eXclusive e-JOURNAL
ISSN: 1339-4509 (Online) Journal homepage: http://www.exclusiveejournal.sk

ECONOMY & SOCIETY & ENVIRONMENT

New spreadsheet functions of Microsoft Excel 2016

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Abstract: Using functions in modeling economic and financial models in spreadsheet software Microsoft Excel is necessary. The paper introduces new spreadsheet functions of Microsoft Excel 2016. It focuses on the creation of new decision-making formulas, examples show the use of new function SWITCH and compares it to well-known Excel function IF.

Keywords: Excel; programming; functions

JEL Classification: C88

1. Introduction

Microsoft Excel is a spreadsheet software which helps users to organize data in rows and columns of cells and it is simpler than most CAAT[1]. It is also highly flexible, with huge list of functions. It is possible to install Add-Ins with advanced features and lower cost for installation. Microsoft Excel has many powerful features and by using this can easily find context of large data tables. Excel has data size limitation of processing only one million rows or records of data (Varma, 2014).

A large number of data tables about tourism is available, international tourism expenditures of international outbound visitors in other countries, including payments to foreign carriers for international transport is available f.ex. here: http://data.worldbank.org/[2]. Also, Eurostat table is available at http://ec.europa.eu/eurostat/web/tourism/data/main-tables and many many other. All these dates could be analyzed in CAAT tool as Microsoft Excel is. Using Excel spreadsheet function increases variability and complexity of data analysis.

Excel as a software system is a bundle of a functional, declarative language of spreadsheet formulas and an imperative language of macros in VBA[3]. They are fundamentally different and require completely different styles of programming, so that proficiency in one of them does not help in learning the other. In fact, many experienced spreadsheet users avoid using VBA.

Taking those factors into account, it is not surprising that (Peyton et al. 2003) proposed an extension to Excel by allowing user defined functions defined by means of spreadsheets. They wrote: *From a programming language point of view, then, spreadsheets lack the most fundamental mechanism that we use to control complexity: the ability to define re-usable abstractions. In effect, they deny to end-user programmers the most powerful weapon in our armory.* Later, they identify the main target users of the proposed solution to be the moderate users, i.e. *those who understand the spreadsheet paradigm fairly thoroughly*. Not only have they already mastered the prerequisites, but they also tackle more ambitious and long-lived applications. (Peyton et al. 2003) Then the authors conclude: *The implementation of a function must be defined by a spreadsheet, because that is the only computational paradigm understood by our target audience.* (Balson, 2014)

2. New Excel 2016 Switching functions

In Excel version 2016 some new switching function was released in January 2016 update. There are new function IFS and function SWITCH in logical Function Library. It allows users to create formulas in brand new style. These functions is available only in Office 365 Excel Online and in desktop version MS Office Excel 2016.

Logical function IFS

Logical function IFS allow to create formulas like nested functions IF with no need to nest functions. How to use the function IFS is described at the next example similar as example at Figure 1.

Figure 1: coding numbers to text

1	excellent		4	
2	very good			
3	good			failed
4	failed			failed

Source: author

=IFS(num=1;"excellent";num=2;"very good";num=3;"good";num=4;"failed")

[1] Computer-aided audit tools

[2] http://data.worldbank.org/indicator/ST.INT.XPND.CD

[3] Visual Basic for Aplicatios

There is only one difference between old switching function IF and new function IFS. If number in cell M23 is outside of range <1, 4> new function IFS returns error message #N/A not FALSE. Here is the solution of the same task using old switching function IF, =IF(num=1;"excellent";IF(num=2;"very good";IF(num=3;"good";IF(num=4; "failed")))). With new switching function IFS there is no nested closing brackets at the end of the formula.

Well, new logical function IFS could be used to calculate bandwidth tax rate from tax base. Following example shows using new logical function IFS instead old function IF.

Figure 2: coding numbers to text

bandwith	tax		base	59 250,00 Kč
7 200,00 €	15,0%		taxR	18,0%
48 500,00 €	18,0%			
114 000,00 €	20,0%			

Source: author

=IFS(base<=txZn1;txVa1;AND(base>txZn1;base<=txZn2);txVa1;AND(base>txZn2;base<=txZn3);txVa2; base>txZn3;txVa3) and with old IF function =IF(base<=txZn1;txVa1;IF(base<=txZn2;txVa2;txVa3)).

Logical function SWITCH

There is another new logical function in Excel 2016 logical Function Library, function is named SWICTH. An example is at Figures 3 and 4.

Figure 3: coding numbers to name of months

L	M	N
		name
month	4	April

Source: author

In the example using new function SWITCH from logical Function Library is shown. When filling the table user can put only number of month, name of month will atomically appear in the next column. Here is the function SWITCH source code according to Figure 2.

Figure 4: using SWITCH function

L	M	N	O	P	Q	R	S	T	U	V
		name								
month	4	=SWITCH(monthNum;1;"January";2;"February";3;"March";4;"April";5;"May";6;"June";7; "July";8;"August";9;"September";10;"October";11;"November";12;"December")								

Source: author

Everyone can say that this example could be solved also using Lookup & Reference function VLOOKUP. When using function VLOOKUP, a little table of all month numbers and month names is necessary. Function VLOOKUP returns text from the second column of this table according to number of month at first column. If number of month is not find at first column of table function VLOOKUP returns error message #N/A. Author want to talk about more complexity SWITCH function for creating switching formulas. Using SWITCH function increased formulas understandability. It is similar like using command switch in C++ programming language.

3. Conclusion

When using new switching function SWITCH principe of formulas is more understandable than with old logical function IF nested in the other logical function IF, with many close brackets at the end of formula. New logical switching functions can help users with easier formulas creation.

References

Balson D., Tyszkiewicz J. (2012). User Defined Spreadsheet Functions in Excel. "The Science of Spreadsheet Risk Management 2012. Retrieved April 4, 2016 from https://www.academia.edu/17695715/User_Defined_Spreadsheet_Functions_in_Excel

Peyton J.S., Blackwell A.F., Burnett, M. (2003). A user-centred approach to functions in Excel. Proceedings of the Eighth ACM SIGPLAN International Conference on Functional Programming, ICFP 2003, 165-176.

Varma T. N. P., Khan DA. (2014, December 14) MS Excel functions as supply chain fraud detector. African Journal of Business Management. Vol. 8(24): 1109-1117. Retrieved March 31, 2016 from http://www.academicjournals.org/journal/AJBM/article-full-text-pdf/CB49E8149629

Microsoft (2016, February) What's new in Excel 2016 for Windows. Microsoft Office Support. Retrieved April 1, 2016 from https://support.office.com/en-US/article/What-s-new-in-Excel-2016-for-Windows-5fdb9208-ff33-45b6-9e08-1f5cdb3a6c73