications (e.g. business licensing, construction projects, infrastructure planning, etc.). The Local Impact Assessment analysis (e.g. by relevant institution in the applicant's expenses – options to be specified) could be a key basis for negotiations about the application at the local level. Then, the decision will depend on the Local Impact Assessment Final Report, approved by the relevant public authority. Local Impact Assessment will be carried out transparently, based on a certified methodology and assessing all relevant societal benefits and costs. If the Local Impact Assessment detects significant negative socio-economic impacts of the project, the applicant has to determine ways of eliminating these negative impacts, or of compensating the social costs and externalities in the catchment area, respectively. This integration of central and decentralized legislative processes is a significant improvement for all concerned subjects. Various analyses of socioeconomic and demographic factors can be made by the Local Impact Assessment approach, so the concept could be used not just for regulatory action, but also in other areas as well (Vanclay 2003).

New Public Management and LIA

The role of the state authorities has grown with regard to more and more issues, in which the public sector intervened in the past century. Among crucial state activities, the internalization of market failures with a negative impact on society is the most important task – a wide range of regulations encroached into all areas like industry, agriculture, leisure, education, etc. (Pildes and Sunstein 2005; Foster 1992). In a parallel, economists have turn the attention to the unintended consequences of regulatory actions that could generate significant barriers to the economic activities and, moreover, could lead to the collapse of the market system as a whole (Akerlof 1970; Veljanovski 2010). That is why we currently observe a greater pressure on redefining the current model of regulation and on searching for innovative approaches that should determine a more efficient way of regulation. Such regulation that would closely reflect the market mechanism and would

neither impose market administrative costs on market actors nor distort the market by aims of unelected interest groups (Baldwin 2010; Ogus 2007). The key conclusion of the current state of knowledge is that we should focus on a decentralization of the state administration, i.e. on transfering regulatory competencies onto lower administrative units.

The decentralization of state administration follows the concept of New Public Management. This concept highlights benefits of the efficient cooperation among institutions at the public administration and of larger involvement of both scientific community and general public in decision-making processes at all levels of government and public administration (Alonso et al. 2015). Another outcome of the debate about better regulation has been the introduction of Impact Assessment Tools (Adelle and Weiland 2012) – the best known tool being a process of Regulatory Impact Assessment: 'Regulatory Impact Assessment (RIA) is an efficient method of policy analysis which is intended to assist policymakers in the design, implementation and monitoring of improvements to regulatory systems, by providing a methodology for assessing the likely consequences of proposed regulation and the actual consequences of existing regulations.' (Crew and Parker 2006; OECD 2002). A modern government, however, has to ensure a balance between the legislative activity at the state level and the efficient operation of local governments, communities and settlements (Dunleavy and Hood 1994). Therefore, it is desirable to develop the Local Impact Assessment (LIA).

In the Czech Republic, the concept of Local Impact Assessment is neither practically used nor theoretically elaborated. An insufficient degree of knowledge together with the absence of any research in this area reflect a rational ignorance of stakeholders towards this attractive concept. Local Impact Assessment is used in Australia. The Office of Liquor, Gaming & Racing uses this principle as an input when evaluating an application for a new business license in a given location, e.g. opening of a new casino with slot machines in some urban area (more in McAllister 2014). The concept of Local Impact Assessment, based on the Australian experience with different regional specifics, can be modified and thus serve as a stimulating inspiration for the Czech public administration.

Better Regulation

For decades, economics has systematically cultivated the public administration by using experience as inputs into theoretical modelling and empirical research. Conclusions made in the field of economics of regulation (the public choice theory, social utility function and allocation of resources between the public and private sector, collective action and public goods, the theory of bureaucracy, interest groups and pressure groups theory, rent-seeking ...) have been actually applied into practice. Economics of regulation defines the public administration (central government and local governments) as an essential pillar for the efficient operation of territorial units, which should serve as a systematic support for regulatory decision-making at various levels of the public sector, carried out according to clearly defined rules limiting benevolence or arbitrariness of public officials (Niskanen 1971). However, regulatory actions (a binding and enforceable rule that changes

spontaneous choice of economic agents – assess control, price control, quality control or output control) are often sub-optimal because the regulation is de facto an economic good. It has its own market with interactions between the supply side (controller) and the demand side (regulated entities). In regulated areas, the supply side (politicians and officials from state and local governments) naturally faces an information asymmetry. This produces significant inefficiencies in decision-making, outlined in the most famous approaches to the theory of regulation:

- Regulatory Capture (Capture Theory): A regulated entity provides selective information to the controller with the aim to create information bias and utilize it for own purpose. The regulator is de facto captured by the regulated subject. This ensures that the development of the controlled sector will follow preferences od regulated entity (Stigler 1971).

- Theory of Economic Regulation (Peltzman Model): Regulation activities are defined by the conflict among politician's personal goal (re-election), goal of interest groups (high prices and profits in the regulated sector) and aim of customer/voter (low prices in the regulated sector). Therefore, a politician must balance a positive response to rent-seeking activity of interest groups and a positive response to voters' desires to secure the highest attainable support (Peltzman 1976).

- Becker Model: The model analyzes an interaction between two interest groups seeking the influence on regulatory decision-making. The model defines reaction curves of interest groups, by which these competitors optimize the pressure on the regulator in order to maintain (improve) the influence (Becker 1983).

Economics of regulation determines an opportunity for implementation of new elements to the state administration practice, especially in emerging and developing countries (Kirkpatrick and Parker 2004; Winer 2006; Jacobs 2006). At the central government level in the Czech Republic, the legislative process uses a tool of Regulatory Impact Assessment as a complement to the work of the Government Legislative Council of the Czech Republic. This should ensure impacts of legislative proposals are comprehensively evaluated.

Regulatory Impact Assessment and Local Impact Assessment

The process of Regulatory Impact Assessment in the Czech Republic adheres to the Guidelines for Regulatory Impact Assessment (RIA). Identification of all new, large-scale impacts in areas of the state budget and other public budgets (3.6a), administrative burden for public authorities (3.6b) and economic and legal relations between public authorities and private entities is defined as the main task of the Regulatory Impact Assessment process. Nevertheless, the process of Regulatory Impact Assessment does not practically provide comprehensive identification due to procedural shortcomings (e.g. exceptions listed in section 3.8 of the Guidelines; inadequate elimination of subjective utility function author (=promoter) of regulatory changes; insufficient identification of concerned public institutions and their agendas because of ignorance of regulatory

process maps; political interests and activities of interest groups; time perspective; a lack of erudition or subjective interests of the entities listed in the database of consulting institutions (DATAKO); etc.). This issue reflected in the lack of real local impacts evaluation, i.e. no impact assessment on the level of local governments (Report on the Effectiveness 2013).

Genuinely, the process of Regulatory Impact Assessment affects decision-making with nationwide and regional effectiveness, however lower-ranking representatives of local governments do not have any similar instrument. It increases the costs of competent and efficient decision-making at the level of local municipalities. But even here politicians and officials must contend with various specific investment projects which constitute a substantial local budgets' burden (infrastructure, land use plans, development projects, leisure activities, etc.). As the result, time required for decision-making at local levels expands, or local representatives rationally assume more passive roles in their jobs. At the same time, a lack of inputs opens up a space for various interest groups, corruption and non-transparent political decisions without any possibility to control the process by voters (Olson 1965; Tullock 1967; Krueger 1974; Posner 1974; Peltzman 1976; Benson 1984; etc.).

Therefore, a tool of regulatory impact assessment from the respective of local authorities (Local Impact Assessment) generates a great potential to improve the general impact assessment process. Especially, if it is applied to decentralized decision-making with respect to impacts of regulation – any systematic evaluation at local levels is missing here. The concept of Local Impact Assessment is built on empirical methods of evaluating the impact of pre-defined activities to interest groups (communities) defined locally, ethnically, socially, etc. (more about these methods in Runyan (1977)). The default approach is an analysis of costs and benefits (Cost & Benefit Analysis, CBA). The approach uses economic (not accounting) economic measures and also time-aspect and discounting (Hahn and Tetlock 2008; Adler and Posner 2006).

The concept of Local Impact Assessment is particularly attractive, because it can be used for a comprehensive control in decision-making and implementation of regulatory actions at both central and local governmental units, i.e. as:

1) A complement to the existing process of Regulatory Impact Assessment (e.g. RIA to the government bill does not evaluate the local economic impact in the catchment area of self-governing unit; Local Impact Assessment carried out in selected locations could remedy this issue).

2) A key element in the control of decentralized decision-making processes at the local government levels (e.g. when deciding whether to grant a license for economic activities or not, municipalities in the Czech Republic unsystematically apply different approaches based on subjective set of qualitative and quantitative measures; Local Impact Assessment as a compulsory impact assessment component could remedy).

The concept of Local Impact Assessment is primarily intended to regulate the supply of goods and services in industries generating economic activities associated with negative social costs. However, it can also be used in evaluating impacts of other, regionally very specific regulatory activities which is not rational to assess at the central government level – heterogeneity problem, additional bureaucracy, budgetary costs, flexibility at decision-making, etc. (Francesco and Radaelli 2010; Weatherill 2007). Local Impact Assessment enables self-governing administrative units to create an operational methodology for evaluation of any phenomenon. It is a transparent tool for elimination of net social costs that would arise after erroneous regulatory decisions. As a particular example, a project of building an industrial zone near the village could be mentioned, when a decision-making authority would be subject to pressures from various interest groups. These interest groups spend unproductive expenses (rent-seeking costs) on the presentation of their subjective arguments and they try to influence the process in their favor. After the implementation of the Local Impact Assessment in accordance with the generally valid methodology, net local economic impacts in the catchment area could be calculated and used in decision-making whether to approve the project plan, which conditions for realization to set, etc.

Conclusion

Decentralization of decision-making competences is perceived as an effective tool in controlling of regulatory activities with significant social costs. The project offers a unique opportunity to implement a systematic solution to the impact assessment process in the Czech Republic, while the ex-ante evaluation of economic impacts on the local level will enable local public authorities, NGOs businesses and individuals in the catchment areas to utilize objective arguments for eliminating erroneous regulatory decisions.

Systematic decentralization of the impact assessment process is a major challenge for local authorities – accumulation of bureaucratic activities increases labor intensity of public officers at all levels of government and multiply activities within the public administration. Before the implementation of regulatory actions by the central government, these impacts in absolute (nominal) measures or relative measures compared to annual expenditure of the state budget or the budget chapter are taken into account. However, for local authorities and local branches of public institutions, even declared "minimal increase in budgetary expenditures" may represent a major budget constraint with regard to the local budget, employees, capital position or other restrictions. Regulatory Impact Assessment do not cover additional costs of regulation within the process map of public administration, because the costs are not linearly distributed among local public institutions. As part of a comprehensive methodology for regulatory impact assessment, Local Impact Assessment should quantify the total economic costs generated to local authorities and thus secure a significant Pareto-efficient change of the status quo.

The concept of Local Impact Assessment identifies relevant economic benefits and costs, generated in the catchment area of the local authority. On this basis, the local authority

can choose the optimal control strategy. Local Impact Assessment could thus expand overall comprehensive approach to the concept of Regulatory Impact Assessment, i.e. to ensure more efficiencies of adopted regulatory actions, especially a detailed analysis of particular impacts on local authorities, and secure the sustainability by identifying fiscal and socioeconomic threats. It follows the modern public administration principles. In general, regulatory actions cause two effects: Ratchet effect (once the regulation has been implemented into the system, it is very difficult to dismantle it, as the responsible official uses information asymmetry against politicians and simply presents the regulation as indispensible) and Snowball effect (one regulatory action generates additional spending needs associated with the preparation, performance, control or administration of the regulatory action at both central and local levels, while the risk of such expenditure needs are not accurately analyzed), as studied in Niskanen (1971), Niskanen (1975), Bradbury and Kellough (2010), Buchanan (1974) or Dunleavy (2014). Impact Assessment tools are intended to eliminate these effects, and by fusing of the Local Impact Assessment concept, this may be happening without an unnecessarily costly process of adapting every central government's legislative process to needs of all entities at local government level. Other impact assessment tools as Regulatory Impact Assessment (RIA), Environmental Impact Assessment (EIA), Social Impact Assessment (SIA), Health Impact Assessment (HIA) and others focus on specific areas, without significant local focus (Burdge and Vanclay 1996; Lock 2000; Ramanathan 2001).

Acknowledgement

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Research into Double Limited and Heterogeneous Social Networks in China

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Abstract

This paper explores the microscopic behavioral characteristics of various nodes in a social network and the macro-evolution law of its formation. Taking the Sina microblog in China as an example, the article presents a multi-agent simulation analysis on the Netlogo platform. The results show that a double limited and heterogeneous feature is possessed by the social network, namely the limited size of the network and the in-degree and out-degree of the nodes, as well as the heterogeneous attributes of the nodes. Compared with a small-world and scale-free network, the double limited and heterogeneous social network can better simulate a real social network. It not only has the overall structural characteristics of a small-world and scale-free network, but also microscopically reflects the influence and control of different types of nodes in a social network.

Keywords: social network, double limited, heterogeneous.

Intruduction

Features and Empirical Analysis of Social Network Structure

A social network is also a social networking service. It is an online community constructed on the basis of different kinds of user nodes and certain relationships. The construction of social network nodes not only includes users that take humans as the principle body, but also various institutional users in the form of individuals (Hansen 2012). Different egocentric networks are constructed by different types of users based on their differing motivations. Complex macro-level behaviours influence the interactions between the microscopic individuals. In turn, the self-organizational behaviour of the overall network influences the microscopic individuals, which results in an ever-changing network structure (Aitkin, Vu and Francis 2014). Previous studies have indicated that social networks are small-world and scale-free, but also possess other features (Java et al. 2007

Leskovec et al. 2008; Kwak et al. 2010). On this basis, and taking the Sina microblog as an example, this study presents an empirical analysis of the macroscopic evolution and microscopic behavioral characteristics of social networks. The results of the analysis show that a double limited and heterogeneous feature is possessed by the social network, namely the limited size of the network and the in-degree and out-degree of the nodes, as well as the heterogeneous attributes of the nodes.

Limited size of the network

Social network nodes provide a map of the individual users, institutional users and other entities in the virtual world of the Internet. However, the number of users, in whichever form, and the use of multiple network identities, puts a limit on the size of online social networks.

At present, the evolutionary model for most networks increases at a fixed rate of m-nodes per unit of time. Under this assumption a network is unlimited in size over time (Nash, Bouchard and Malm 2013). However, it is clear that this kind of evolutionary model is not in line with the actual evolutionary situation of social networks.

The evolution of a social network is similar to the dissemination of technological innovations and sales of traditional durable goods. The increment of the network size is not constant, instead, it is closely related to external and internal influences. External influence involves the use of a range of media to promote social networking characteristics in order to encourage potential users to join a social network. Internal influence involves taking advantage of existing users to achieve the same goal.

If the internal consistency between the increasing size of a social network and the influencing factor of the dissemination of technological innovation are taken into consideration, the Bass diffusion model can be used to describe the evolution of a social network´s size. This is represented by the formula (1):

$$M\ t\quad 1\quad a\ M\!\!-\ M\ t\quad bM\ t\ M\!\!-\ M\ t$$

(1)

where is the increased number of social network users at time ; is the number of existing social network users at time ; is the innovation factor, which is related to the external factors; is the simulation factor related to the internal factors; is the maximum number of social network users. Formula (1) can be reformulated as follows:

$$M\ t\quad 1\quad -bM_2\ t\quad 1-a\quad bM\!\!-M\ t\quad aM\!\!-$$

$$M_2\ tM\ t$$

(2)

where $\quad b$; $\quad 1-a\quad bM$; $\quad \dfrac{aM}{}$.

In order to verify the validity of the Bass model, the data in the bi-annual and annual reports of the Sina microblog were used to simulate the growth in user numbers (see Figure 1 - where is the innovation coefficient; is the simulation coefficient; and the

largest user number = 700.78 million). The simulation results show that the Bass diffusion model can effectively simulate the growth in user numbers of the Sina microblog (see Table 1).

In-degree and out-degree limitation of the nodes

The out-degree of the network nodes is represented by the number of interested users, whereas in-degree is represented by the number of users who choose it as their object of interest. According to the limitation of the social network size, the existence of the theoretical upper limits for the out-degree and in-degree of the network nodes is known, namely M -1, whereby the actual out-degree and in-degree limits are much less than the theoretical upper limits.

Michael H. Goldhaber put forward the notion that the web-based "new economy" is in essence an "attention economy". In this economic form, the most important resource is neither monetary capital in the traditional sense nor information itself, but attention (Davenport and Beck 2001). Although the social radius of social networks is expected to expand, thereby enhancing social capital, limited attention will limit the selected object of interest (out-degree). In addition, different users have different out-degrees. Using the Sina microblog as an example, the average out-degree value of 200,000 randomly selected users is 113. The out-degree distribution is presented in Figure 2.

The sum of the out-degree of the social network is equal to the sum of its in-degree.

Even though there is a preferential link feature in the social network i.e. a small number of nodes will get a lot of links, the limitation of the out-degree will inevitably lead to a limitation of the in-degree. In addition, different users have different out-degrees. Using the Sina microblog as an example, the maximum out-degree value of the 200,000 randomly selected users is 8,286,157. The in-degree distribution is presented in Figure 3.

Modelling of Double Limited and Heterogeneous Social Networks

Initial network settings

The initial social network consists of M_0 nodes with k class(es) of different attributes. The fully coupled network of N_0 edges is formed on the basis of the following formula (3):

$$N_0 = \frac{M_0 \sum_{i=1}^{k} M_{0i}}{M_0 \left(M_0 - 1\right)} \tag{3}$$

Network evolution

For each time step, the following steps are executed repeatedly until the total number of network nodes reaches M .

New nodes

At time t , the number of new nodes $M\,t$ is represented by formula (1). According to the probability $p_{ch\_i}\ i\ 1,2,\ ,k$, new nodes select their attributes and satisfy equation (4):

$$p_{ch\_i}^{\ \ k}\ 1 \tag{4}$$
$$_{i\ 1}$$

Determine the number of linked new nodes. According to the out-degree distribution of the subordinated type, the new node $new-j$ determines the out-degree $n_{link\_out\_i\_new\_j}$ depending on $p_{link\_out\_i}\ i\ 1,2,\ ,k$.

Determine the number of links between the new links of each new node and all the attribute nodes. The number of links $k_{new\_j\_link\_i}$ between the new nodes new_j and the i th class of attribute nodes can be expressed as the formula (5):

$$r\ \ k_{new\_j\_link\_i}\ n_{link\_out\_i\_new\_j}\ p_{s\_link\_i} \tag{5}$$

where r represents the type of new nodes new_j ; $p_{s\_link\_i}$ represents the probability that the s th class of nodes links with the i th class of nodes and satisfies the equation (6):

$$p_{s\_link\_i}\ 1\ i \tag{6}$$
$$_{1k}$$

Determine the new nodes and select the range of objects of interest. The objects of interest can be chosen by new nodes within a LAN at the range of the located radius r_0 . In addition to the new nodes, an alternative set $_i\ \ i\ 1,2,\ ,k$ is constituted by the i th class of attribute users in the LAN.

Determine the objects of interest of the new nodes. In the i th class of alternative attribute sets, new nodes refer to the link rules for the scale-free network and select their objects of interest depending on $p_{new\_j\_i\_h}$, where $p_{new\_j\_i\_h}$ satisfies the equation (7):

$$p_{new\_j\_i\_h}\ h\ \ i\ \ \frac{n_{in\_h}}{\displaystyle\mathop{n}_{\substack{n_{in\_f}\\ f\ 1}}} \tag{7}$$

where n_{in_h} represents the in-degree of the h th node; n_i is the number of nodes in the alternative set i.

New edges of existing nodes

Select an existing node. According to the probability of p_{old_i}, n_{old} existing node(s) is(are) chosen randomly.

In the reference to the links rules of the NW small-world network, an existing node old_j is chosen randomly for the existing node n_{old_i} according to the probability $p_{old\_link\_nw}$ and a link between the existing node n_{old_i} and the existing node n_{old_j} is established.

In the reference to the TF links rules of the HK model, an existing node old_f is chosen randomly for the existing node n_{old_i} according to the probability $p_{old\_link\_hk}$ and an interest set of old_f determined for the node old_f. The objects of interest are selected in the interest set old_f according to the probability $p_{old\_i\_f\_h}$:

$$p_{old\_i\_f\_h} \quad h_{old\_f} \qquad \frac{n_{in\_h}}{\sum_{f1 old\_f}^{n} n_{in\_f}} \qquad (8)$$

where, n_{old_f} expresses the number of nodes in the interest set old_f.

Determine the objects of interest for becoming mutual fans. The interest set new_j is determined for new nodes new_j. The proportion of objects of interest for becoming mutual fans p_{hf_i} is ascertained according to the feature of class i that the new nodes belong to. Depending on probability $p_{i\_hf\_h}$, the nodes for becoming mutual fans are confirmed when they satisfy the equation (9):

$$p_{hf\_i} \quad \sum_{h\,1}^{k} p_{i\_hf\_h} \qquad (9)$$

Deletion of existing nodes and disconnection of existing edges

Select and delete nodes. n_{delete_old} existing nodes are selected at random depending on p_{delete_node} and deleted.

Select the disconnected edge. n_{delete_link} existing nodes are selected at random depending on p_{delete_link} and deleted.

Analysis of simulation results

The multi-agent simulation platform Netlogo was utilised in this study. The results of the empirical analysis of the Sina microblog were used as model parameters (Figures 1 and 4 and Tables 1-4) to simulate a double limited and heterogeneous social network. As the simulation results show, the construction of the social network according to the evolutionary rules has the shortest path and a higher than average clustering coefficient. Furthermore, its in-degree is subject to a power-law distribution with regards to its small-world and scale-free features, and the network's influence and control are not the same for various types of nodes.

Analysis of overall network

The time length of the simulation was set at 289. A double limited and heterogeneous social network was subsequently generated with 2025 nodes and 38,108 edges. The network was then compared with a random network, small-world network and scale-free network with the same number of total nodes and closed edges (see Table 5). The simulation results show that the double limited and heterogeneous social network possesses small-world characteristics. However, its out-degree distribution is subject to a given distribution (see Figure 3) and the in-degree distribution follows a power-law distribution (see Figure 6 and Table5). In addition, it is scale-free. However, the large clustering coefficient (see Table 5) is in line with the characteristics of the actual social network (Bazarova and Choi 2014).

The increase in the clustering coefficient of double limited and heterogeneous social networks is correlated with two rules, namely the TF link rule and the rule of becoming mutual fans. The TF rule can be described as the link that is established by node i and node j at time t during the evolutionary process, whereby at time $t\ 1$, a neighbouring node l of node j is selected to link with node i. In undirected networks, a closed triangle is formed by i, j, l as a result of the TF rule (see Figure 6a), which enhances the network clustering coefficient. However, if the real social network is a directed graph (such as a microblog), nodes i, j, l do not form a closed triangle (see Figure 7b) and therefore the network clustering coefficient does not significantly increase due to the TF rule (see Table 6). On the basis of the TF rule, the rule of becoming mutual fans is added. A closed triangle between nodes i, j, l can be really formed by building a link between node l and node i shown in Figure (c). Hence, the clustering coefficient of the social network can be improved effectively as is demonstrated in Table 6.

Node Analysis

Centrality of degree

In social networks, the in-degree of nodes can be used to express the centrality of degree. The higher the centrality of a node the more links the node has and the larger the impact of the node. In the double limited and heterogeneous social network obtained through the

simulation, the average centrality of degrees is not the same for various attribute nodes (see Figure 8).

Of the five types of users, the average centrality value of degree for non-authenticated users and microblog talents is relatively low. However, there are a few users that boast a higher centrality of degree with greater influence, namely authenticated users of individuals, authenticated users of institutions and microblog girls. Of these, the centrality of degree distribution for microblog girls is quite even, which is worth focusing on.

Centrality of intermediary agencies

If a node is located at n shortcuts of all pairs of nodes, then the greater is, and the more important the position of the node is in the network. The centrality of intermediary agencies can be used to characterize the control degree of nodes for information. In the double limited and heterogeneous social network obtained through the simulation, the average centrality of intermediary agencies is not the same for various attribute nodes (see Figure 9).

Of the five types of users, the average centrality value of intermediary agencies for non-authenticated users and microblog talents is relatively low. However, there are a few users that boast a higher average centrality of intermediary agencies with greater control over information dissemination, namely authenticated users of individuals, authenticated users of institutions and microblog girls.

Conclusion

The mode and effect of information dissemination in social networks are determined by the structure of the social network. The structure therefore forms the foundation for related research into social networks. This paper explores, on the basis of previous studies, the microscopic behavioral characteristics of various nodes in a social network and the macro-evolution law of its formation. In addition, the results of an empirical analysis of the Sina microblog were used as model parameters, and the Netlogo platform adopted to conduct a multi-agent simulation analysis. On the basis of the analysis, two conclusions were drawn :

(1) The social network possesses the double limited and heterogeneous feature, namely the limited size of the network and the in-degree and out-degree of the nodes, as well as the heterogeneous attributes of the nodes.

(2) The double limited and heterogeneous social network model enables better simulations of real social networks. From the macroscopic perspective, the overall structure of the double limited and heterogeneous social network possesses both small-world and scale-free features, but it cannot only be replaced by a small-world network or scale-free network. From the microscopic point of view, the influence and control of different types of attribute nodes in the network can be truly reflected.

Theoretical contributions and marketing implications

In most theoretical studies of existing social networks, the number of network nodes and variances in edge numbers is basically the same for the default unit of time (increases at

a fixed rate of m-nodes per unit of time). In addition, the network nodes have the same behavioural characteristics (such as the preferential link rule of degrees of dependent nodes), resulting in the network size being infinite over time and the difference in network node attributes being neglected. In this study, diffusion theory and attention economy are introduced into the research on social network structures in order to make up for this deficiency. As shown in both the theoretical analysis and the empirical study, like the projection of real society in virtual society, social networks enjoy the double limited and heterogeneous feature with small-world and scale-free characteristics, as well as all kinds of attribute nodes with different positions in the network.

The double limited and heterogeneous feature of social networks can provide a basis for developing marketing strategies within companies. Firstly, the evolution of the overall network size is subject to an S-shaped curve. Therefore, for companies with a social networking platform, the strategic focus for attracting and retaining users should be different according to the network evolution stage. For example, when a social network is at the beginning stage of its development, companies need to focus on attracting new users, whilst in the mature stage, companies have to try their best to decrease their churn rate. More importantly, they need to retain their high-value users. Secondly, the in-degree and out-degree of the nodes are all limited. Therefore, social network nodes, be they either individuals or institutions, should choose their objects of interest and topics in a smarter way, thereby making sure to avoid an obsession with large quantities of information. For example, social networks may need to allow users to form unidirectional connections as "fans" or "followers", such as a company creating a fan page on Facebook, so that users can enlist as "fans". However, users who are a "fan" of a company or brand may want to follow it without granting the company access to their profile. Thirdly, different attribute nodes are heterogeneous. Hence, the branding and customer relations management in businesses can be managed effectively through their understanding of their own attribute features and their impact on other nodes. This means that companies need to identify the influential nodes in social networks. Known methods range from node centralities, such as degree, closeness and betweenness, to diffusion-based processes, like PageRank and LeaderRank. Recently, a new local ranking algorithm named ClusterRank was presented, which takes into account not only the number of neighbours and their influence, but also the clustering coefficient (Chen et al. 2013). In addition, the operator of the social networking platform can also improve the number of key nodes (such as microblog girl with both high centrality of degree and intermediary agencies) to strengthen the effectiveness of information dissemination on the platform.

Deficiencies and future research directions

This research analyses the influence and control of different types of attribute nodes in a social network´s structure. However, the strength and weakness of the social relationships are not considered. As a result, the construction of a weighted double limited and heterogeneous social network should be the focus of future research.

The results of an empirical analysis of the Sina microblog were used as an example in this study. The user attributes were divided into five categories, namely non-authenticated

users, authenticated users of individuals, authenticated users of institutions, microblog girls and microblog talents. If required, other parameters can be used to subdivide each type of attribute user e.g. institutional users can be classified according to industry, size, etc. The area of focus in future studies will therefore be the characteristics of user behaviours in the subdivided classes and their influence and control in a network structure.

Social network structures form the basis of research into information dissemination. Future research will therefore also focus on an analysis of the influence of different attribute nodes on information dissemination and the reaction of information dissemination to social network structures on the basis of existing double limited and heterogeneous social networks. In addition, a model will be constructed of the interactive effects between a network´s structure and information dissemination.

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Tables and Figures

Table 1. Bass diffusion model parameters for the growth in user numbers of the Sina microblog

	Coefficients	Standard error	t Stat	P-value	Lower 95%	Upper 95%	Lower limit 95.0%	Upper limit 95.0%
α	16.0682597	0.868215	18.50725	9.99E-68	14.3649	17.7715	14.3649	17.7715
β	1.002728155	9.14E-05	10964.98	0	1.00254	1.00290	1.00254	1.00290
γ	0.999999958	1.83E-09	-23.0483	3.83E-98	-4.6E-08	-3.9E-08	-4.6E-08	-3.9E-08

Source: Authors

Table 2. Analysis of the selected users of Sina microblog

	Non-authenticated	Individuals	Institutions	Microblog girls	Microblog talents	In total
No. (ten thousand people)	6809.3	36.4	18.1	18.1	369.4	7251.3
Proportion	93.90%	0.50%	0.25%	0.25%	5.09%	00.00%

Source: Authors

Table 3. Interest probability for five kinds of Sina microblog users

Interest probability	Non-authenticated	Individuals	Institutions	Microblog girls	Microblog talents
Non-authenticated	31.58%	27.28%	9.19%	19.46%	12.49%
Individuals	35.57%	22.25%	9.29%	22.36%	10.53%
Institutions	32.57%	14.94%	14.23%	22.86%	15.40%
Microblog girls	34.14%	14.23%	6.20%	25.44%	19.99%
Microblog talents	35.40%	13.65%	8.20%	24.27%	18.48%

Source: Authors

Table 4. Preference for becoming mutual fans for five kinds of Sina microblog users

	Probability becoming fans mutually	Proportion of each type of user				
		Non-authenticated	Individuals	Institutions	Microblog girls	Microblog talents
Non-authenticated	38.10%	17.80%	0.90%	0.40%	11.90%	7.10%
Individuals	54.40%	19.40%	11.60%	2.10%	12.50%	8.80%
Institutions	46.80%	15.30%	5.20%	8.10%	12.10%	6.10%
Microblog girls	57.00%	19.30%	1.80%	0.50%	18.50%	16.90%
Microblog talents	53.90%	20.60%	1.20%	0.50%	16.30%	15.30%

Source: Authors

Table 5. Comparison of various networks

Network name	Network diameter	Average clustering coefficient	Average path length
Random network	13	0.009	2.973
Small-world Network	14	0.355	5.24
Scale-free network	11	0.064	2.258
Double limited and heterogeneous network	7	0.148	3.306
Simulation network excluding becoming fans mutually	11	0.092	4.095
Simulation network excluding idol effect and becoming fans mutually	11	0.086	4.335

Source: Authors

Table 6. Parameters of double in-degree logarithmic distributions for the simulation results

|	Coefficient	Standard error	t Stat	P-value	Lower 95%	Upper 95%	Lower limit 95.0%	Upper limit 95.0%
Intercept	3.539	0.143	24.757	0.000	3.255	3.823	3.255	3.823
X Variable 1	-1.631	0.085	-19.226	0.000	-1.800	-1.463	-1.800	-1.463

Source: Authors

Figure 1. Bass diffusion model simulations of the growth in users of the Sina microblog
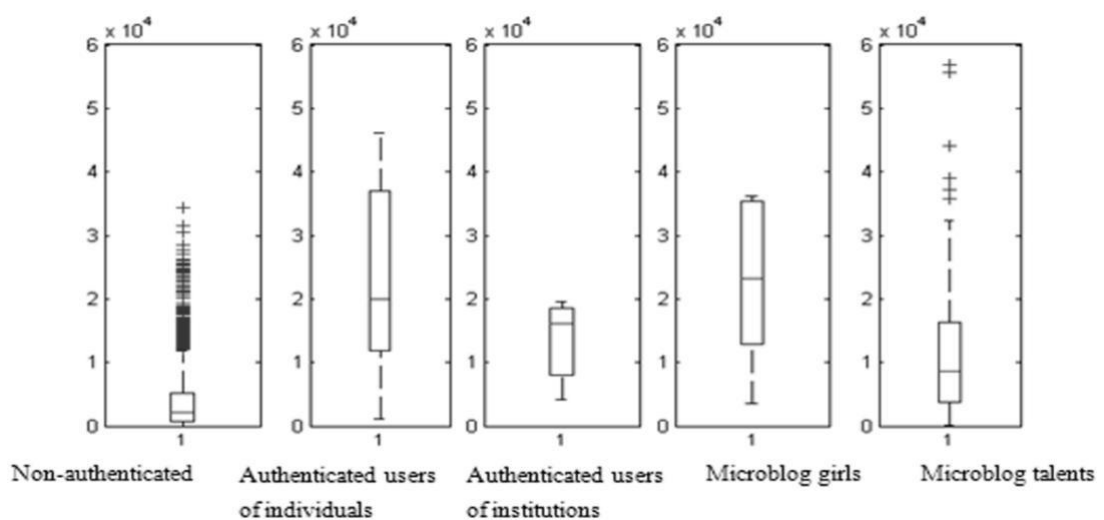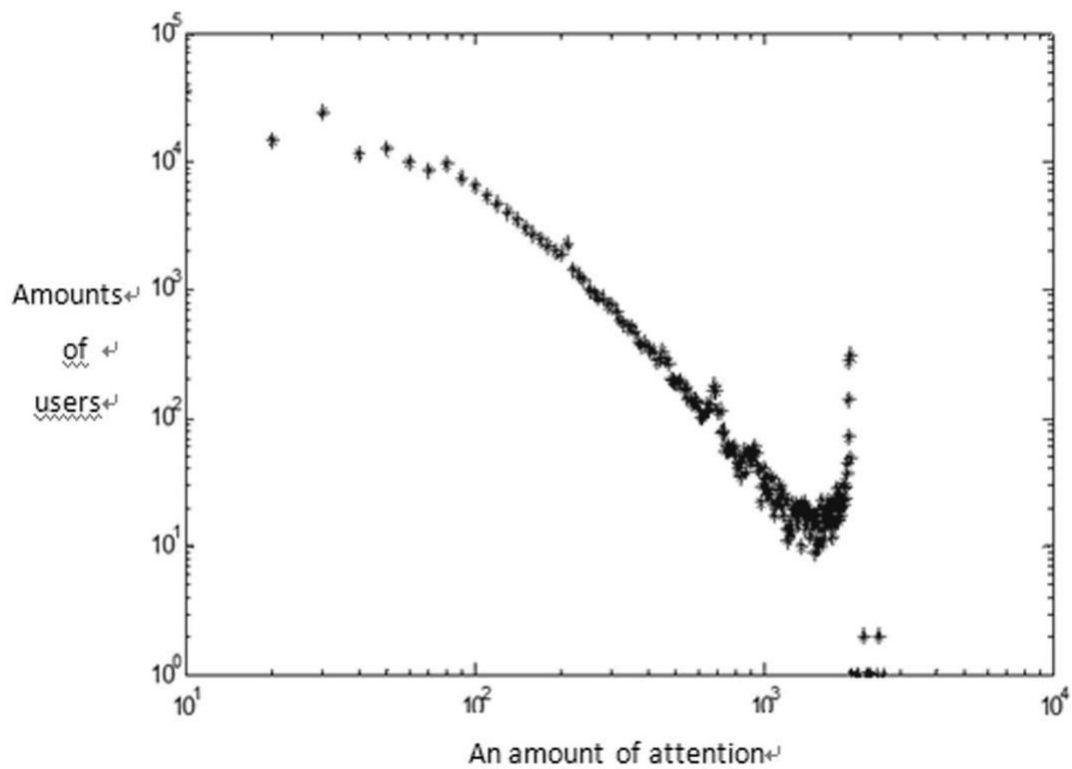

Source: Authors

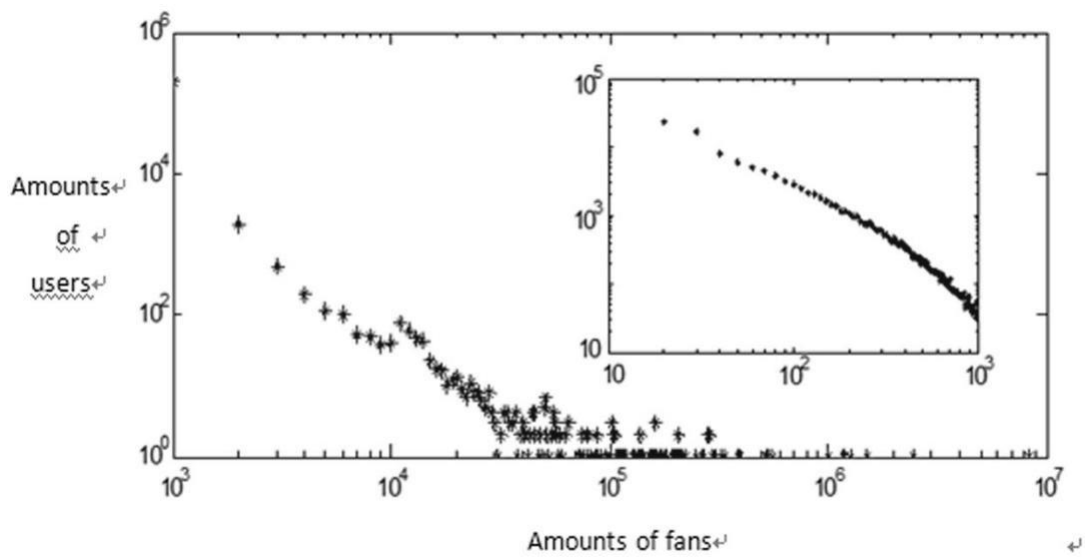Figure 2. Out-degree distribution of Sina microblog users
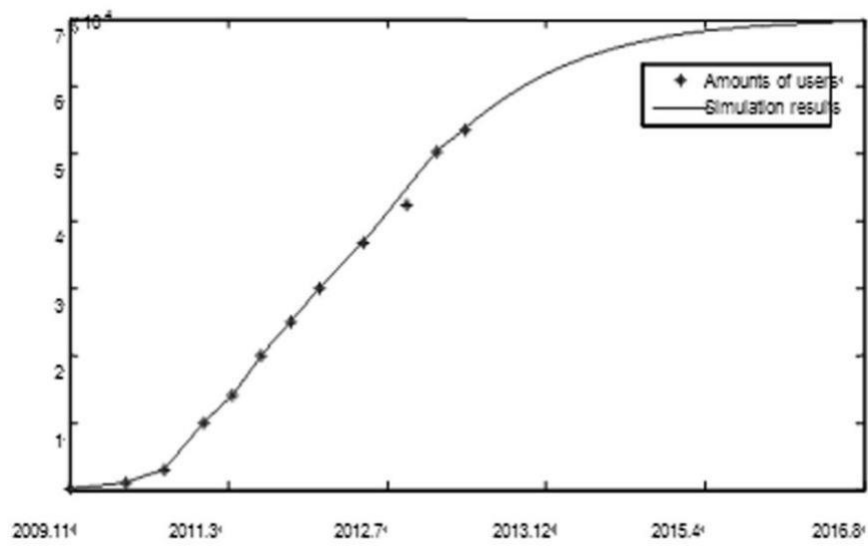
Source: Authors

Figure 3. In-degree distribution of Sina microblog user
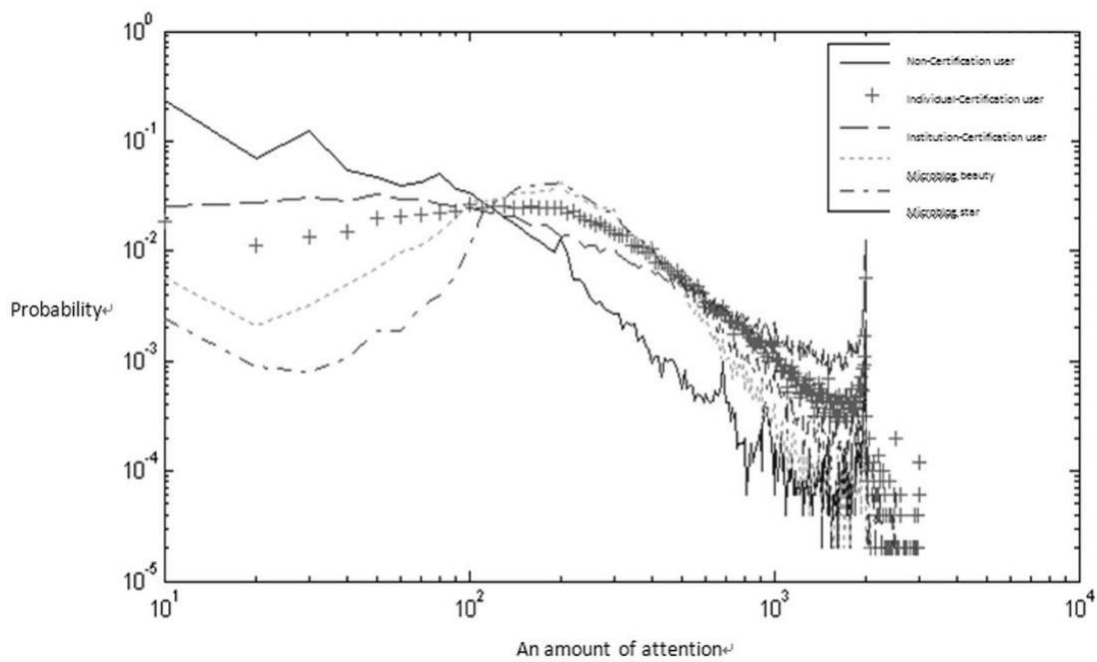

Source: Authors

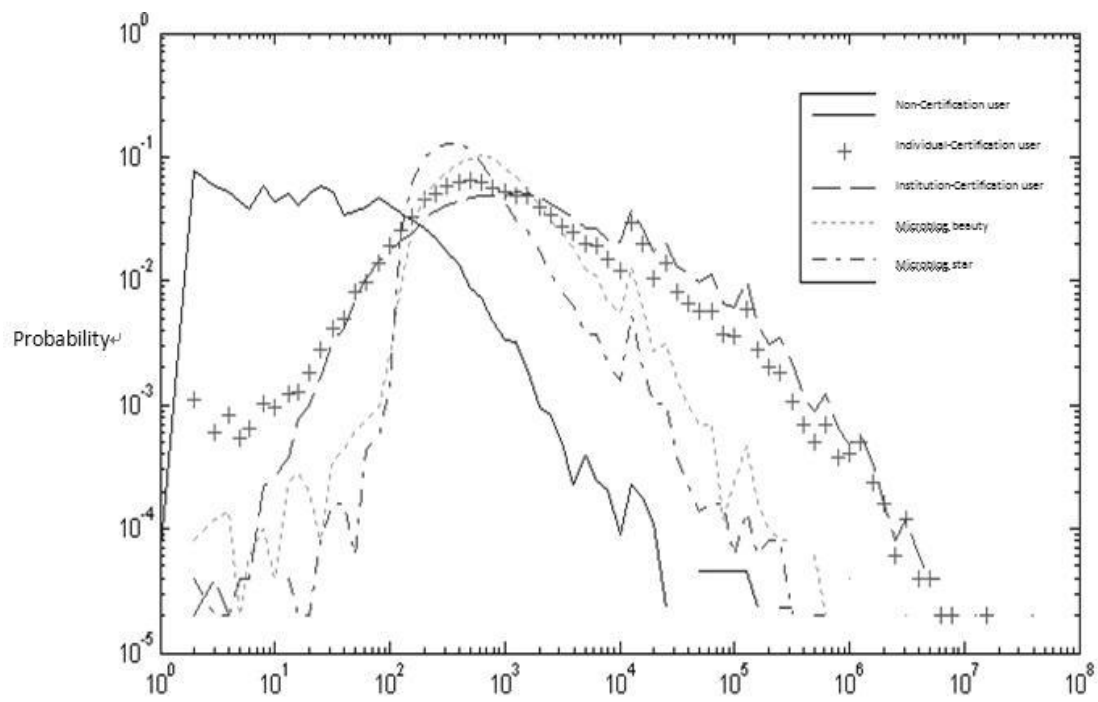Figure 4. Out-degree distribution of five kinds of Sina microblog users

Source: Authors

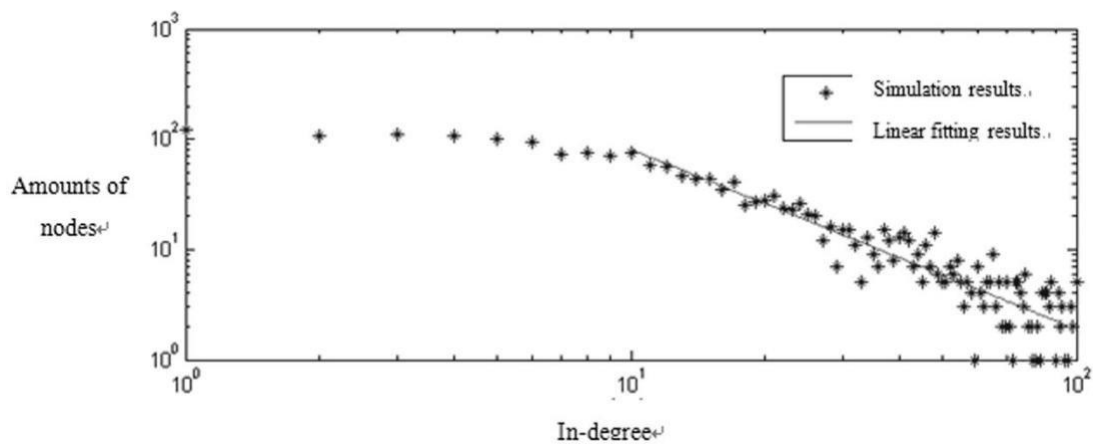Figure 5. In-degree distribution of five kinds of Sina microblog users

Sourc: Authors

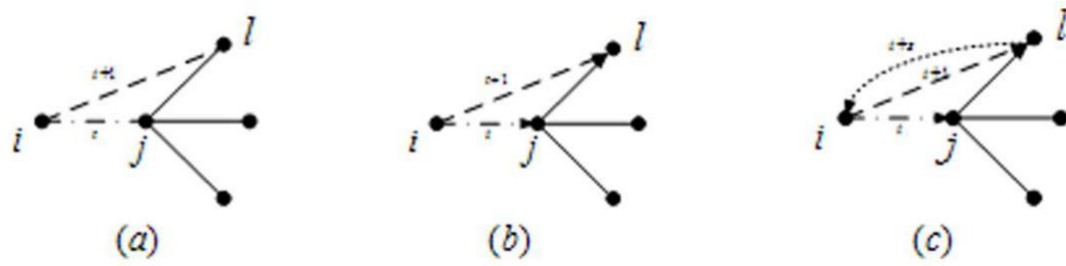Figure 6. In-degree distribution of simulation results

Source: Authors
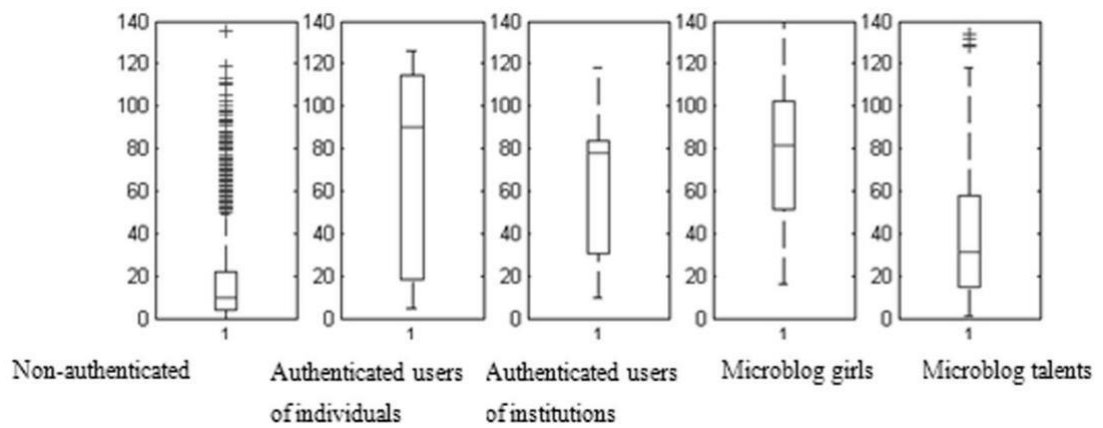
Figure 7. Link diagram of network nodes

Source: Authors

Figure 8. Boxplot of the centrality of degree for each type of attribute node

Source: Authors

Figure 9. Boxplot of the centrality of intermediary agencies for each type of attribute node

Source: Authors

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The Attitude of the British Dominions to the Geneva Protocol

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Abstract

The study is based on unpublished sources of British provenance and on scientific literature. It analyses the attitude of the British dominions to the suggested Protocol for the Pacific Settlement of International Disputes (Geneva Protocol) in the autumn of 1924. Great Britain, as one of the main victors of the war, had to react to situations brought on by the new reality of the years following 1918. This primarily concerned its approach to the system of collective security that was constructed in order to prevent the horrors of war. The Geneva Protocol signified a certain climax in these efforts, in particular by France, who wanted to push through its views on collective security. After the victory of the Conservatives in the parliamentary elections in the autumn of 1924, it became clear that obligations such as compulsory arbitration or the possibility of the British Navy sailing out on behalf of the interests of the League of Nations were unacceptable to His Majesty's Government.

Keywords: collective security; Great Britain; Geneva Protocol; British dominions; Imperial Foreign Policy; British Empire.

Introduction

In 1918, World War I ended and Europe had to recover from the bloodiest conflict in its history. It was therefore no surprise that after the war ended, the majority of people wanted to feel safe and believed that something similar would never happen again. However, the question of how to achieve such security remained unanswered. The pre-war allied alliances and the Concert of Europe failed to resolve the problem, with the public blaming them for their competing interests causing the war. It was therefore generally muted that a new and better organization had to be formed, one based on cooperation and trust.

Great Britain, as one of the main victors of the war, and a world power whose interests almost covered the entire world, understood that collective security was not only its

responsibility, but a necessity as well. Its position after the war was very strong and weak at the same time – all of its enemies were defeated, but the costs of war had inflicted significant debts; the economic dominance of the country had definitely come to an end. It was therefore necessary to establish peace and prevent another war. This axiom became very important during the decision-making processes of British politicians in the inter-war period; to some extent it became the deciding factor.

Collective security, as interpreted by the newly established League of Nations, meant a system of mutual guarantees based on one general principle; potential conflicts were to be resolved peacefully, whereby the participants in the disputes promised to try to resolve their differences through negotiation. In case a situation arose where one of the countries were not to respect the set rules, sanctions would be imposed on it. In the first half of the 20th century it was France who felt the most threatened and feared a German attack. Paris therefore tried to convince Great Britain to jointly initiate a collective security system, thereby neutralizing Berlin. However, London looked at the European continent through the prism of its own specific interests; London did not share French concerns or rather directly or indirectly rejected them. The entire first half of the 1920s was marked by the vain efforts of France to engage Britain in "its" system of collective security.

London also had problems with the opinions of its dominions. Their independence increased after the war through their separate representation in the League of Nations. During the course of the 20th century, the idea that it would be possible to conduct imperial politics rapidly dissipated. The dominions frequently acted independently and, with regards to the issue of collective security for Europe, clearly and repeatedly voiced their disapproval of new British commitments. Under these circumstances, it was impossible for Great Britain to consider a system of collective security which would see it engaged everywhere in the world to an identical degree. Great Britain saw two options as possible solutions – international security in the broadest sense of the word as represented by the League of Nations, or a model of participation in the provision of security for those parts of the world that were vital to British interests.

The first option proved very difficult to realize after the United States of America were unable to ratify their obligation to join the League of Nations. This further increased the doubts of British Conservatives about the purpose of the new organization and its ability to assert itself in the field of international politics. During the first half of the 1920s, there were several attempts to create a system of collective security under the aegis of the League of Nations; the most important and most significant of these attempts was the Geneva Protocol. However, London rejected all of these attempts for one reason or another.

Materials and Methods

For the study, the direct analysis method was applied to the analysis of unpublished archive sources. This method is the most widely used among historians working in the field of the history of politics. It involves directly deriving information from one or more

historical sources, examined on the basis of external and internal critique, whereby questions concerning the origin of the sources, their societal function, and/or their interpretation are investigated.

The authors did not only focus on analysing unpublished sources, but also on a critical assessment and interpretation of scientific literature. They also tried to confront the facts contained in the sources with the opinions of historians and experts who had previously tackled the issue. They subsequently drew their own conclusions.

Great Britain was fully aware of the unfavourable impression that was left behind by it turning down the Draft Treaty of Mutual Assistance in the autumn of 1924, which is why it was forced to produce some kind of alternative plan (Novotný 2006; Břach 1992; Feriancová 2010). The draft of the Protocol for the Pacific Settlement of International Disputes (also called the Geneva Protocol) was therefore discussed from the beginning of October 1924 until March 1925. The continental European countries pinned their hopes on this draft. The introduction of the principles of arbitration and the observance of the agreements on collective security and disarmament were supposed to "revive the languishing spirit" of the League of Nations. The Protocol was not only supposed to provide its signatories with security guarantees, but also to compel them to participate in declared sanctions against aggressors (Orde 1978).

The Geneva Protocol provided solutions to a number of significant issues in connection with collective security. A war of aggression was prohibited. Unless otherwise approved or commanded by the Council of the League of Nations, the signatories were bound not to enter into any armed conflict in order to enforce their own interests. In such cases where a conflict could not be resolved by mutual agreement, the Protocol offered a solution either in the form of a ruling by the Permanent Court of International Justice or in the form of an arbitration award by the arbitration commission. The aggressor was defined as the country who chose to conduct war despite conciliation efforts under the Protocol. In such cases, sanctions were to be imposed on the aggressor. Under the Protocol, the signatories were duty bound to participate in these sanctions according to their geographical location and military power.

At that point in time, it seemed that the issue of collective security had been resolved. Unfortunately, the opposite was true. The parliamentary elections in Great Britain towards the end of October 1924 ended in a landslide victory for the Conservative Party, which returned to power after almost a year in opposition. Stanley Baldwin became the new Prime Minister, who nominated the experienced politician Austen Chamberlain as the head of the Foreign Office.

The Conservative victory was a severe threat to the plans of everyone who supported the Geneva Protocol. On the other hand, it strengthened the hopes of its opponents (primarily the representatives of the government administration and the dominions) (Novotný 2006). Both the Secretary of State for Foreign Affairs and the Prime Minister were of the opinion that they should take into consideration the opinions of the dominions in their discussions concerning the Protocol, and act accordingly. Some members of the cabinet

were even convinced that the best way of implementing British interests would be not to intervene on the continent at all.

In December 1924, in light of the importance of the issue and the fundamental importance of the attitude of the British dominions, the new Secretary of State for the Colonies, Leopold Amery, started to organize a special meeting of the Imperial Conference for March 1925 in order to discuss its stance on the Protocol (Cmd. 2458 1925). Towards the end of December 1924, the Prime Minister of Canada, William Lyon Mackenzie King, told him that the proposed date of the meeting was not ideal. The Ottawa government thereby stated that it would be grateful if "the decision on the Geneva Protocol came to a similar conclusion" as the Draft Treaty on Mutual Assistance. His Australian counterpart, Stanley Bruce, for a change, strongly argued that the Empire should "in difficult and delicate matters keep a united front and speak as one united voice". The prime ministers of Australia, New Zealand, Union of South Africa, and Newfoundland echoed the statements made by Mackenzie King with regards to them being too busy and that it would be impossible to meet in person. It is for this reason that they mutually agreed that consultations should be held telegraphically, which is why Amery consistently sent them reports and memoranda (Cmd. 2458 1925).

Towards the end of 1924, it became clear that the majority of the British government rejected the draft of the document and that they regarded it merely as a tool for meeting French security needs (Cassels 1980; Grayson 1997). On the other hand, the ministers realized that simply rejecting the document would anger France, which could have led to complications on the continent. Austen Chamberlain proposed implementing a pact between Great Britain, France, and Belgium. In December 1924, two meetings of the Committee of Imperial Defence (CID) took place. The meeting drew the conclusion that a new CID subcommittee should be implemented to examine the document and release a report on it (TNA, CAB 2/4 1924). The CID subcommittee soon came to the conclusion that it was almost impossible to accept the Protocol because its philosophy was based on compulsory arbitration and automatic sanctions against the aggressor, both of which could restrict the freedom of conduct of the British government. Its members also established the issue of the consent of the dominions (TNA, CAB 16/56 1924).

The opinions of the individuals who rejected the Geneva Protocol in Great Britain can be summarized in two points – too loosely defined obligations, not only economical but military as well, and the submission of national sovereignty to the League of Nations. Nevertheless, there were some people who supported the document. According to their views, the document's goal was not to restrict the country's sovereignty. However, it is important to note that the supporters of the Protocol were in a clear minority amongst British politicians and belonged to the old guard that no longer peddled much influence with regards to defining foreign policy (Novotný 2006).

The Prime Minister of Australia, Stanley Bruce, unlike his Canadian counterpart Mackenzie King, chose a more careful approach and suggested that if the Protocol was rejected, then an alternative political solution should be formulated (Cmd. 2458 1925).

The Prime Minister of New Zealand, Vincent Massey, thought that the text of the document lacked quality, endangered domestic jurisdiction over immigration and was generally dangerous to the British Empire. That is why he suggested that Britain should reject the document (Chaudron 2011; Cmd. 2458 1925). The Prime Minister of South Africa, General James Hertzog, on the other hand did not particularly trust the international position of the League of Nations because the United States of America, Germany, and the Soviet Union were not amongst its members. He therefore feared the obligations that would arise from signing the Geneva Protocol. He suggested that the final decision should be made by the Committee of Imperial Defence (Cmd. 2458 1925). The Irish representatives also did not recommend signing the document. The Indian representatives shared the fears of the leaders of the dominions and added that the Protocol should not be applied overseas and would therefore have to be geographically restricted to Europe (TNA, CAB 24/172/11 1925). Even though all the prime ministers of the dominions supported the League of Nations and believed in its ideals, they tried to avoid the guarantees, which would economically, politically, or militarily restrict them. This is the main reason why they were against signing the Protocol (Moore 1931).

On 13th February 1925, a CID meeting started that would last six days and which was supposed to definitively determine the attitude of the His Majesty's Government towards the Geneva Protocol. The members of the committee prepared several suggestions for the cabinet to assess. However, most of the members of the committee believed that the best solution at that moment would be not to react at all; each had different reasons for this attitude (Orde 1978). After six days, and during another CID meeting, it was decided that the committee would recommend the government to reject the Protocol. Ever since the Conservatives had won the election it was clear that the chances of the document being ratified were significantly lower. None of the members of the CID or the government were unequivocally for accepting the document. Some almost flatly rejected any kind of British engagement in Europe and put the Empire's interests first (Leo Amery, Lord Birkenhead, Sir Samuel Hoare), whereas others supported a kind of regional pact – either only with France, such as Austen Chamberlain, or to hold talks with Germany as well (Sir Winston Churchill).

The Secretary of State for the Colonies, Leopold Amery, was not amongst the supporters of the ratification of the Protocol because he saw it as controversial due to extremely isolationist objections and the almost hostile attitude of the United States of America (Burks 1959). From Amery's point of view, the document generated more disadvantages than advantages for the Empire. London's politicians generally viewed the Protocol as untrustworthy; there were definitely more influential opponents than supporters of the document. During February 1925, expert discussions were held to analyse the impact of the security commitments on Imperial foreign policy and defence. The discussions were not only held at all levels of government, but also in the Committee of Imperial Defence, which was strongly against signing the document (TNA, CAB 24/172/5 1925).

On 4th March 1925, the British government was in session. The ministers considered all the presented memoranda, which politically, economically, and militarily spoke against

the Geneva Protocol. They therefore came to the "logical" conclusion that it was impossible to accept the document of the League of Nations. This, even though the former British Prime Minister, James Ramsay MacDonald, had jointly helped to phrase the document with his French counterpart, Édouard Herriot. On 12th March, the Secretary of State for Foreign Affairs, Austen Chamberlain, announced the rejection to the League of Nations in the name of Commonwealth (TNA, CAB 24/172/36 1925). There were four main reasons why Britain rejected the document: 1) negative attitudes of the dominions;

2) fear of possible complications with the United States of America; 3) unwillingness to guarantee the geographical arrangement in Central and Eastern Europe; and the 4) deeply rooted aversion of Foreign Office employees to compulsory arbitration (Walters 1952).

Conclusion

The Geneva Protocol was unacceptable to the Conservative government from the start. Terms such as compulsory arbitration, automatic implementation of sanctions if arbitration was rejected, the possibility of the British Navy sailing out in the interests of the League of Nations, or restricted decision-making with regards to war or peace, created insurmountable objections for the opponents of the Protocol. These opponents not only included members of the cabinet, but also members of the government administration and representatives of the army. Their objections were not necessarily focused on every suggestion with regards to finding a solution for collective security, but rather focused on every attempt to force London to accept too extensive commitments on the continent and to deprive it of its freedom to negotiate in conflict situations. The rejection of the Geneva Protocol in March 1925 was a failure of a certain concept of collective security; it did however offer Germany a way out of isolation and back into the fold to become a great European power.

There were also very few supporters of the Protocol among the representatives of the dominions. Overseas politicians often held almost isolationist attitudes and were not very open to accepting any more binding economic, political, or military obligations, which had not been fully discussed with them and their British representatives. The British realized that possible guarantees for Western Europe were only acceptable to a certain extent with the support of the dominions, or rather India. Chamberlain, by declaring a new British principle on collective security, started a new approach that eventually led to the acceptance of the Locarno Treaties, which would shake Imperial foreign policy to the core.

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Issues Inside the Field of Economics of Innovation: Definitions, Data Sources, Estimation Procedures and Comparability of Results

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Abstract

Innovation economics requires an interdisciplinary approach and at least knowledge in economics and history. A historiographical approach to data representativeness is necessary to perform literature review without producing errors when comparing studies with datasets lacking small companies. Knowledge in econometrics is necessary to assess the possibility to compare results from two innovation papers. An identification strategy is necessary for comprehension because the definitions of innovators are most of the time rather incomparable. Some papers recognize only successful innovators in terms of delivering the product new to the market. In other papers, innovators are companies, which imitated their competitors or trained staff recently. These issues are dependent on the understanding of the definition of the term innovation. Comparison of innovation economics research results or using them in an argument is not possible without complex understanding of data (representativeness), methods (set of control variables) and other limits of dependent variables.

Keywords: Innovation economics, identification strategy, innovation, innovation activities.

Introduction

The analysis of innovation activities in a defined economy requires a rich theoretical background and places relatively high demands on the researcher. This paper aims to review the issues and problems researches face and mistakes they do when analysing innovation activities of firms, industries and national economies.

This paper brings together theoretical contributions of theories dealing with endogenous growth theory and perspectives from scholars who have contributed to the empirical

testing in the field of innovation activities, international competition, business strategies, and generally, economics of technological and social change.

The aim is to broaden the understanding in the field of innovation economics. The methods respect traditional economic historical approaches. The aims are traditional in the sense of their practical scientific contribution to the field of economics of innovation. Initially, definitions and theories are discussed to contribute to a better understanding of the so-called "i-terms" (innovation, imitation, invention) and their definitions, i.e., to promote their dynamic and simultaneous relationship.

This understanding of the terms allows us to proceed to the second aim, which is a review of the recently used econometric methods, innovation datasets, and their results. As mentioned above, there are many ways innovation can be understood, many ways innovation process is estimated, and many issues with data sets. That is why interpreting and comparing the results must be done with caution.

The firm-level strategies and microeconomic principles are an essential part of the Schumpeterian based growth theories. I want to pay tribute to one of the most influential economists and historians, Josef Alois Schumpeter, whose theories and thought experiments, however imperfect, are a source of inspiration for many scholars around the world. In the academic competition-innovation debate nothing is resolved yet (Gilbert 2006).

This paper aspires to show that to analyse hypotheses about a firm's market survival conditions, potential competitors, the process of creative destruction, dynamic efficiency, and the never-ending debate about competition and innovation, an interdisciplinary approach and knowledge of at least in economics and history are required.

Materials and Methods

Literature review is a main technique; a direct comparison of Scopus indexed papers follows to show specific problems and issues. To show differences, issues and problems, highest cited original articles in the fields of Business, Management and Accounting and the fields of Economics, Econometrics and Finance are analysed. The selection is based on the title of the article and the use of the word innovation. In the first stage, five articles regardless their publication year are selected, then Scopus indexed original articles from authors experience and general innovation literature are used to complement the analysis of highly cited literature. For the analysis of definitions, terms innovation and innovator are searched for and their definitions are described. For the analysis of the methods, an estimation method is described. For the dataset limitations, representativeness of the data is described.

Table 1: Summary statistics for CIS waves in the Czech manufacturing industry

Variable	Obs.	Mean	Std. Dev.	Min	Max
Innovator (new to the market)	42663	0.16	0.36	0	1
Innovator (new to the firm)	42663	0.28	0.45	0	1
Total R&D expenditures	42387	11616.37	146349.80	0	1.51E+07
Number of employees	34913	259.99	1205.67	1	81662

Source: Czech Statistical Office (2016)

For the case study, Czech Community Innovation Survey (CIS) datasets (2001, 2003, 2005, 2006, 2008, 2010, 2012 and 2014) were used for the analysis. The firm level innovation data and financial statements were not joined because CZSO no longer provides the opportunity to join data. Case study is aimed at the decision and intensity of innovators (Table 1). Estimation strategy of innovation process is similar to the one used by Castellacci (2009) and Crepon, Duguet and Mairesse (1998), however due to the data unavailiabilty (assets, material and energy costs are no longer provided by CZSO) only two frist equations were used (Table 2).

Table 2: Estimation porocedure of innovation porcess – innovation intensity

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Source: Based on Castellacci (2009) and Crepon, Duguet and Mairesse (1998)

Where $X_{nit}\beta_n$'s (with n = 1, 2, 3, and 4) are vectors of explanatory variables and ε_{itn}'s (with n = 1, 2, 3, and 4) are random-error terms. The error terms are assumed to be independent of the exogenous variables. The vector of parameters to be estimated is denoted β_n (with n = 1, 2, 3, and 4). The first equation (r_{it}^*) accounts for selection bias. The probability of a firm i to engage in continuous R&D in a year t is specified as a probit model, i.e. $P(r_{it}^*>0) = \Phi(X_{1it}\beta_1)$, where r_{it}^* equals 1 if firm i is an innovator and reports R&D expenditures.

The second linear equation (k_i^*) describes innovation input, which relates the log of internal and external R&D expenditures (without machinery expenditures) to the number of employees in a firm i, conditional of being a process innovator and doing R&D. The i represents fixed effects. In both equations there are potential determinants ($X_{nit}\beta_n$'s); such as, a firm's size, foreign ownership, being part of a group of companies etc.

Results

There is much confusion when economists talk about innovation. The same term is used identically as an "act" and also as an "end product". For example, the term innovation is identically used as the act of innovating (the whole innovation process) and also as an end product (an invention). A consensus on a clear differentiation of the terms has clearly been an issue in economics and the social sciences from the very beginning (Brozen 1951) to the present (Godin 2008). With all the "i" terms, a pejorative meaning is perceived throughout history. Innovation meant, for example, changing to socialism (Godin 2012).

In the economics of innovation, a dynamic environment (Schumpeterian tradition) is expected and there is no universal definition of the term innovation, although many scientists (see examples in Baregheh et al. 2009) define it as a complex process. It encompasses all the activities associated with the act of innovating from the beginning to the end. Therefore, we must define the beginning and end of the process.

Typically, (Schmookler 1966), the initial phase is characterised by (1) a generation of ideas through (2) experiments and problem-solving methods. The final phase is characterised by (3) the implementation of ideas and (4) its market and society diffusion. From another point of view, we can speak of (1) basic research activities, followed by (2) applied and experimental research in the initial innovation input phase. In the output phase, we observe (3) piloting and prototyping, followed by (4) commercialization, and changes to the market and in the society. (Greenhalgh and Rogers 2009).

There are countless interactions between economic agents in every phase of the innovation process. Mostly we observe the firms' reaction (imitation, cooperation, innovation, etc.) and their adaptation (mergers, exits, court battles, etc.) to new market conditions. But there are also customers and governments, and we can track the impact of an innovation internationally, i.e., on a global scale. The demand side, governments, and global tendencies are all important sources of information. This extraction of desires is a valuable innovation factor in every phase of the innovation process.

A lot of dynamic factors and simultaneous processes are linked with the act of innovating. We are not able to track and observe all the outcomes of economic agent interactions and not even all outcomes of the innovation process. There are abandoned innovations, defence and military R&D projects, and simply all the secrets and strategic non-declaration in the financial statements and surveys.

Two interesting simultaneous processes are the full act of invention and imitation. They also have dual meanings, as does the term innovation. We observe an act of inventing/imitating and a final invention/imitation. As one can imagine, there are many possible intersections between all the "i" terms.

The act of inventing is typical of the initial (1) phase of the act of innovating, i.e., we observe creativity and the generation of ideas. But the complete process of inventing, the act and the outcome, can result in a prototype (phase 2, and 3), or an innovative outcome
(4) which is an invention. To put it another way, the outcome of the act of inventing, a

law of physics, or the invention of a new chemical element, is a basic research outcome (2), i.e., not the end-product of the innovation process.

The imitation term has, again, a dual form. The act of imitating is sometimes mistakenly equated with an act of exact copying. Although these terms are related, the act of imitating can be, and usually is, a far richer act than making copies. We again can place the act of imitating in the initial phase (1) of the act of innovating, but the relationship of these two terms is more complicated. We are, in most cases, inspired, however pejoratively it may sound, by the current state of technology and scientific knowledge. Imitating usually, but not universally, follows the act of inventing and sometimes outcomes emerge as a by-product of that activity, with luck, or simply by the process of trial and error, i.e., haphazardly trying possible solutions and discarding those that are in error until one works. Therefore, the act of imitating can result in a new basic research outcome (2), a new and better prototype (3), or a new in the world market invention (4). Once more, the outcome of the act of imitating can be a similar thing, without any inventive effort, a copy, which is not the outcome of the innovation process.

The terms imitation and innovation are very close to each other and sometimes we are not able to distinguish between them. To distinguish between those two terms, a measure of novelty is introduced. We speak about imitation when there is a zero level of novelty. Novelty is broadly used in patent law. It is a level of originality and industrial usability that can be compared "objectively" to the current scientific knowledge and state of technologies. This objective manner is a patent office arbitrary routine which has its limitations. But it is a method used to assess an innovation by an impartial spectator.

Such a routine requires educated guesses, and multiple specialists involved. But only time will tell, if an innovation is useful and successfully introduced to the market. In time, after the innovation is introduced to the market, we can distinguish between incremental and radical innovations, i.e., how influential an innovation was on the market. We can also observe how a firm views its innovation impact on the market in retrospect and what type it was.

According to the Oslo manual (OECD 2005) and the Frascati manual (OECD 2002), four types of innovation are recognized. Product, process, organizational, and marketing innovation are viewed by firms as new-to-the-firm, new-to-the-local market, and finally the world's first introduction to the global market. Such typology is a useful simplification. However, as we've shown, the field of innovation is not black and white, and a firm, an institution, even a government is not exactly a trustworthy reviewer and reporter of its financial and innovation activities.

In the literature, both approaches are used and we observe innovation to be the act of innovating (the whole innovation process) and the end-product (just the invention). Most cited paper by Teece (1986) describes innovation and innovators in the sense of the "end-product". "…innovators - those firms which are first to commercialize a new product or process in the market" (Teece 1986, p. 285) "The analysis so far assumes that the firm has developed an innovation for which a market exists…" (Teece 1986, p. 301). Second

(Powell, Koput, and Smith-Doerr 1996), third (Moore, and Benbasat 1991), fourth (DiMasi, Hansen, and Grabowski 2003) and fifth most highly cited paper (Audretsch and Feldman 1996) do not define innovation or the term innovator. It is only assumed indirectly by the subject of analysis, for example in Audretsch and Feldman (1996) inventions are counted and the "end-product" definition of innovation is thus assumed.

The R&D (Research and Development) functions were popularized in Mansfield (1965) as a mix of (1) research expenditures (as the R&D input) and (2) number of important inventions (as the R&D output) and by the definition, innovation was considered to be the "end product" of an innovator or a company that was first to introduce a new product to the market.

In the CDM literature, named after researchers Crépon, Duguet and Mairesse (1998), the definition of innovation reflects the whole innovation process. This analysis of the complex definition of innovation process is reflected for example in Castellacci (2011), Classen et al. (2014), Doran and O'Leary (2011), and Hashi and Stojcic (2013). Innovators are described directly by self-reporting in CDM models. First CDM model suggested that the innovating firms were those which answered 'yes' to at least one of the following eight questions in the innovation survey: "…did you performe in the five last years (between January 1st of 1986 and December 31 of 1990) an innovation of the following type: (i) product improvement; (ii) new product for the market; (iii) product imitation (i.e., new for the firm but not for the market); (iv) technological breakthrough; (v) process improvement; (vi) packaging innovation (explicitly excluded from i, ii and iii in the questionnaire); (vii) organizational innovation linked to the introduction of technological change and (viii) marketing innovation. " (Crépon, Duguet and Mairesse 1998, p. 141) This approach suggests that imitation is a part of innovation, because in the above citation there is the option iii) innovation new for the firm but not for the market.

Similarly, Doran and O'leary (2011, p. 203) state: "Innovating firms are defined as those introducing products that are either new to them or new to the market." but the distinction here is not five last years but only three years. Classen et al. (2014, p. 602) are even more restrictive and account only for one year and they are using R&D expenditures instead of self-reporting variables "innovators including only firms with a positive innovation expenditure in 2006" and explaining innovation expenditures as "internal and external R&D or the acquisition of external resources to realize innovation projects" Classen et al. (2014, p. 597).

Hashi and Stojcic (2013, p. 358) define an innovator as a company that "invested in intramural or extramural activities in R&D, purchased new machinery, equipment and software, purchased or licensed patents, know-how and similar forms of knowledge from other organisations, engaged in training of staff for development of new or significantly improved products or processes, and activities for the market introduction of new or significantly improved goods and services." and similarly Castellacci (2011, p. 643) defines an innovator as a firm that "Engaged in R&D: a dummy variable that indicates whether a firm has carried out R&D activities in each period." The positive value of total

R&D expenditures is another way of identifying companies as innovators in a broader sense (f. e. including imitators and companies with abandoned innovation projects).

Problems with estimation

Highly cited papers by Teece (1986), Moore and Benbasat (1991) are rather theoretical and no econometric method is employed. Powell, Koput, and Smith-Doerr (1996) use indexes and fixed effects panel estimation to specific innovation issues but the innovation stage is not clearly distinguished. Cross-sectional approach is used in DiMasi, Hansen, and Grabowski (2003) to estimate innovation drug development costs using differences (χ2 testing) in phases of drug validation process. Audretsch and Feldman (1996) use Gini coefficient and ordinary least square estimation of cross-sectional data. Advanced econometrics is not used in top cited articles. It was probably because Mansfield (1964) encountered several estimation issues like endogeneity bias in the ordinary least square (OLS) estimation back in the 1960s. He was also concerned about R&D knowledge function because the data was hard to collect and the analysis depended on the firm true reporting of its financial indicators and research expenditures.

It took about thirty years for present approaches like the original CDM model to solve complicated maximum likelihood estimates, mainly due to computer computational capacity. The CDM models became popular because they gave researchers a more efficient way to estimate innovation activities and make the most of Community Innovation Surveys (CIS). However, the limitations of the Cobb-Douglas linear production function and reporting problems have remained and researchers have to be careful and perhaps not too optimistic in the empirical findings of their production function models.

In reviewed models (Crépon, Duguet and Mairesse 1998; Castellacci 2011; Classen et al. 2014; Doran and O'leary 2011; Hashi and Stojčić 2013), advanced econometrics and CDM models are introduced. The problem is that there are in general two estimation methods, one with four equations like in original CDM model and one with five equations with bivariate PROBIT in the third stage (as observed in Classen et al. 2014). Another distinction is the utilization of cross-sectional data like in Hashi and Stojčić (2013) and panel estimation procedure like in Castellacci (2011). The interpretation of results is appropriate but it is hard to compare the results of these studies because the identification strategy of explanatory variables and instruments is also different. The substantively larger problem is data credibility and representativeness.

Problems with representativeness of small companies

Papers by Teece (1986), Moore and Benbasat (1991) are rather theoretical and no database is directly used for analysis. Powell, Koput, and Smith-Doerr (1996) use own data and there are issues with under representativeness of companies which are not publicly traded and summary statistics of the number of employees or assets are missing and also, we do not know how many micro sized companies (less than 10 employees) are in the data sample. Randomly selected companies are included in the analysis of DiMasi,

Hansen, and Grabowski (2003) but the direct data representativeness in terms of number of smaller companies is not provided. In Audretsch and Feldman (1996) the sample is from the Small Business Administration's Innovation Data Base, but again no summary statistics or data representativeness in terms of number of smaller companies is not provided. It can be expected that small companies are under-represented because in the previous research of one of the authors (Acs and Audretsch 1988) small companies were those with 500 and less employees.

Case study

The coefficients seem to be quite similar and the differences between new-to-the-market innovators and new-to-the-firm innovators are not substantial in decision stage (Models 1 and 3, Table 3). This is because the selection bias is to some extent suppressed. But we can observe on average lower market orientation coefficients in new-to-the-firm innovators. World markets orientation is a highly important factor of being a new-to-the-market innovator. The R&D intensity of new-to-the-market innovators is substantially dependent on the industry sector. Aggregate sector differences are not observable in case of new-to-the-firm innovators.

The problem of fixed effects estimation is that we observe only a limited within variation (Models 2 and 4, Table 3). There is a problem with datasets consisting of 4 and more CIS datasets. The questions are changed or discontinued and the ability to create complete model with interesting variables allowing for random effect estimation of R&D expenditures intensity is very limited. Another problem is the lack of willingness of statistical offices to provide data. In case of Czech Republic, the financial data are modified to some extent (around one standard deviation).

(Table 3 about here)

Conclusion

It is the hard to answer the hypotheses about a firm's market survival conditions, potential competitors, the process of creative destruction, dynamic efficiency, and the never-ending debate about competition and innovation. In this paper is shown that such analysis requires interdisciplinary approach and knowledge at least in economics and history. Historiographical approach to data credibility and representativeness is necessary to describe when performing literature review of the original research articles. Knowledge in statistics is necessary to assess the possibility of comparing results from two innovation papers.

An identification strategy is necessary to analyse because the definition of innovators is most of the time incomparable. In some papers, only successful innovators in terms of delivering products new to the market are recognized. In other papers, innovators are defined as companies that imitated their competitors or trained staff recently. These issues are dependent on the understanding of the definition of innovation, since there are at least two group of researchers who consider innovation to be described in terms of

"marketized end-product new to the market" and in terms of positive R&D/innovation expenditures.

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Table 3: Innovation intensity – Czech industry 2001-2014

8 CIS Waves 2001-2014	(1) Innovator (0/1) df/dx (New market)	(2) Log of R&D expenditures per employee	(3) Innovator (0/1) df/dx (New firm)	(4) Log of R&D expenditures per employee
	PROBIT RE	OLS FE	PROBIT RE	OLS FE
Log of employees	0.259***	-0.594***	0.286***	-0.465***
	(0.02)	(0.20)	(0.01)	(0.13)
Being part of a group	0.353***		0.472***	
	(0.04)		(0.04)	
Foreign company	-0.200***	0.331*	-0.273***	0.202
	(0.04)	(0.18)	(0.04)	(0.14)
Manufacturing	0.780***	1.321***	0.832***	0.299
	(0.06)	(0.36)	(0.05)	(0.39)
Services	0.507***	1.060**	0.526***	0.627
	(0.07)	(0.52)	(0.05)	(0.55)
National markets	0.755***		0.472***	
	(0.06)		(0.04)	
European markets	0.715***		0.575***	
	(0.06)		(0.04)	
World markets	0.771***		0.578***	
	(0.07)		(0.05)	
Linear trend	0.065***	0.004	0.055***	0.003
	(0.01)	(0.02)	(0.01)	(0.01)
Lack of personnel	0.327***		0.488***	
	(0.04)		(0.03)	
Lack of information	0.096**		0.066*	
	(0.04)		(0.04)	
Prior innovation	-0.253***		-0.297***	
	(0.04)		(0.03)	
Cooperation		0.264**		0.264**
		(0.11)		(0.11)
Funding – local GOV		0.264		0.221
		(0.26)		(0.17)
Funding – central GOV		0.474***		0.443***
		(0.11)		(0.10)
Funding – EU		0.135		0.177*
		(0.13)		(0.10)
Funding – UE FP		0.042		0.108
		(0.15)		(0.10)
Log of R&D expenditures per employee				
Constant	-133.757***	-2.294	-114.682***	-0.049
	(13.05)	(39.27)	(11.32)	(26.30)
Observations	23802	3378	24289	5399
Adjusted R2	n/a	4.28 %	n/a	3.52 %

Robust Standard errors (bootstrapping) in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$ Source: Author

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Review

SINN, Hans-Werner. V pasti eura, 2016. Brno: Centrum pro studium demokracie a kultury. ISBN 978-80-7325-394-3.

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German translation of the not voluminous (175 pages) but factually stuffed book of German economist Hans-Werner Sinn „Trapped in the Euro" (in the original Gefangen im Euro) appeared in the Czech market in 2016.

H.-W. Sinn is one of the first professors of economics who signed the Euro crisis initiative (in July, 2012) expressing disagreement with the "bank debt sharing" in the Eurozone (among many others this initiative was also supported the Czech ex-President Václav Klaus). The feedback of the professional and lay public was stormy. A number of German and foreign economists perceived it as highly controversial, and from the political side it was sharply criticized by the German Chancellor Angela Merkel and Finance Minister Wolfgang Schäuble. By means of this book, conceived in the form of interviews with the editor of the publishing house Redline Verlag, the author puts forward the reasons that led him to a sceptical attitude towards the single euro currency and the euro area as such.

In a distinctive and pregnant way within the seven acts of Part 1 the book offers a critical assessment of the history of the euro and the escalation of the euro crisis. The cause of the euro crisis sees the author in a huge amount of capital shift to the southern countries of the Eurozone and Ireland, which triggered an inflationary credit bubble, deprived them of their competitiveness and made them vulnerable to the financial crisis that spread across Europe since 2008. As a result of these events private capital has been withdrawn from the southern countries; the European Central Bank (ECB) came to the aid by providing a loan, which was obtained by printing of new money. This step kicked off the escalation of the euro crisis. The aforementioned action exposed the ECB to investment risks, which had to be subsequently secured by intergovernmental rescue operations. They provided substitute loans instead of the ECB, which itself replaced the

declining private sector loans. The interventions violated the status of the Maastricht Treaty ratified by the Member States in 1992 and created a spiral of dependency that made the parliaments of governments the assistants of the ECB´s Governing Council.

The author perceives the ECB´s actions as purely purposeful – its main objective is to stabilize the financial markets and prevent collapse, which would have otherwise meant the failure of some banks and the loss of investors´ assets. Contrary to the ECB, the author does not believe that the stabilization of financial markets is to be the primary objective. The primary issue is to support and ensure the long-term stability of the system and compliance with binding contracts, emphasizing the requirement for investors' own responsibility for their investment decisions. The pursuit of these objectives would have affected US pension funds, French banks, British hedge funds, German insurance companies, among others. The ECB's target pursuit hit the taxpayers and put them at risk of becoming foreign debt payers. The ECB, or respectively financial institutions´ argument that the failure of financial investors would have pulled down the economy, respectively the citizens' welfare, passes the author by referring to intimidation of taxpayers who are consequently willing to "open their wallets".

At this stage, the author's argumentation seems to be weak and would have benefited from presenting the estimates of the effects of the ECB's interventions on voters' wallets in contrast to the estimation of the damage in the event of a financial institution crash that would have certainly hit the taxpayers as well.

In the second part within the points 1 to 6, the proposals are put forward on how to end the euro crisis once and for all; the urgency and necessity of the proposals is clearly explained and justified. The first point proposes a partial debt relief for the most by the "euro" affected countries. The author also suggests that the euro area needs to rethink its rules of conduct by limiting the ECB's role, leaving soft budget constraints and removing public and bank debt. The Euro system should become more flexible by offering its members the opportunity to leave and re-enter the euro area. In the last point the author argues in favour of introducing bankruptcy rules for Eurozone countries – the purpose is to prevent over-indebtedness as the existence of the rules tells the investors what risks are to be undergone; in the case of disproportionate over-indebtedness of a state the purpose is to avoid a chaos.

The future of the Eurozone sees the author in the European Confederation according to the Swiss pattern, where different nationalities and different cultures "live in peace and prosperity" despite different languages. The question that emerges is whether this model is feasible in the euro area as well. The Swiss status as a glowing example of a multi-national region with a common currency had been built for many decades while coping with great difficulties – are the Euro-Europeans ready for that? Similar and other questions, for which no simple and unambiguous answers exist, evoke this book. What, however, can be definitely agreed with the author is by a history proven fact that the political class cannot disrespect economic laws forever, and if doing so it harms seriously the interests of its citizens.

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Conference Review

"Entrepreneurial Competences and Human Resource Management in the 21st Century"

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The international conference "Entrepreneurial competences and human resources management in the 21st century" was a part of the program "ETS Objective 2014-2020 Czech Republic – Free State of Bavaria" and its "Entrepreneurial competences on the Czech-Bavarian labor market" project, No. 34. The conference was organized by the Institute of Technology and Business in České Budějovice (VŠTE) and the Ostbayerische Technische Hochschule Regensburg (OTH Regensburg). The conference was carried out between October 16th and 17th 2017 in České Budějovice. Approximately 100 persons attended the conference; there were eight significant representatives of the international scientific committee pursing among others the topic of the conference.

This relevant conference was aimed at the topics of entrepreneurial competences and human resources management regarding regional individuality of labor markets in the South Bohemian Region and Bavaria. The conference program primarily focused on presenting research results that were collected during the previously mentioned international project.

The first speaker was Mgr. Zdeněk Caha, MBA, Ph.D., the primary manager of the project as well as the head of the Faculty of Corporate Strategy at the Institute of Technology and Business in České Budějovice. He talked about entrepreneurial competences on the Czech-Bavarian labor market. His lecture was based on research and the question if the VŠTE and OTH Regensburg students tend to choose entrepreneurship or intrapreneurship as well as how the respondents assess their competences. The results regarding the entrepreneurial competences on the Czech-Bavarian labor market are also featured in an expert monograph, which was introduced to the attendees.

The University Prof. Dr. Wolfgang H. Güttel introduced his expert publication "Heuristics and simple rules: managing competences in turbulent times" that he cooperated on with his colleague Mag. Johanna Gruenauer. The publication explores how elementary heuristics can be used thanks to simple rules. Based on the analytic support during the

process of implementing the methodology of simple rules in WÜRTH in Austria, they are developing a practice-oriented handbook aimed at identifying, transferring, developing, and applying strategic competences based on organizational knowledge that are used according to decisions made by individuals. Thanks to the method of simple rules that is presented in an expert monograph, the authors also contributed to decoding aspects of organizational genetics that are in connection with competition.

A highly interesting and beneficial presentation was held by prof. Ing. Zuzaně Dvořákové, CSc. She introduced us to the consequences of the strategies of gaining and motivating the Generation Y and Generation X regarding digitization and robotization in human resources management. The benefits of such digitization were also described in the context of microeconomic and macroeconomic expectations, the demand for increased qualifications and unemployment. A very significant expert on econometrics, Ing. Marek Vokoun, Ph.D., presented his research, which is based on a questionnaire survey of university students who assessed the entrepreneurial environment in the South Bohemian Region. His research made clear that according to the students the most important factor that influences the entrepreneurial environment in the South Bohemian Region is the lack of foreign language skills when conducting business in foreign countries. The next speaker who attended the conference was RNDr. Vladimír Brablec who is the head of the employment department at the Labor Office in České Budějovice. He presented the current situation on the South Bohemian labor market from the perspective of the Labor Office of the Czech Republic. We were shown employment statistics as of September 2017; the most important causes of unemployment were also described.

A very beneficial entry during the conference was presented by Ing. Josefu Kroulíkovi who in his presentation dealt with three fundamental tools of management; he also characterized their implementation in practice. The first tool was called "position profile". The author describes this tool as an adequate combination of knowledge, skills, and personal prerequisites that candidates should have. The next tool is the so-called "analysis of team roles". In real working life, simple typologies are used that work with action, social, and mental functions in a selected team. The last tool described by the author is "motivation management". The author regards this tool as an inevitable activity of managers, which is also in connection with the previously described tools.

Johann Faltermeier, MBA discussed the entrepreneurial competences in theory and practice based on the case of professionally oriented universities. The author states that entrepreneurial competences are important not only for entrepreneurship but also for the labor market where they are understood as employee competences. The author introduced us to the methods of classifying and defining entrepreneurial qualifications within the European reference context. The author also talked about the entrepreneurial research theory which plays a significant role in entrepreneurial competences. Based on research, the author deduced the primary results of the study as well as significant differences between the VŠTE and OTH Regensburg universities. The author primarily

stresses the importance of two fundamental variables – "university environment" and "knowledge".

Dr. Xenia Justus spoke about academic education in the field of entrepreneurship and challenges; she also discussed current trends. Justus talked about how support of entrepreneurial competences can be created and how internationalization of teaching plans on the theoretical level during the first stages of study programs can be achieved. The author introduced us to suggested recommendations for educating future entrepreneurs which the author researched in scientific literature. Her first recommendation is that current education services should be mutually extended and coordinated including corresponding target groups and areas. The second important recommendation by the author is that students should have more information about the options of self-employment and the importance of entrepreneurial competences for their future careers. Another important recommendation is that the already existing educational options should be systematically evaluated over a long period of time and according to comparable criteria. Only this approach allows us to effectively compare or control which didactic approach has the biggest influence of the target variable.

The former regional council president and the representative of the South Bohemian Region, Mgr. Jiří Zimola, was the next speaker. He focused on stressing the importance of supporting entrepreneurship from the aspect of public administration in the South Bohemian Region. The author describes the support from the South Bohemian Region in the context of boosting entrepreneurship through innovation. In the South Bohemian Region, support through motivation was implemented via entrepreneurial vouchers that help entrepreneurial subjects to pay for services of selected scientific institutions in the South Bohemian Region. The next topic that the author discussed was the aid with building a scientific center. Such center would be used to make natural sciences and technical study fields more attractive for the public, to make science more approachable, and represent innovational technologies of enterprises.

The quality engineer of the ROHDE & SCHWARZ enterprise, Vimperk facility, Ing. David Pasler, spoke about the topic of quality management and the requirements of human resources in the ROHDE & SCHWARZ enterprise. The author explained to us in detail how the development of the enterprise works, their managerial and engineering experiences with entering the Czech market; he also analyzed the components of enterprise culture, the methods of quality management, and their requirements for human resources. Based on research, the author concluded that the human resources market lacks candidates for jobs that have the skills of finding, sorting, comparing, and critically assessing information. Another significant aspect that the candidates lack is the motivation to continue learning new things as well as language skills that are nowadays a crucial prerequisite for the development of employees in the field of new technologies.

The next speaker was Ing. Petra Pártlová, Ph.D. who focused on the topic of stratification of Czech managers in the entrepreneurial sector. The author introduced us to the analysis of the current level of organizational and management structures. The analysis was based

on an extensive testing set consisting of enterprises primarily from the South Bohemian Region. Based on the research, the author, among others, concluded that microenterprises and small and medium-sized enterprises use a department management structure (90 percent of enterprises). The author also discussed the mutual relationship between organizational structure and profitability in medium and large enterprises.

The next speaker was Ing. Simona Hašková, Ph.D. who talked about entrepreneurial competences from the educational viewpoint. Based on her experiment, she in more detailed studied the sources of gaps between desired entrepreneurial knowledge and gained skills of students. Based on the research, the author stresses the crisis in "knowing" that qualitatively co-defines the aspect of entrepreneurial competences.

The Deputy Director of the Department for Research, Development and Creative Activity and the head of the Department of Management at the Institute of Technology and Business in České Budějovice, doc. PhDr. František Stellner, Ph.D., who is a very important expert on economic and political history of Russia and labor markets in the Czech Republic. He was one of the leading quests at this international conference. Doc. PhDr. František Stellner, Ph.D. introduced us to the main conclusions from the monograph "Analýza současného trhu práce v Jihočeském kraji a Horní Falci" by the collective of authors Marek Vokoun, Zdeněk Caha, Sean Patrick Sassmannshausen, and František Stellner.

Ing. Jarmila Straková, Ph.D. talked about the topic dealing with managers in the process of strategic management of enterprises in the Czech Republic. Based on mathematic and statistical methods, the author assessed and analyzed connections between enterprise strategies and the size categories of tested enterprises, and sector differentiation and the extent of their authority. Thanks to her research, she proved the connection between adapting the enterprise strategy and the size category of enterprises. She also successfully proved the dependency of the strategy of enterprises on the scope of their authority.

Doc. PhDr. Ing. Jan Urban, CSc. is one of the experts who focus on human resources. At the conference, he talked about the issue of the ability of motivating employees and it being one of the key parts of entrepreneurial competences. Based on his findings, the author concludes that superiors, as well as the enterprise, very often do not use motivational tools correctly. There is a number of motivational tools whose effects are not sufficiently understood by managers.

One of the important experts who spoke at the conference was Prof. Dr. Sean Patrick Sassmannshausen, the head of the start-up center at OTH Regensburg, who talked about the concept of entrepreneurship in founded enterprises and about re-gaining competitiveness. A member of the work committee for assessing the impact of regulations of the government of the Czech Republic, prof. Ing. Jiřina Jílková, CSc., also spoke at the conference. She talked about the topic of Regulatory Impact Assessment in the Czech Republic – a tool for improving the entrepreneurial environment. Both presentations were very interesting and educational.

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Conference Review

"Economic Policy in the European Union Member Countries"

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Institute of Technology and Business in České Budějovice

The International Scientific Conference Economic Policy in the European Union Member Countries (HPVEU) took place in a small town named Kopřivnice in the Czech Republic between 8th – 10th November 2017. Since 1997, the annual conference has been aimed at the dissemination of ideas, research, and various approaches to the economic policy. The Department of National Economy, the Faculty of Economics, and the VŠB – Technical University of Ostrava, celebrated 40 years since their establishment (1977-2007) and held this conference in cooperation with the Department of Economics and Public Administration, the School of Business Administration in Karviná, the Silesian University.

The members of the International Conference Committee started the conference with a welcome speech. The session was led by Zdeněk Zmeškal (Dean, Faculty of Economics, VŠB-TU Ostrava), Pavel Tuleja (Rector, Silesian University), Daniel Stavárek (Dean, School of Business Administration in Karviná, Silesian University), Jiří Balcar (Head of Department of National Economy, Faculty of Economics, VŠB -TU Ostrava), Chair of the conference Scientific Board Jaromír Gottvald (Vice-rector, VŠB - TU Ostrava), and under the auspices of Marian Lebiedzik (Vice-dean, School of Business Administration in Karviná, Silesian University) and financial support of the Moravian-Silesian region.

The plenary session chaired Mariola Pytliková (Faculty of Economics, VŠB-TU Ostrava); two keynote speakers gave their presentations. Filip Pertold (IDEA and Cerge-EI) discussed gender inequalities and women labor market participation. John Earle (George Mason University, Schar School of Policy and Government) spoke about productivity dispersion.

Dr. Pertold explained that there is a promising trend and that the gender gap has been narrowing in the last years. The usual regressions in all kind of studies suggest a significant gap between males and females in European countries. He warned about the

issues with regressions design. There are many control variables; the historical context should be studied as well. Women study more often and longer in European countries. He presented several results and research ideas. One of the research questions is the lack of women in the boards of companies. The share of female board members in publicly listed companies is around 20 percent worldwide. Current studies of occupational choice of women are aimed at convex jobs. The more hours a week you work the more you get paid. In other words, there is an increasing reward; the less you work the more you are penalized. We also deal with overrepresentation (around 60 %) of women in public sector jobs. After the 1st child, more women pursue public jobs. Their earnings decrease and working time goes down as well. Mothers have higher prevalence of flexible jobs, which are not often found in the private sector (convex jobs).

Current women studies deal with gender norms. They are quite strong for unpaid work (for example: work at home and care for family members). Migrants are entering labor markets and lowering wages of all the employees. Migrants are mostly taking professions usually (in a higher share) occupied by women. There are also certain norms that are shaping labor markets. For example, wives earn less than husbands and do more unpaid work. The problem is that regardless of the wage or relative income to their husband, women still carry out more unpaid work. Pertold's work shows that this field of study is a very complex one and it is one of the most misinterpreted topics.

Prof. Earle dealt with the factors, which can explain differences in productivity dispersion. The traditional views suggest the roles of technology, endowments, institutions, and culture. He also analyzed the factors that prevent equalization. The reasons can be idiosyncratic such as taxes and subsidies. Some authors suggest that reforms can reduce the dispersion of productivity in industry. The evidence is however different. The deregulation in the US telecommunication equipment manufacturing suggests no equalization of the standard deviation of Multifactor productivity (MFP). In transitional countries, reforms led to a higher dispersion in comparison to the US economy. The discussion focused on the issue of dispersion measurement and how to develop a sound thesis. Further models should be based on different factors as well (cost of entry, cost of investment, restructuring activities etc.).

The next day, a lot of presenters dealt with labor market policy issues, such as population ageing and labor migration, monetary policies, and regional development policies. The third keynote speaker Roberta Rabelotti (Department of Political and Social Sciences, University of Pavia) initiated a discussion about multinational companies. This topic is well known to Czech academia because the Czech economy is under a heavy influence of multinational corporations. The research is aimed at factors of green field investment and control foreign investments of multinationals. The effects of multinational presence and location factors can be measured, and a complex approach is needed. Research in this area is lacking quality data and preparing a credible and representative research sample is a work intensive process.

This conference was important for economic policy makers as well as for academia because it showed new methods and new ways how to develop credible data sources. The work of researchers was criticized a lot and they received a necessary feedback. From my experience, this conference's value added was in a friendly atmosphere and criticism which was both substantial and constructive. In this framework, it is more likely that the criticism is accepted and new research introduced.

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Conference Review

"Financial Management of Firms and Financial Institutions"

Marek Vokoun

Institute of Technology and Business in České Budějovice

The International Scientific Conference Financial Management of Firms and Financial Institutions (FRPFI) took place in Ostrava in the Czech Republic between 6th – 7th September 2017. The conference, which takes place every two years, has been aiming at the dissemination of ideas, research and various approaches in the financial management and decision-making of companies since 2009. The Department of Finance, the Faculty of Economics, the VŠB – Technical University of Ostrava, celebrated 40 years (1977-2017) since their inception and organized the conference.

Dana Dluhošová (VŠB - Technical University of Ostrava), a member of the Organizing Committee, started the conference with a welcome speech. She introduced Zdeněk Zmeškal (Dean, Faculty of Economics, VŠB-TU Ostrava), Petra Pospíšilová (President of the Chamber of Tax Advisors), Petr Musílek (Vice-Rector for Science and Research, University of Economics, Prague), Petr Gurný (Department of finance, Faculty of Economics, VŠB -TU Ostrava), and Martin Macháček (Department of economics, Faculty of Economics, VŠB -TU Ostrava).

Petra Pospíšilová started the plenary session. She dealt with current assessment of the tax policy in the field of legal persons in the Czech Republic. She talked about Czech tax administration and discussed what the public sector can do, what can be changed, and what is problematic to change. Czech economy is heavily influenced by foreign direct investments, the presence of multinational companies, and most importantly the European "Acquis communautaire." Taxes are a game for politicians and a popular election theme, but there is no room anymore for radical changes in the analyzed tax settings. According to her, the changes in the tax system in the field of legal persons (corporations) in the Czech Republic can be only parametrical.

Tax collection is influenced by the efficiency of tax administration. Large businesses have been losing their national character and have the flexibility to manage their taxes. Czech

tax administration is not able to see the multinational dimension. Large corporations have the option to switch from one tax collection country to another and they take more factors into consideration. One of them is the amount of costs of administration related to taxes.

The latest 2008 crisis has shown both strong and weak sides of the Czech tax administration. Businesses had negative profits and they did not pay any taxes. There were tax scandals concerning Amazon, UBER, and Apple who decided not to pay taxes by having headquarters in one country and management in another country since there are different approaches to tax collection of multinational corporations in Europe and the US. This is a well know example since 1961 (JFK Special message to the congress on taxation 136, 20 April 1961) but there is still no consensus or improvement.

There are also substantial differences in the amount of information in the hands of tax administration offices. There are many sources of information in the Czech Republic but significantly less in Western Europe. There are new efforts like the EU Tax Avoidance directive and better information exchange but the current state of things is lacking skilled workers and better e-government.

Prof. Musílek introduced his work on investment bubbles. His approach is to classify bubbles and add a more philosophical aspect. The well-known market hypothesis suggests that the price mechanism in liquid markets is effective but we can observe that there are all kind of failures on the markets. Modern financial markets are characterized by substantial and step changes in prices. These changes are fundamental and linked to unexpected factors.

That is why there are many definitions. Some are trying to emphasize psychological factors, some are trying to develop an approach that would measure deviations from "internal" or "correct value". How to create an intrinsic value which is correct, right and not distorted is difficult and may be even impossible. The problem is to account for frauds, investment criminality, and public policies. Some definitions built on the fact that bubbles eventually burst. In this case, we can calculate the risk of the bursting of the bubble. But there are financial bubbles that were not bursting and we observed a soft landing.

The new microbubbles are caused by algorithmic (bot) trading. Speculative bubbles are a mix of fundamental and psychological factors. Behavioral economics suggests that there are noise traders who can cause chain failures in the markets.

In his contribution, prof. Musílek suggests that stock market efficiency is not constant. We must account for breakthrough events such as new Information, new trading ways, or changes in the environment. A substantial factor is the state. Central bank active monetary policies contribute to sentiment swings in equity and real estate markets. There is no simple solution to deal with investment bubbles and it is very difficult to predict them. His work suggests steps, which can be used to analyze protentional investment bubbles.

Dr. Gurný was the last keynote speaker of the introductory session and talked about new ways of value of the business determination based on sectoral value multipliers. This

approach is practice oriented. His team is trying to develop a fast way for valuing private publicly-traded companies. The correct method of future-discounted-asset-effects is too laborious. They suggested to implement the current value of perpetuity of the industry. Their approach is quite satisfactory and provides reliable estimates.

The next sessions that continued on the second conference day were mostly aimed at new methods of prediction in the financial markets and portfolio management. VŠB-TU Ostrava is oriented at time series and panel data analysis and this institution is known to educate financial analysts. The contribution was mostly experimental and presenters suggesting new methods and approaches.

The value added of this conference is in the ability to provide academic contacts. The Faculty of Economics VŠB-TU Ostrava aims at networking and cooperation. The members of all departments of the Economic faculty (National economy, Economics, and Finance) provided a great experience and showed interdisciplinary critique. Most of the participants utilized extensive econometric critique and creative suggestions to try new ways of estimation. Some of them found new data sources and new research ideas.

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