

literacy“.¹⁷ The functional literacy consists of literary, documentary, numerical and linguistic literacy.

Functional literacy			
Literary literacy	Documentary literacy	Numerical literacy	Linguistic literacy
ICT literacy			

Figure 1.1 Components of information literacy

Source: DOMBROVSKÁ, M. – LANDOVÁ, H. – TICHÁ, L. 2004. Informační gramotnost: Teorie a prax v ČR. [online]. In *Knihovnická revue online*. 2004, vol. 15, no. 1, p. 7-18. [Retrieved: 2013. 16. 12.]. Available: <http://full.nkp.cz/nkkr/NKKR0401/0401007.html>. ISSN 1214-0678

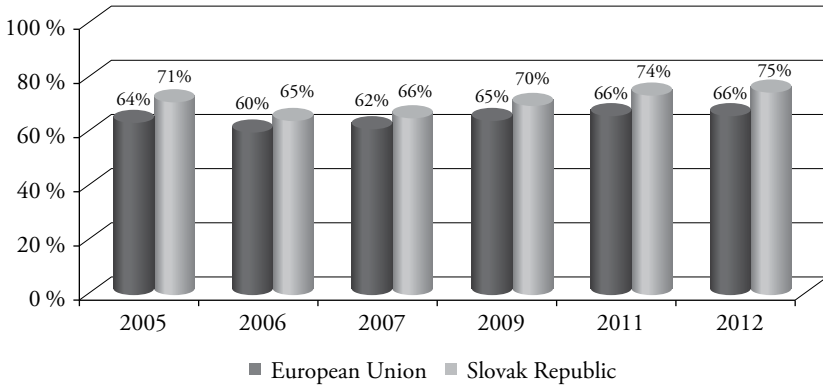
Individual views and their parallels present a wide variety of information literacy content's focus, as well as the fields, which it exceeds. After evaluation of the individual views, the term of information literacy is specified as follows: **Information literacy is defined as the ability to identify the need for information; to search, access and process information by available and suitable tools of information and communication technology; to evaluate information; and to use information in the most effective way.** In general, information literacy includes the ability to understand information and to use it in a variety of formats from various sources presented by modern ICT. The information literacy is related to the entire population. We agree with a statement in the Prague Declaration of 2003 and the Dombrovská's appendix that „information literacy is a process that applies to all. It does not involve a dichotomy of literacy versus illiteracy, but a question of the extent within the continuum.“¹⁸

In the years 2005 – 2012, studies of the European Statistical Office (Eurostat) showed that a proportion of Slovak population on digital skills

¹⁷ DOMBROVSKÁ, M. – LANDOVÁ, H. – TICHÁ, L. 2004. Informační gramotnost: Teorie a prax v ČR. [online]. In *Knihovnická revue online*. 2004, vol. 15, no. 1, p. 7-18. [Retrieved: 2015. 16. 12.]. Available: <http://full.nkp.cz/nkkr/NKKR0401/0401007.html>, ISSN 1214-0678.

¹⁸ NÁRODNÍ KNIHOVNA. 2004. *Pražská deklarace 2003 – Směrem k informačně gramotné společnosti*. [online]. In *Knihovnická revue online*. 2004, vol. 15, no. 1, p. 19. [Retrieved: 2015. 16. 12.]. Available: <http://knihovna.nkp.cz/NKKR0401/0401019.html>. ISSN 1214-0678

was above the average of the European Union in all surveyed periods. Digital literacy ranged from 65% to 75%, while the EU average in the individual periods reached maxima of 60% to 66%. For example, in 2009 Slovakia reached a higher digital literacy share than Belgium, Bulgaria, the Czech Republic, Estonia, Ireland, Greece, Spain, Italy, Latvia, Lithuania, Cyprus, Hungary, Malta, Poland, Portugal and Romania. To compare, in 2012 out of 27 countries of the European Union, Finland and Sweden were ahead of Slovakia. Austria and France together with Slovakia and Germany reached the identical percentage of the digitally literate population (75%).



Graph 1.1 **Digital literacy in EU and SR**

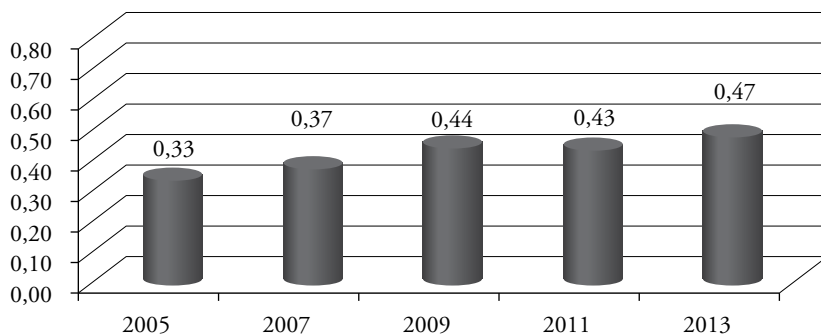
Source: EUROSTAT. 2013. *Information society statistics. Digital literacy, eskills*. [online]. [Retrieved: 2015. 20. 12.]. Available: http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Information_society_statistics.

Töröková claims that „developed economies have a significant advantage in information literacy growth. A space for increasing the information literacy is in the highly sophisticated and effective use of technologies that people can afford with a limited budget.“¹⁹

The Institute for Public Affairs characterises the digital literacy of the Slovak population as one of the key development indicators in the area of

¹⁹ TÖRÖKOVÁ, A. Kontinuálne vzdelávanie a jeho vplyv na informačnú gramotnosť. In *Výbrané problémy informačného manažmentu : Recenzovaný zborník vedeckých štátí*. Bratislava : EKONÓM, 2013, p. 1-15. ISBN 978-80-225-3606-6

the society informatisation, which seems quite favourable internationally.²⁰ Based on the research of the Institute for Public Affairs (IVO) in 2013, 79% of the population were digitally literate in Slovakia and 21% were digitally illiterate. In the previous observed period (2011) of the IVO research, the digital illiteracy rate was 24% and the digital literacy rate was 76%. We state that a trend is positive because there was an increase in the digital literacy of the Slovak population in the examined periods. The following graph shows development of a synthesizing indicator – the Digital Literacy Index (DLI). By the DLI, the Institute for Public Affairs measures inhabitants' digital literacy. This index includes up to 27 - 28 indicators that measure the level of ICT usage. The index value ranges from 0 = digital illiteracy up to 1 = maximum rate of digital literacy.



Graph 1.2 **Digital literacy index of Slovak population**

Source: VELŠIČ, M. 2013. *Digitálna gramotnosť na Slovensku 2013*. Tlačová správa. [online]. Bratislava : Microsoft Slovakia & IVO, 2013, p. 1. [Retrieved: 2015. 15. 10.]. Available: http://www.ivo.sk/buxus/docs/rozne/Digitalna_gramotnost_2013_TS.pdf.

A process of measuring the digital literacy level by the Institute of Public Affairs takes place every two years. The presented indices show that the trend is increasing despite a slight decrease in 2011.

However, it is important to notice that in the case of Eurostat (2005 - 2012) and IVO (2013), the overall share of digital literacy in the population is calculated from different data sources. The Eurostat data are based on

²⁰ VELŠIČ, M. 2011. *Digitálna gramotnosť na Slovensku 2011*. Výskumná správa [online]. Bratislava : IVO, 2011, p. 4. [Retrieved: 2015. 15. 10.]. ISBN 978-80-89345-33-5. Available: http://www.ivo.sk/buxus/docs/publikacie/subory/Digitalna_gramotnost_2011.pdf.

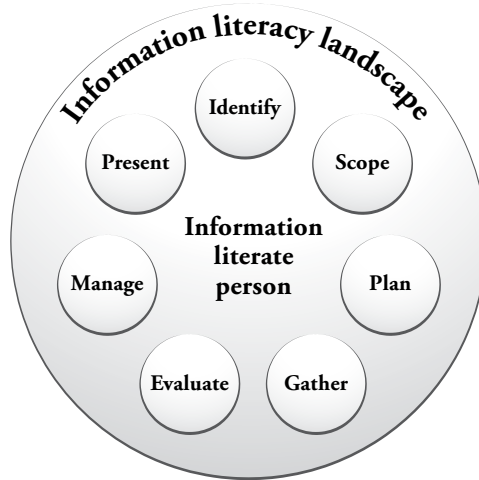


Figure 1.5 **Seven Pillars of Information Literacy**

Source: SCONUL. 2011. Seven pillars of information literacy. [online]. London : Sconul, 2011. [Retrieved: 2015. 07. 29.]. Available: <http://www.sconul.ac.uk/sites/default/files/documents/doughnut.jpg>.

The pillars are displayed in a circle because the model forms space for the information literacy. The circular shape indicates that it is not a linear process, but individuals can develop their information literacy in a number of areas (pillars) simultaneously and independently. However, they are often closely related in practice. The model is interactive and recognises attributes as well as skills; individuals may be experts in different pillars and may start with any pillar in different periods.²⁸

1. Identify – the ability to identify the personal need for information. The pillar points out the formation of new information and data which are necessary to obtain and to learn. To be informationally literate means that a manager knows how to identify the need for new information (published – available, unpublished); the manager develops learning to actively acquire new information and subsequently, uses it all the time. The

²⁸ BENT, M. 2011. *The new Seven Pillars of Information Literacy model*. [online]. Newcastle : Moriablog, 18/04/2011. [Retrieved: 2015. 08. 22.]. Available: <http://moirabent.blogspot.sk/2011/04/new-seven-pillars-of-information.html>.

informationally literate manager knows how to identify lack of knowledge in a specific field and looks for themes or areas where he/she has significant reserves. Furthermore, the manager is able to define limits of the information needs; to formulate current knowledge; to apply basic information to search for new information; to assume personal responsibility for information searching; and to manage time effectively while performing the process of identification.

2. Scope – the ability to assess current knowledge and to identify gaps.

In the second pillar, the information literacy involves knowledge of the information portfolio diversity in social life; various sources of information; and different formats of information. The manager understands accessibility of information and services which are significant to obtain information. Moreover, the manager knows to identify available tools for searching and the formats of information and is able to obtain missing information; to determine which information best satisfies the need; to use the new searching tools as soon as they are available.

3. Plan – the ability to develop a plan, a strategy for information and data searching. The third pillar points to the need for knowledge of a searching range by available techniques that search for information. The informationally literate manager understands differences of various searching tools, recognises advantages and disadvantages of the tools. The manager does not use only one searching tool, but verifies information using multiple instruments and available techniques. He/she can revise key words and adapt the searching strategy to available resources and restrictions (hardware and software, dictionaries). The manager clearly and in the appropriate language formulates searching requirements and sets limits and restrictions. While searching, he/she cooperates with dictionaries and taxonomy.

4. Gather – the ability to access and obtain sought information.

The informationally literate manager, who knows to identify the need for information and to search for it, must be also able to acquire information from a source, in which it is stored. The manager understands principles of information providing, data mining, information from data warehouses and digital libraries using ICT. He/she controls practical skills necessary to obtain information, techniques of data mining, compression,

RESEARCH OBJECTIVES, HYPOTHESES AND METHODOLOGY

Information and communication technologies penetrate into social life and into all levels of economy while changing society into the information society. It can be briefly defined as the society focusing on the information and information technologies. Information has become the growth potential of organisations. The need for comprehensive and systematic access to information throughout the organisation has been more and more increasing. The access to information cannot be achieved without using the new ICT which represent technical, software and organisational sources of information processing. The information society maintains cultural and linguistic diversity of individual states while integrating economies and creating a global market. Participation in the information society involves faster communication, development of new and creative ideas, and the need for lifelong learning. This fact is the principal determinant to formulate the main objective of the scientific monograph.

The main objective of the monograph, based on results of a survey, is to assess the current level of information literacy leading to design the information literacy model for middle managers.

The main objective is fulfilled by partial objectives in order to apply scientific outputs in theoretical and practical areas. To achieve the main objective, the following partial objectives are set for the main parts of the scientific monograph:

1. Literature review:

- To anatomise and compare various models of information literacy and characteristics of information literacy in the Slovak Republic and abroad,
- To identify the default state to conduct the survey of managers' information literacy.

2. Results and discussion:

- To map skills and knowledge of managers in the ICT area in favour of organisations,

- To identify whether gender, age, managers' education and the level of management are significant determinants affecting information literacy of the managers at the significance level of $\alpha = 0,05$,
- To design the significant and quantitative information literacy model that refers to statistically significant factors affecting the index of managers' information literacy,
- To develop the qualitative model of managers' information literacy which results from partial quantitative and qualitative analyses.

Hypotheses are a part of output harmonisation in order to meet the main scientific objective of the monograph. The following formulated hypotheses are verified by several scientific methods applied in the analytical and synthetic part of the monograph.

Hypothesis no. 1

When testing managers' responses segmented into three groups according to the level of management: operational, tactical and strategic – top management, a parametric One-way Anova test with the Bonferroniho correction and a test to measure data homogeneity (Levene's test) are used, as these data are normally distributed. The purpose of this method is to test significant differences between means of several groups (samples).³⁶

Hypothesis no. 2

The level of management (operational, tactical and top management) has a significant effect on the aggregate index of managers' information literacy at the significance level of $\alpha = 0,05$. The tested hypothesis may be written as follows:
 H_0 : There **is no significant effect** between the level of management and the aggregate index of managers' information literacy.

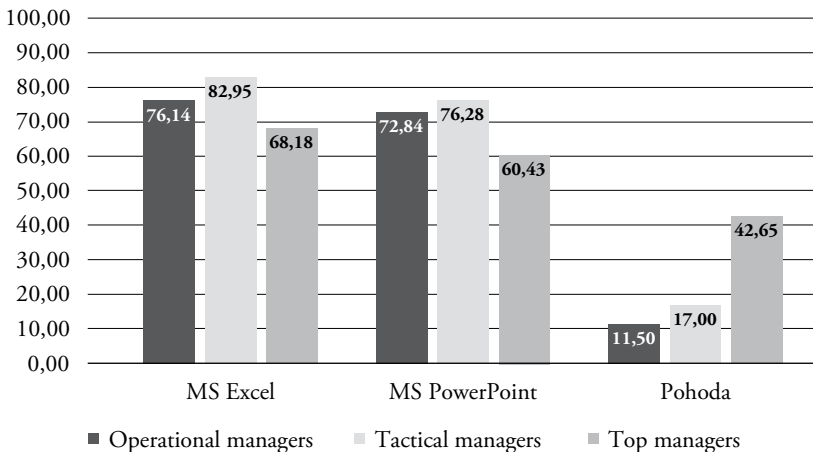
H_1 : There **is a significant effect** between the level of management and the aggregate index of managers' information literacy.

Outcomes of the hypotheses' verification are given in the chapter of Results.

The main objective of the research is met by achieving the partial objectives and by using appropriate scientific methods. In the first part, the monograph is based on knowledge excerption of domestic and foreign

³⁶ RIMANČÍK, M. 2007. *Štatistika pre prax*. 1. ed. Košice: 2007. 200 p. ISBN 978-80-969813-1-1

There are significant differences in the digital literacy level of the indicators: B6 – MS Excel ($p < 0,000$); B7 – MS PowerPoint ($p = 0,036$); and B18 – Pohoda application software (the value approaches 0,05) between the managers' groups depending on the position. The best results in the digital literacy level of working with MS Excel (82,95 points) and MS PowerPoint (76,28 points) are achieved by the tactical managers. The digital literacy level of the operational managers working with MS Excel reaches 76,14 points and working with MS PowerPoint reaches 72,84 points. The top managers represent the least literate position in working with the programs: MS Excel – 68,18 points and MS PowerPoint – 60,43 points. On the other hand, the digital literacy level of working with the Pohoda software achieves the best values for the top managers – 42,65 points, while the tactical managers reach 17,00 points and the operational managers only 11,50 points.



Graph 3.3 Digital literacy of indicators B6, B7 and B18 by the job position in points

Source: Own processing.

4. Statistical significance's verification of differences in digital literacy depending on the education level

The managers are segmented into the four groups based on the highest education achieved: 1. – secondary education with a school-leaving exam; 2. – Bachelor's degree; 3. – Master's degree; and 4. – Doctoral degree. We tested the statistical significance of the highest education achieved by

the managers on both the aggregate indices and the partial digital literacy indices. The Levene’s test was used to test normal distribution of the data. The following table shows the results of the test.

Table 3.15 **Testing normality of data distribution by education**

Indicator	Levene Statistic	df1	df2	Sig.
IH	1,594	3	176	,193
IS	,793	3	176	,499
IOS	,452	3	176	,717
IAS	,655	3	176	,581
II	,818	3	176	,486
IC	,809	3	176	,490

Source: Own processing.

The tested data are normally distributed. Subsequently, the data were tested by the parametric One – Way Anova test with the Bonferroni correction.

Table 3.16 **Testing digital literacy differences by education**

Indicator		Sum of Squares	df	Mean Square	F	Sig.
IH	Between Groups	4372,938	3	1457,646	3,077	,029
	Within Groups	83369,292	176	473,689		
	Total	87742,230	179			
IS	Between Groups	1358,875	3	452,958	2,151	,095
	Within Groups	37054,033	176	210,534		
	Total	38412,908	179			
IOS	Between Groups	1896,136	3	632,045	2,080	,105
	Within Groups	53471,186	176	303,814		
	Total	55367,323	179			
IAS	Between Groups	1066,369	3	355,456	1,423	,238
	Within Groups	43964,217	176	249,797		
	Total	45030,587	179			

Indicator		Sum of Squares	df	Mean Square	F	Sig.
II	Between Groups	8418,962	3	2806,321	5,493	,001
	Within Groups	89911,348	176	510,860		
	Total	98330,310	179			
IC	Between Groups	1281,633	3	427,211	,850	,468
	Within Groups	88455,072	176	502,586		
	Total	89736,705	179			

Source: Own processing.

By applying the parametric test using the correction, we have discovered that the highest education of the managers has a significant effect on the digital literacy level in the area of hardware ($p = 0,029$) and information ($p = 0,01$). The p-value approaches 0,05 in the highest education achieved by the managers' effect on the digital literacy level in the area of software. Statistical significance has not been proved in the other indicators.

The partial indicators were subjected to testing as well. Firstly, normal distribution of data was tested using the Levene's test. The normally distributed data were not statistically significant, which was proved by the parametric tests. The indicators: A4; A6; A9; A10; B1; B7; B10; B12; B15; B16; B17; B18; B19; B20; B21; B23; B29; C4; C8; C9; D1; and D5 did not meet the condition of normal distribution (Levene statistic $p > 0,05$). Therefore, these data were tested using the non-parametric K Independent Kruskal-Wallis H test. The results of the statistical analysis are presented in the following table.

Table 3.17 **Testing digital literacy differences for individual indicators by education**

Indicator		Chi-Square	Df	Asymp. Sig.
A4	Working with a PDA	4,732	3	,193
A6	Working with a printer	14,709	3	,002
A9	Working with storage media	10,503	3	,015