

# The economic impact of the University of Žilina's employees expenditures on the host city

Lucia Gašperová, Mária Rostášová

**Abstract**— In the era of globalization is a region devoted more attention as the destination for the source of competitiveness. The existence of universities in the region plays important role in economic development. Universities contribute to the economic growth of the region, not only through the production of a highly qualified workforce. The university also has a significant impact on the flow of funds to the region through student, staff and university spending. The aim of this paper is to analyze and quantify the impact of expenditures related to the presence of the university in the city where it is located. The paper focuses primarily on the direct and indirect short-term local economic impact of expenditures of University of Žilina employees in Žilina.

**Index Terms**— university, economic development, expenditures of employees, multiplier effect, direct short-term local economic impact of expenditures, indirect short-term local economic impact of expenditures, University of Žilina.

## 1 INTRODUCTION

Regional development ensures the growth of the economic and social potential of the regions, which is achieving the living standards of the population, the social and economic development of the country, and sustainable development. The definition of regional development from a geographic point of view presents regional development as a set of economic and social processes taking place in the natural and social environment of the regions that use but also the respectful possibilities, prerequisites and uniqueness of the region. [1] Local economic development is based on endogenous development, which activates local actors to meet a common development strategy. According to the World Bank, local economic development offers the local government, the private sector, the non-profit sector and the local community the opportunity to work together to improve the local economy. The aim is to increase competitiveness, which also involves stimulating sustainable development. Factors influencing local development are based on the intrinsic qualities of the site, and under different spatial conditions, they acquire a different efficiency. [2] By transforming its two traditional roles in education and research, the university is actively involved in regional economic development. University in the city causes the spectrum of economic changes. Local businesses have a higher demand for goods and services, the educational level of the population is increasing, the rate of entrepreneurship is increasing, business productivity is growing, and firms are becoming more innovative. [3] When analyzing the contributions of universities to the local economy, it is necessary to define which activities carried out by the university have an economic impact on the economy of the host city. Universities use economic, financial and personnel resources in the area in which they are located. Goldstein

et al. (1995) summarized and classified all activities that are not mutually exclusive, through which universities create economic impacts: knowledge creation; creating human capital; technology transfer and know-how and technological innovation; investment in capital goods and increased local demand; regional leadership; and impact on the regional environment. Their impact on the regional environment is due to increased productivity and improved quality of production factors, both physical and human. [4]

Taking into account the role of the university in the region and its resulting product, we can talk about the university's activities in the region. Based on the role of the university, Rehák and Šipikal (2012) distinguish two influences of the university on the region, which can be divided into the so- subsequent relationships and feedback. Future relationships represent changes in human capital, changes in the knowledge base, and changes in site attractiveness for businesses and individuals. Backward relations are those that relate to staff, university and university students, such as households, local government and businesses in the form of changes in their income and changes in employment. [5]

Economic impact is the result of institutional expenditure. The major economic impacts of the university include those that occur as a result of the daily operation of the university, its students and employees. These impacts include:

- direct impacts - the impacts resulting from the university's income and employment;
- staff spending impact - staff spending their wages increases the turnover of businesses in the economy, which generates wealth and supports employment; and
- supplier impact - the university purchases goods and services that increase the turnover of businesses and support jobs in its supply chain.

The university has an economic impact on companies that are part of its supply chain. In these areas the university supports work and generates gross added value in these businesses. [6]

Žilina Region is located in the northwestern part of Slovakia. There are four colleges in the county, namely University of Žilina in Žilina, Catholic university in Ružomberok, Jessenius

- Lucia Gašperová is PhD student at the Department of Communications at University of Žilina, Slovakia, e-mail: lucia.gasperova@fpedas.uniza.sk
- Mária Rostášová is professor at the Department of Communications at University of Žilina, Slovakia, e-mail: maria.rostasova@fpedas.uniza.sk

Faculty of Medicine of the Comenius University in Bratislava is in Martin and Armed Forces Academy of General Milan Rastislav Štefánik is in Liptovský Mikuláš. University of Žilina in Žilina (from now on referred to as UNIZA) as a public college of university type provides education at all three levels of study (bachelor, engineering/master, doctoral) in daily and external form. UNIZA is the second largest employer in the region. [7]

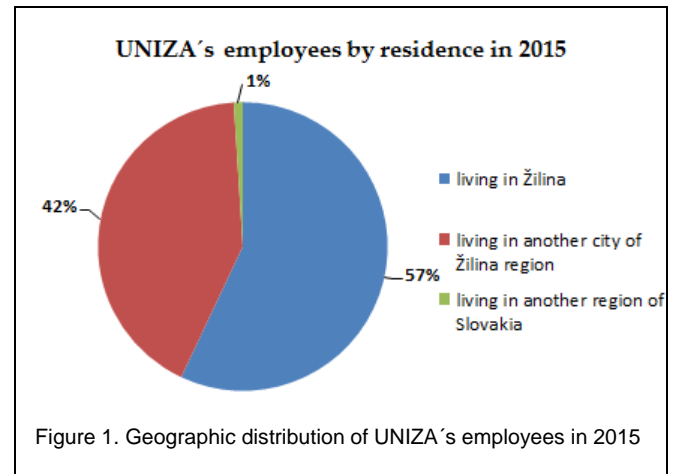
UNIZA had a total of 1540 employees in 2015. To assess local economic impacts, we identified individual groups of employees whose revenues and expenditures are significantly different. We have divided employees according to their type of activity to teaching staff (assistants, associate professors, professional assistants, lecturers and professors), researchers, administrative, professional and operational staff, including staff of student homes and canteens. The share of teaching staff in the total number of UNIZA's employees is 40.5%, the second largest group is the operating staff (22.9%), and the third largest group is the administrative staff (12.7%), the researchers with the share of 12, 5% and professional staff (11.4%). Data from the Personnel Department of UNIZA showed that 56.3% of employees live in Žilina; the remaining 43.7% are non-resident employees. [8]

TABLE 1  
STRUCTURE OF UNIZA'S STAFF IN 2015

Categories of staff	Staff numbers	Wage costs (in €)	Average salary (in €)
Teaching staff	624	10197182	1362
Professors	97	2332446	2012
Associate professors	163	3012853	1537
Professional assistants	340	4595823	1125
Assistants	5	46343	823
Lecturers	19	209717	920
Researchers	193	2897888	1253
Professional staff	175	1961603	934
Administrative staff	195	3328827	995
Operational staff	353	1308637	580
Total	1540	19830519	1073

In Table 1 is summarized the UNIZA's employee structure in 2015 and UNIZA's wage costs in 2015, along with the average wages of each category of employee. The volume of wages paid to UNIZA employees working in Žilina in 2015 was 19830519€. [8]

Figure 1 shows the structure of UNIZA's employees in 2015 according to their place of residence, which we obtained from the UNIZA's Personnel Department. Up to 57% of employees are residents and the remaining 43% are non-residents.



## 2 METHODOLOGY

The primary objective of the contribution is to examine the overall short-term economic impact of UNIZA's staff expenditures on goods and services in 2015 and also to express the multiplier effect of the university on the region. To achieve the primary objective, we set the following sub-objectives:

- analysis of the structure of UNIZA's employees in 2015 and their interest in working in Žilina, if the university did not exist in the city;
- carry out primary research directed at UNIZA's employees - to determine the structure of their spendings in Žilina according to the Statistical Classification of Economic Activities of the European Community (from now on referred to as NACE);
- quantify the direct, indirect and induced impact of UNIZA's employees in 2015 and express the multiplier effect of the university on the region.

In calculating the regional impact of employee's expenditure, we proceeded as follows:

- Specify the geographical structure of employees from the University staff database (distribution of employees to residents and non-residents).
- Divide employees into four categories (teaching, scientific, operational, administrative). Each group of employees has a different average wage; at the same time, if the university does not exist, the administrative and operational staff would probably remain in the city in another institution, while the teaching and research staff would tend to leave the city for work at another university.
- Calculation of average expenditure on goods and services in the local economy by NACE expenditure groups (for housing, food, clothing, education, etc.) for each of the four groups of respondents separately.
- Reduce employees in each group - to quantify the number of employees who would not come to the city, if the university did not exist there.
- Calculation of net monthly impact of staff expenditure = Average staff expenditure by group of goods and services \* Number of employees reduced.
- Calculation of indirect and induced monthly impact of

staff expenditure = (net personnel expenditure in the sector \* multiplier of the sector).

- Calculation of the total monthly impact of staff expenditure = net monthly impact of staff expenditure + indirect and induced monthly impact of staff expenditure
- When calculating the total annual economic impact, the monthly impact \* 12 (12 months of the calendar year) is multiplied. [8]

The respondents were employees of various departments of UNIZA. Based on the formula for calculating the size of the survey sample in the sample universe 1,540 employees we have obtained a minimum sample size i.e., 308 respondents for the whole UNIZA. We addressed the staff personally. We received 85% return (263 questionnaires from the calculated sample 308 planned). After reviewing the database we obtained the answers of ten respondents.

To quantify the multiplier effect of employee expenditures, we used values of employment, added value, output and income multipliers for different groups of goods and services that were calculated at the Technical University in Košice for all self-governing regions in Slovakia. Multipliers were calculated using the Input-Output Model. In Table 2 there are multipliers of goods and services groups for the Žilina region through which we expressed the multiplier effects of UNIZA's staff expenditures in 2015. [9], [10]

In our case, households are considered to be a sector within the region, household spending is included in the overall effect. These multipliers are called Type II multipliers, total multipliers, or multipliers derived from a closed model.

TABLE 2  
SELECTED SECTOR MULTIPLIERS FOR ŽILINA REGION

Sector multiplier	Employment multiplier	Output multiplier	Income multiplier	Value added multiplier
Retail trade, except of motor vehicles and motorcycles	19,32386946	1,709453936	0,347856749	0,785691736
Accommodation and food service activities	18,96112278	1,882434444	0,399233013	0,795287192
Land transport	12,36459758	1,752063139	0,258945964	0,635424781
Education	51,68255565	1,930173547	0,741592574	0,964632631
Human health	34,04795729	1,817132012	0,51813793	0,833610792
Telecommunications	7,980413905	1,78551186	0,232960239	0,845582265
Financial activities	11,61811156	1,751270339	0,319344722	0,882647978

### 3 RESULTS

In determining the regional impact of employee expenditures, we are based on an assessment of the question of how many employees would not work in Žilina if UNIZA did not exist. In the evaluation of reduced employee expenses are only included expenses of employees who are in precisely because of the existence of the university.

Primary research has shown (Figure 2) that teaching staff and researchers should tend to leave the city in the absence of a

university compared to other categories of staff. Approximately 49% of teaching staff would not work in Žilina but work in another city at another university or other institution. 32% of researchers would leave Žilina in the absence of UNIZA. From the real number of teaching staff and researchers we are talking about 365 employees, which is 45% of the total number of these employee categories.

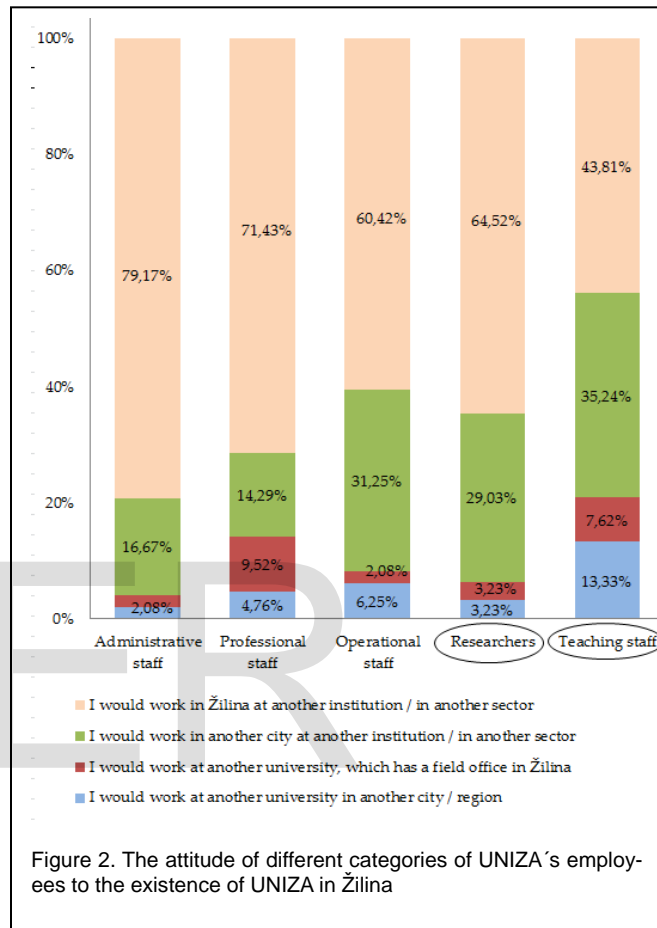


Figure 2. The attitude of different categories of UNIZA's employees to the existence of UNIZA in Žilina

Each employee category has a different average wage and different spending that will be spent in Žilina. We obtained the volume of local staff costs and their structure based on UNIZA's primary research.

Figure 2 shows the average wages of individual categories of employees and their average expenditures realized in Žilina. According to the research, the highest average expenditure is paid by professional staff who spend 72% of their total income in Žilina, operational staff spend 67% of their total income in the city of Žilina, administrative staff 58% of their total income, teaching staff 47% of their total income and researchers 42% of their total income.

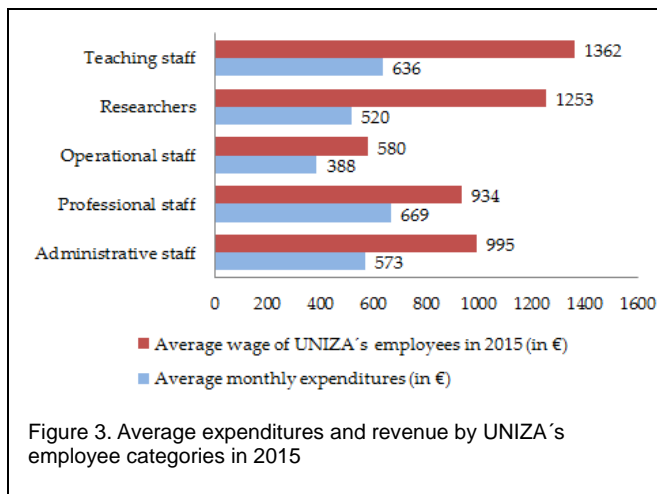


Figure 3. Average expenditures and revenue by UNIZA's employee categories in 2015

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### 3.1 Quantification of direct, indirect and induced impact of UNIZA's employees on Žilina

Based on the structure of local expenditures of UNIZA's employees in 2015 according to NACE economic activities, we quantified the short-term local economic impact of employee expenditures on the city of Žilina.

In Table 3 are shown the direct economic impacts of employees in Žilina in 2015. The table includes all employees (residents and non-residents). Based on primary research, we can claim that the largest monthly (annual) spending in Žilina has pedagogical staff at 192673€ per month (2312079€ per year).

TABLE 3

DIRECT MONTHLY AND ANNUAL ECONOMIC IMPACT OF UNIZA'S STAFF'S EXPENDITURES IN 2015

Expenditure group	Administrative staff	Professional staff	Operational staff	Researchers	Teaching staff
Retail trade; except motor vehicles	12157,50	11530,71	29191,25	14384,00	105218,86
Accommodation and food service activities	4625,42	3543,57	11803,00	8740,00	43112,57
Land transport	1453,79	2555,14	3330,25	3792,00	14041,89
Education	611,27	828,14	1333,75	740,00	7892,43
Human health	807,83	535,86	1661,00	466,00	5055,77
Telecommunications	617,44	672,57	1281,50	1072,00	4986,51
Financial services (and other expenditures)	925,00	2424,71	2640,00	3060,00	12365,29
<b>Total per month (in €)</b>	<b>21198,26</b>	<b>22090,71</b>	<b>51240,75</b>	<b>32254,00</b>	<b>192673,32</b>
<b>Total per year (in €)</b>	<b>254379,12</b>	<b>265088,57</b>	<b>614889,00</b>	<b>387048,00</b>	<b>2312079,79</b>

According to research carried out, we can claim that administrative staff spent at least 20198 € per month in Žilina (254379 € per year) compared to other groups of employees.

The volume of expenditure per sector varies for each group of

employees. UNIZA's employees had the highest spending in Žilina in 2015 for transport, financial services and retail except for motor vehicles. On the contrary, the lowest spending was in the telecommunications and healthcare sectors.

Table 4 shows the total indirect and induced economic impacts of UNIZA's employees in 2015. By applying regional multipliers, we can express the indirect and induced economic impact of UNIZA's employees' expenditures on Žilina.

**Total impact on output:** The total value of local expenditures of all UNIZA's employees (it was 3848056 €) generated a total additional production of 6798903€ in all sectors of the economy according to NACE in Žilina in 2015.

**Total impact on revenue:** The total value of local expenditures of all UNIZA's employees (3848056€) caused an overall increase in employee income in the city of Žilina's economy to 1405804€ in 2015.

TABLE 4

INDIRECT AND INDUCED ECONOMIC IMPACT OF UNIZA'S EMPLOYEES EXPENDITURES IN 2015

Sectors	Expenditures of employees in Žilina (in €)	Total impact on output (in €)	Total impact on revenue (in €)	Total impact on employment (in number)	Total impact on added value (in €)
Retail trade; except motor vehicles	173413	3557313	723878	40	1634997
Accommodation and food service activities	71396	1612783	342045	16	681366
Land transport	25739	541159	79980	4	196263
Education	11003	254872	97924	7	127376
Human health	8915	194399	55431	3	89181
Telecommunications	8872	190104	24803	1	90030
Financial services (and other expenditures)	21330	448273	81743	3	225932
<b>Total per month (in €)</b>	<b>3848056 €</b>	<b>6798903 €</b>	<b>1405804 €</b>	<b>74</b>	<b>3045143 €</b>
<b>Total per year (in €)</b>	<b>173413 €</b>	<b>3557313 €</b>	<b>723878 €</b>	<b>40</b>	<b>1634997 €</b>

**Total impact on employment:** In 2015, 74 new full-time jobs were created thanks to the expenditures of UNIZA's staff (3848056 €) in the economy of Žilina.

**Total impact on added value:** As a result of the production of additional output induced by all production cycles, including final consumption of households, the total value added increase in the city of Žilina's economy is estimated at 3045143€.

The direct, indirect and induced impacts described above only represent the impact of university staff on the local economy. Other research conducted may also include short-term local economic impacts of UNIZA and PhD students spending in 2015. In 2015, UNIZA had a total of 2,596 suppliers of which foreign suppliers represented 29.85% (775) and domestic 70.15% (1,821). Of the total number of domestic suppliers, local suppliers created 24.71% (450), regional suppliers constituted 15.49% (282) and 59.8% (1,089) were national suppliers. The largest share of expenditures in the region of Žilina from UNIZA's total expenses was 17.264% for goods and services included in the group "Wholesale except motor vehicles". When comparing the total economic impact of UNIZA and the total economic impact of the Slovak Agricultural University in

Nitra (SÚA) in the same year presented in Melichová et al. (2017), UNIZA's total spending at the regional level reached 19.81 million €, and the total expenditure of the SÚA was 2.47 million €. [11], [12], [13]

The overall impact of the university can be estimated by adding to the multiplied average student, university and staff costs and spending on goods and services made in the region. This may be the subject of a further study.

#### 4 CONCLUSION

The contribution focuses on the analysis of the direct, indirect and induced impacts of UNIZA in various sectors of the economy. In the present research we were found total multiplier effects of spending UNIZA employees in 2015 to the output, income, employment and added value. Employees spend their wages in Žilina, thereby increasing the turnover of businesses in a wealth-creating economy that promotes employment in the city. Significant are the primary expenditures of those employees who arrived to the city simply because of the existence of the university. The direct and indirect multiplier effects mentioned above show that UNIZA is a key actor supporting the local economy in Žilina. UNIZA plays an important role in shaping the economy of Žilina.

An analysis of the short-term economic impacts of the university allows us to quantify the importance of the university in the local economy. Universities become the driving force behind socio-economic development in the region in which they are located.

#### 5 DISCUSSION

The impact of the university on the city where it is located can not be overlooked because it contributes to the development of the region. This issue of quantification of the university's economic impact on the region is devoted to countries around the world. Many higher education institutions use the study of economic impacts as a tool to examine their impact within their local and regional economies. At present, there are various projects at universities that carry out research on the impact of universities on regional development. In Slovakia, we can present as an example a domestic research project entitled Universities and Economic Development of Regions (UNIREG), which is attended by five Slovak universities: the University of Economics in Bratislava, the University of Žilina in Žilina, Matej Bel University in Banská Bystrica, the Technical University in Košice and Slovak Agricultural University of Nitra. The UNIREG research project is focused on examining the economic impact of universities for the development of the regions from four different perspectives. The project examines short-term regional economic impacts of the university on the region, the long-term impact of universities on the development of innovative entrepreneurship through the emergence of university spin offs, and the effectiveness and efficiency of development policies of regions through the support of universities. Within the project, we conducted primary researchs focusing on the impact of expenditures of university, staff and students (PhDs).

The discussion could further focus on identifying and quantifying the indirect and induced impacts of expenditures of individual categories of UNIZA's employees in 2015, where it would be possible to assess which category of employees and how much it contributes to the development of individual sectors of the economy. UNIZA could quantify the university's total economic impact on the city regularly every year.

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