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ONLINE FORMS AND SPREADSHEET AS MEANS TO SUPPORT QUALITY MEASUREMENT BY THE SERVQUAL METHOD

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Purpose: The main purpose of the research is to devise and present a concept for a solution enabling integration of popular off-the-shelf online forms with a tool aligned with the MiRel concept used for quality measurement by application of the SERQUAL method.
Design/methodology/approach: The analysis performed by the author comprised various possibilities of using standard features of popular online forms to store data for purposes of the SERVQUAL method. This involved identification of several potential layouts of the master table where the answers previously received are kept. The analysis concerned the data structure applied in the tool designed, as proposed in the literature, in accordance with the MiRel concept, to support the method in question. The elements identified in this structure were the attributes whose values should be entered directly and manually in tables as well as those whose values should be added automatically on the basis of the answers previously received. Solutions were developed to enable automatic data migration from the master table to the tool's respective tables.
Findings: The data required for purposes of the SERVQUAL analysis, supported by a tool created in a spreadsheet according to the MiRel concept, can be successfully stored by means of commonly available online forms. What proves to be problematic is the impossibility of verifying the correctness of the answers in terms of the relevance of individual dimensions, yet in this respect both the verification and potential adjustment of the answers received can be inherent in the mechanism responsible for data migration from the master table to the tool's tables. A fully functional solution enabling data to be retrieved from the master table and moved to the tool's tables can be developed using built-in spreadsheet features only, without the need for any code created in any programming language.
Practical implications The solution proposed in the paper can be used in practice when measuring quality using the SERVQUAL method.
Originality/value: The concept described in the paper is the author's original solution.

Keywords: spreadsheet, database, MiRel, data processing, quality management.

Category of the paper: Conceptual and technical paper.

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1. Introduction

Day-to-day operations require every contemporary organisation to process massive amounts of information. It is obvious that more or less complex IT solutions must also be used on an ongoing basis. Despite the continuous evolution of already extensive and highly integrated systems, much of the data stored in organisations is still processed using one of the most popular of the available tools, which a spreadsheet most certainly is. There are various concepts mentioned in the literature as to how this group of tools can be put into practical use in different operating areas of organisations. These include finance, sales and marketing, or HR management. Many of the solutions proposed require data processing to be supported for the sake of quality management. The suggested solutions include using spreadsheets to support the ABC method (Szczęśniak, 2010), the Suzuki method (Szczęśniak, 2020b), quality control (Carlberg, 2007), or statistical process control (Knight, 2009; Szczęśniak and Molenda, 2013). A part of this domain is a tool intended to support data processing in quality measurement using the SERVQUAL method (Szczęśniak, 2021). It was designed by Parasuraman, Zeithaml, and Berry (Parasuraman et al.,1995; Parasuraman et al., 1998) to measure the discrepancies between the quality perceived and the quality expected of a service delivered to customers. This measurement is conducted by means of a questionnaire whose main part prompts customers to assess the extent to which they agree or disagree with individual statements. The questionnaire statements make references to items associated with the quality of the service being surveyed. For each item, the form provides a statement pertaining to the expected quality and one concerning the perceived quality. According to the original approach, this assessment is based on a 7-point Likert scale (Ulewicz, 2014; Pradela, 2015; de la Cruz del Río Rama et al., 2014), where 1 means that the respondent strongly disagrees with a given statement, and 7 – that they strongly agree. Next to the original seven-point scale, a five-point variation is also in use (Luke and Heyns, 2020; Aghamolaei and Zare, 2008). In a decided majority of cases, statements concerning a certain item are positive in their overtone, which means that a higher number of points given is correlated with a higher assessment of the service level. However, a survey questionnaire may well comprise items linked with negative statements. Where this is the case, the answers thus obtained should be modified by reversing the scale prior to further analysis. Each item linked with a given statement is assigned to one of key dimensions. Those defined in the original version of the method are empathy, reliability, tangibles, assurance, and responsiveness (Zeithaml et al, 1990; Dalrymple et al., 1995), but this set is sometimes modified (Nowacki, 2005; Chatzoglou et al., 2014; Pakdil and Aydın, 2007). When filling in the questionnaire, the customer decides on the relevance of individual dimensions by distributing 100 points among them (Zeithaml et al., 1990; Dalrymple et al., 1995). The dimensions which have received the highest number of points are those the customer considers the most relevant. Additionally, the questionnaire can be used to collect supplementary information which characterises the customer. Based on the data thus acquired, one can establish the value of individual indices which make it possible to assess the perceived vs the expected quality. Since there are no explicit guidelines as to the indices that can be calculated, different studies mention various kinds of approach. Papers commenting on studies performed using the SERVQUAL method mention 14 identified indices which one can calculate (Szczęśniak, 2021). There is also a tool proposed as a means to support the SERVQUAL method in practice (Szczęśniak, 2021), developed in a spreadsheet in accordance with the MiRel concept (Szczęśniak, 2017, 2018a, 2018b, 2020a). One of the assumptions underpinning this tool is that data are collected using a questionnaire created in a spreadsheet. However, what seems to be considerably more convenient in this respect is to use online forms, which are growing in popularity. The following sections of this paper discuss a concept of using such forms to collect data for purposes of the SERVQUAL method, as well as a concept of their integration with the tool proposed.

2. Data collection using online forms

When assessing the possibility of integrating the tool supporting the SERVQUAL method with online forms, it was assumed that one should use the most popular free-of-charge forms, i.e. the solutions provided by Microsoft and Google, referred to as variant 1 and variant 2, respectively, in this paper. The functionality range of both solutions is very similar.

The entire form was divided into 4 parts. Part one contained information about the respondent, part two concerned the relevance of individual dimensions, part three – the respondent's expectations as to the service subject to assessment, and part four – the actual assessment. Each part was defined using the *Section* type item, available in both solutions. The questions contained in the first part of the form allowed the respondent to choose one among several options. In Microsoft forms, this is the *Choice* type question, while in those from Google – the *Multiple choice* type. In the form's second part, the best solution would be to pose a question which makes it possible to assign a specific number of points to individual answers, and where all answers are taken into consideration collectively, enabling verification if the total score is consistent with the assumptions previously adopted. Unfortunately, none of the solutions analysed offers such a question type. With regard to the foregoing, it was decided that the relevance of individual dimensions would be assessed in separate questions by assigning a number from 0 to 100 to each of them, with an explicit reservation that the sum of all points given must be 100. In Microsoft forms, the *Text* type question was used, while in Google forms – that of the *Short answer* type. In both cases, a limitation was imposed on the values to be entered so that one could only enter numbers from the 0-100 range. The sum condition is not verified in the form, and one can submit a filled-in questionnaire if the values entered sum up to a number different than 100. Consequently, as the form was being integrated with the tool intended to support the processing of the data acquired, it was necessary to propose a mechanism that would proportionally adjust the values being entered in such a manner that the result to be obtained complied with the premises of the SERVQUAL method.

Based on an analysis of the available types of questions, it was concluded that there were two options which could be applied in the third form part where the persons surveyed were expected to state whether or not, and if so to what extent, they agree with individual statements.

The first option entails providing multiple statements in a single question. This being the case, consecutive questions are presented in a concise form, one below another, with the rating scale displayed next to each question. The question type which one should apply in the form to make use of this option is:

- *Likert* – when using Microsoft forms.
- *Multiple choice grid* – when using Google forms.

In both cases, the main phrase used in the question does not refer to the statement being assessed, but only provides additional information. According to variant 1, individual statements are put in the question as consecutive *Statement* type items, while in variant 2 – as type *Row* items. On account of the restriction in place as to the number of type *Statement* items in a single question of the *Likert* type, when using Microsoft forms, one must add two *Likert* type questions in order to provide the standard number of 22 questions.

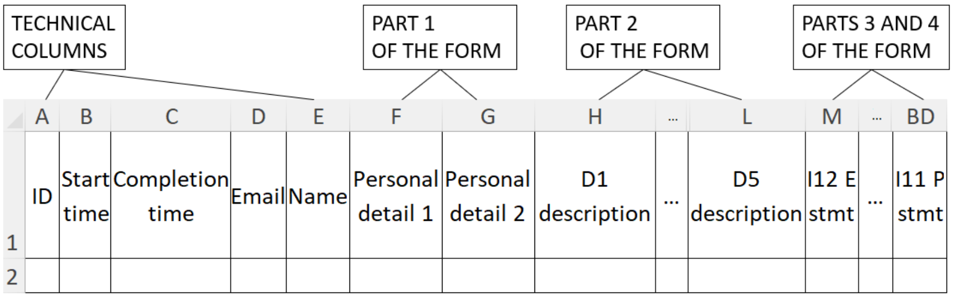
Option two assumes that there is a separate question for each statement in the form. With this variant in place, statements are presented in the form's consecutive paragraphs, while the rating scale is always to be found under the statement being assessed. The question type which one should apply in the form to make use of this option is:

- *Rating* – when using Microsoft forms.
- *Linear scale* – when using Google forms.

In both cases, the main phrase used in each question is invariably the statement subject to assessment.

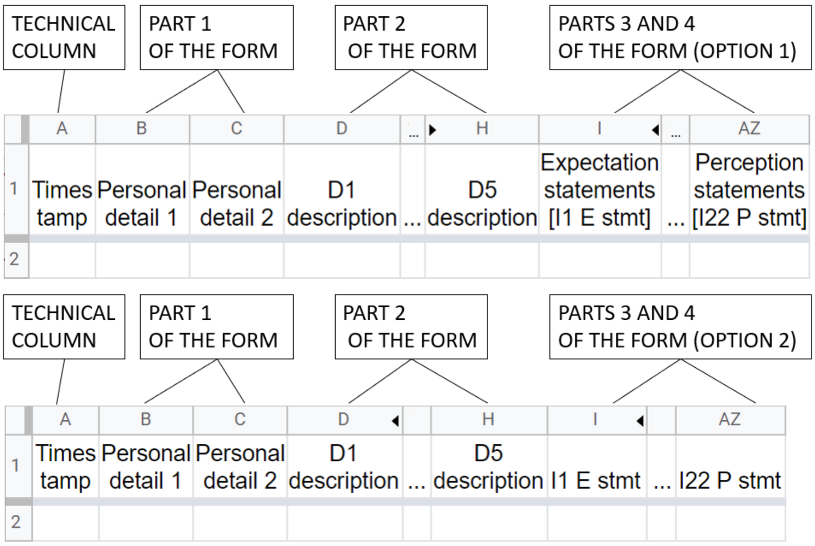
The layouts of the third and fourth part are identical, which makes it possible to use exactly the same question types in the form's last part as in the third.

The answers obtained when using the forms in question can be automatically added to a spreadsheet as a single master table. In the consecutive rows of this table, answers given by consecutive respondents are provided, and each column contains answers to one specific question or those concerning a given statement. Column headers are consistent with the main phrases used in the questions retrieved from parts 1 and 2, as well as from parts 3 and 4, where the form has been created according to option 2. If the form has been created as per option 1, the headers of the columns where the answers to questions from parts 3 and 4 are kept depend on the brand whose forms are in use. When using Microsoft forms, these headers are consistent with the text entered as consecutive items of the *Statement* type. In the case of the forms from Google, these headers contain text which combines the question's main phrase and the text entered in square brackets as another item of the *Row* type. In Microsoft forms, the sequence of the master table columns containing answers can be random. Additionally, the columns which come first in this table are the technical ones, such as *ID, Start time, Completion time, Email* and *Name*. In Google forms, the sequence of the columns containing answers matches the sequence in which questions appear in the form, while the initial one is a single technical column *Timestamp*. The layout of columns in master tables has been depicted in Figures 1 and 2.



	A	B	C	D	E	F	G	H	...	L	M	...	BD
1	ID	Start time	Completion time	Email	Name	Personal detail 1	Personal detail 2	D1 description	...	D5 description	I12 E stmt	...	I11 P stmt
2													

Figure 1. Layout of columns in a master table generated when using Microsoft forms.



	A	B	C	D	...	H	I	...	AZ
1	Times tamp	Personal detail 1	Personal detail 2	D1 description	...	D5 description	Expectation statements [I1 E stmt]	...	Perception statements [I22 P stmt]
2									

	A	B	C	D		H	I		AZ
1	Times tamp	Personal detail 1	Personal detail 2	D1 description	...	D5 description	I1 E stmt	...	I22 P stmt
2									

Figure 2. Layout of columns in a master table generated when using Google forms.

3. Form and tool integration in a spreadsheet

The tool proposed in the literature makes it possible to retrieve values of all the identified basic indices taken into account when using the SERVQUAL method. In this tool, data are stored in tables representing entities such as *Respondent, Personal detail 1* and *Personal detail 2, Item, Statement, Statement answer, Dimension, Dimension answer*. The links between individual entities as well as the attributes identified for them are consistent with the model depicted in Figure 3.

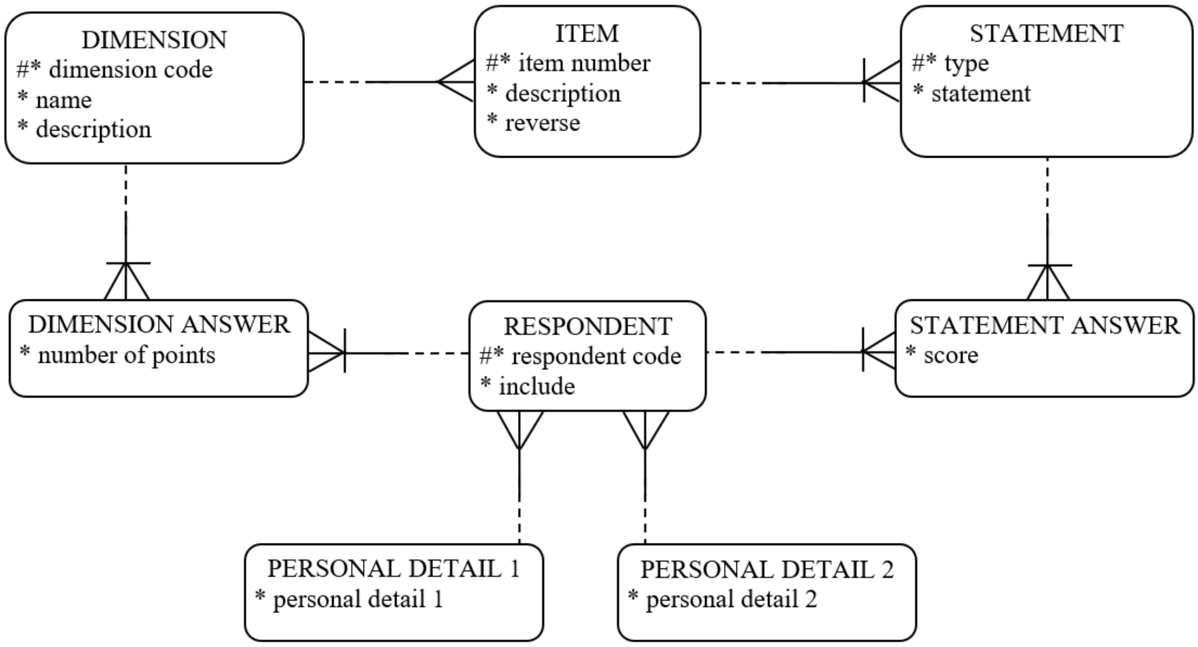


Figure 3. CASE Method-compliant model of relationships between entities for the tool supporting the SERVQUAL method.

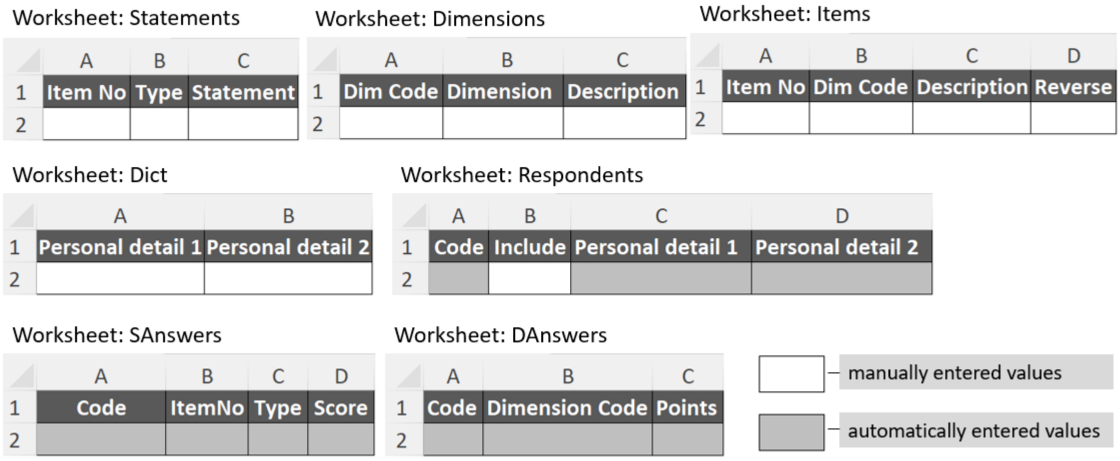
Entities such as *Dimension, Dimension answer, Item, Statement, Statement answer, Respondent* are represented as tables placed in separate worksheets titled *Dimensions, DAnswers, Items, Statements, SAnswers,* and *Respondents,* respectively. It was assumed that the table titles should be consistent with the titles of the worksheets. Entities *Personal detail 1* and *Personal detail 2* are represented as one-column tables performing dictionary functions, and consequently, they were placed in consecutive columns of a shared worksheet titled *Dict*. Using external forms, part of the data acquired is manually entered directly in individual tables, while another part is extracted from a master list generated on the basis of the answers previously received. The manual keying of data pertains to the following attributes:

- *Item No, Dim Code, Description, Reverse* in table *Items*.
- *Dim Code, Dimension, Description* in table *Dimensions*.
- *Item No, Type, Statement* in table *Statements*.
- *Include* in table *Respondents*.
- *Personal detail 1, Personal detail 2* in worksheet *Dict*.

Using the answers previously acquired, values of the following attributes are entered automatically:

- *Code, ItemNo, Type, Score* in table *SAnswers*.
- *Code, Dimension Code, Points* in table *DAnswer*.
- *Code, Personal detail 1, Personal detail 2* in table *Respondents*.

The layout of the tables, including the breakdown into attributes whose values are manually keyed in and the attributes whose values are automatically retrieved, has been shown in Figure 4.



Worksheet: Statements

	A	B	C
1	Item No	Type	Statement
2			

Worksheet: Dimensions

	A	B	C
1	Dim Code	Dimension	Description
2			

Worksheet: Items

	A	B	C	D
1	Item No	Dim Code	Description	Reverse
2				

Worksheet: Dict

	A	B
1	Personal detail 1	Personal detail 2
2		

Worksheet: Respondents

	A	B	C	D
1	Code	Include	Personal detail 1	Personal detail 2
2	▨		▨	▨

Worksheet: SAnswers

	A	B	C	D
1	Code	ItemNo	Type	Score
2	▨	▨	▨	▨

Worksheet: DAnswers

	A	B	C
1	Code	Dimension Code	Points
2	▨	▨	▨

□ – manually entered values

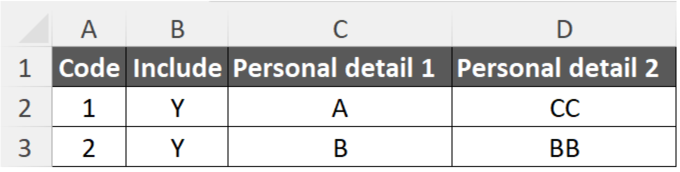
▨ – automatically entered values

Figure 4. Layout of tables in the analysed tool.

The existing set of worksheets was complemented with worksheet *FormsIn*, containing all the answers obtained, representing a master table matching Figure 1 or 2, depending on the variant and option applied. For the data layout shown, a mechanism was developed to automatically enter values of corresponding attributes in tables with reference to the existing master table. The following assumptions were made for purposes of the said mechanism:

- the main phrases used in the questions contained in part 1 of the form must correspond to the names of the attributes characterising a given respondent in table *Respondents*, and in the structure proposed, these attributes are *Personal detail 1* and *Personal detail 2,*
- the main phrases used in the questions contained in part 2 of the form must correspond to the values of attribute *Description* in table *Descriptions*,
- where option 1 is applied for parts 3 and 4 of the form, the main phrases used in the questions must correspond to the values of attribute *Statement* in table *Statements*,
- where option 2 is applied for parts 3 and 4 of the form, the phrases entered as type *Statement* items in variant 1 and those entered as type *Row* items in variant 2 must correspond to the values of attribute *Statement* in table *Statements.*

If one uses Microsoft forms, regardless of the option applied in parts 3 and 4 of the form, the solution proposed is identical. In step one, with reference to the master table, values of the corresponding attributes are entered in table *Respondents*. Values retrieved from consecutive rows of the master table are migrated to consecutive rows of the former table. The solution which migrates the consecutive values in worksheet *Respondents* features the formulas shown in Figure 5. The principle followed when presenting formulas in individual columns is that the formula shown in the figure is the one from the top cell of a given column. The form taken by the formulas in consecutive cells is a resultant of the visible formula copied into these cells, and this stems from the master addressing principles which apply in spreadsheets.



	A	B	C	D
1	Code	Include	Personal detail 1	Personal detail 2
2	1	Y	A	CC
3	2	Y	B	BB

Column	Formula
Code	=IF(FormsIn!A2<>"";FormsIn!A2;"")

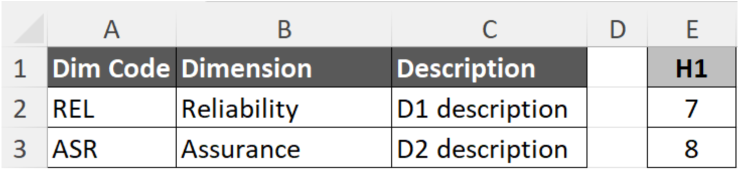
Personal detail 1	=IF($A2<>"";INDEX(FormsIn!$A2:$BD2;1;
	MATCH(C$1;FormsIn!$A$1:$BD$1;0));"")

Personal detail 2	=IF($A2<>"";INDEX(FormsIn!$A2:$BD2;1;
	MATCH(D$1;FormsIn!$A$1:$BD$1;0));"")

Figure 5. Formulas entered in the columns of worksheet *Respondents*.

The formula in column *Code* checks if there is any value in the given row of column *ID* of the master table in worksheet *FormsIn*. If so, this value is migrated to table *Respondents*. If any value has been entered in the given row in column *Code*, the formula in column *Personal detail 1* identifies the right column in the master table and retrieves from it the value of attribute *Personal detail 1*. The value of attribute *Personal detail 2* is retrieved in the same manner. In the rows where the corresponding values have been entered by way of the formulas, one must key in the value of attribute *Include* which defines if the answers provided by a given respondent are to be taken into consideration in further analysis.

Once the right values have been entered in table *Respondents*, values of attributes are entered in tables *DAnswers* and *SAnswers*. The mechanism which fills in the former of these tables with values adds 1 auxiliary column in worksheet *Dimensions* and 4 auxiliary columns in worksheet *DAnswers*. The layout of these columns, along with the formulas applied in individual worksheets, has been shown in Figures 6 and 7.

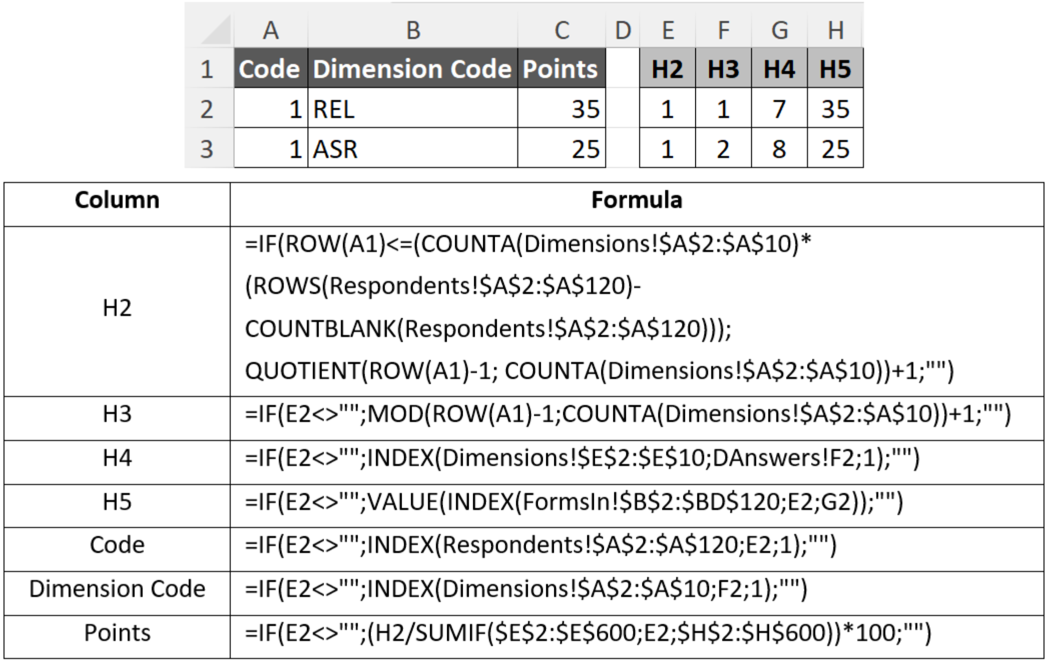


	A	B	C	D	E
1	Dim Code	Dimension	Description		H1
2	REL	Reliability	D1 description		7
3	ASR	Assurance	D2 description		8

Column	Formula
H1	=IF(A2<>"";MATCH(C2;FormsIn!$B$1:$BD$1;0);"")

Figure 6. Auxiliary column in worksheet *Dimensions*.

The formula in auxiliary column *H1* returns a number which designates the master table column where the answers concerning the given dimension are to be found. In consecutive rows of table *DAnswers*, all possible combinations of the respondent code and dimension code pair must appear. The values generated in auxiliary columns *H2* and *H3* are the numbers of the rows in table *DRespondent* and table *Dimension*, respectively, from which values of individual codes are to be retrieved.



	A	B	C	D	E	F	G	H
1	Code	Dimension Code	Points		H2	H3	H4	H5
2	1	REL	35		1	1	7	35
3	1	ASR	25		1	2	8	25

Column	Formula

H2	=IF(ROW(A1)<=(COUNTA(Dimensions!$A$2:$A$10)*
	(ROWS(Respondents!$A$2:$A$120)-
	COUNTBLANK(Respondents!$A$2:$A$120)));
	QUOTIENT(ROW(A1)-1; COUNTA(Dimensions!$A$2:$A$10))+1;"")

H3	=IF(E2<>"";MOD(ROW(A1)-1;COUNTA(Dimensions!$A$2:$A$10))+1;"")
H4	=IF(E2<>"";INDEX(Dimensions!$E$2:$E$10;DAnswers!F2;1);"")
H5	=IF(E2<>"";VALUE(INDEX(FormsIn!$B$2:$BD$120;E2;G2));"")
Code	=IF(E2<>"";INDEX(Respondents!$A$2:$A$120;E2;1);"")
Dimension Code	=IF(E2<>"";INDEX(Dimensions!$A$2:$A$10;F2;1);"")
Points	=IF(E2<>"";(H2/SUMIF($E$2:$E$600;E2;$H$2:$H$600))*100;"")

Figure 7. Auxiliary columns and formulas in worksheet *DAnswers.*

The formula in auxiliary column *H2* generates consecutive numbers in accordance with the following expression:

$$r_r = \left\lfloor \frac{i-1}{d} \right\rfloor + 1 \tag{1}$$

and the formula in auxiliary column *H3* operates in accordance with the following expression:

$$r_d = \left((i-1)\ mod\ d\right)\ + 1 \tag{2}$$

where:

r_r – number of the row in table *Respondents* from which the respondent code is to be retrieved and, at the same time, number of the master table row from which the given respondent's answers are to be retrieved,

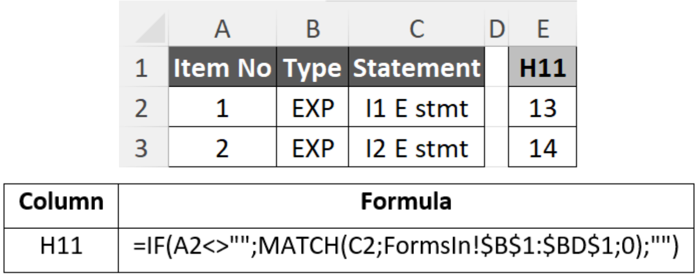
r_d – number of the row in table *Dimensions* from which the dimension code is to be retrieved,

i – index of the current row in table *DAnswers* (index starting with the value 1),

d – number of dimensions entered in table *Dimensions*.

Depending on the value returned by the formula in columns *H2* and *H3*, the formulas in columns *Code* and *Dimension Code* return the respondent code and the dimensions code, respectively, while the formula in auxiliary column *H4* retrieves the master table column number pre-established for the given dimension. In the next step, based on the value retrieved from columns *H2* and *H4*, the formula in column *H5* returns the number of points the given respondent has assigned to the given dimension. Since the total number of points the given respondent has assigned to all dimensions is not verified at the form filling stage, any potential adjustment of the answers provided takes place when values are migrated from column *H5* to column *Points*. According to the assumptions of the SERVQUAL method, the sum of the points in column *Points*, in the rows which contain the same respondent code, always equals 100.

The mechanism which enters values in table *SAnswers* adds 1 auxiliary column in worksheet *Statements* and 5 auxiliary columns in worksheet *SAnswers*. The layout of these columns, along with the formulas applied in individual worksheets, has been shown in Figures 8 and 9. The formula in auxiliary column *H11* returns a number which designates the master table column where the answers concerning the given statement are to be found.



	A	B	C	D	E
1	Item No	Type	Statement		H11
2	1	EXP	I1 E stmt		13
3	2	EXP	I2 E stmt		14

Column	Formula
H11	=IF(A2<>"";MATCH(C2;FormsIn!$B$1:$BD$1;0);"")

Figure 8. Auxiliary column in worksheet *Statements*.

In consecutive rows of table *SAnswers*, all possible combinations of the respondent code paired with the item number and type must appear. The values generated in auxiliary columns *H12* and *H13* are the numbers of the rows in table *DRespondent* and table *Statements* from which the respondent code as well as the item number and item type are to be retrieved, respectively. The formula in column *H12* generates consecutive numbers in accordance with the following expression:

$$r_r = \left\lfloor \frac{i-1}{s} \right\rfloor + 1 \tag{3}$$

and the formula in auxiliary column *H13* operates in accordance with the following expression:

$$r_s = \big((i-1)\ mod\ s\big) + 1 \tag{4}$$

where:

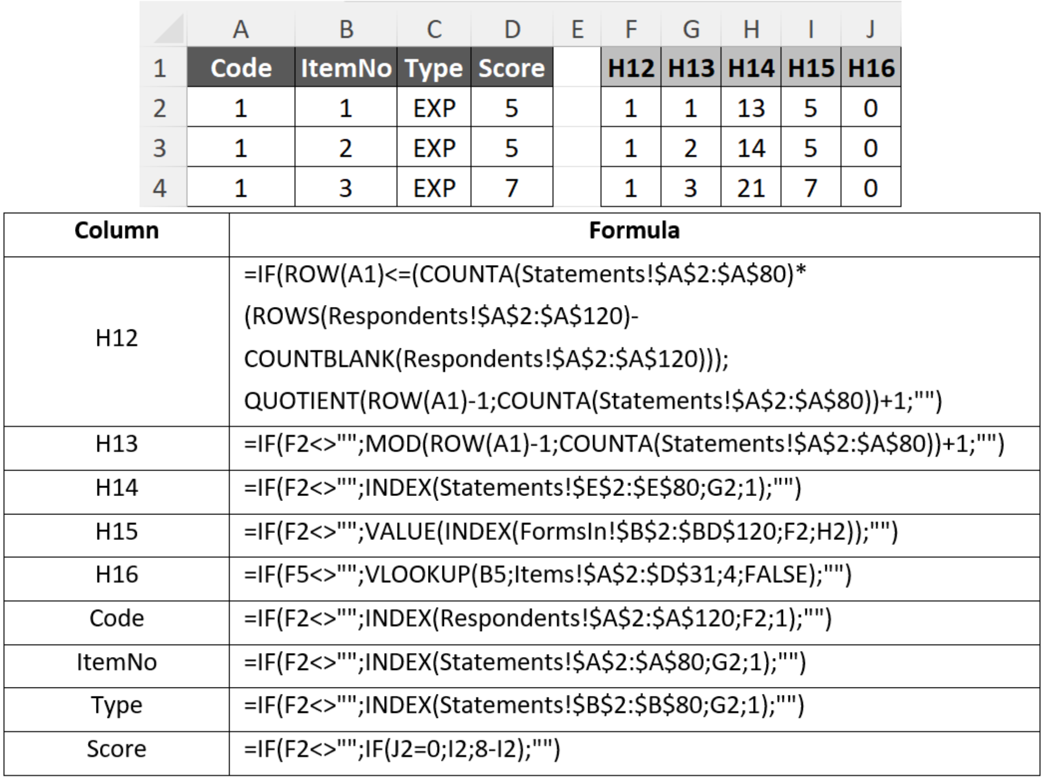
r_r – number of the row in table *Respondents* from which the respondent code is to be retrieved and, at the same time, number of the master table row from which the given respondent's answers are to be retrieved,

r_s – number of the row in table *Statements* from which the item number and type are to be retrieved,

i – index of the current row in table *SAnswers* (index starting with the value 1),

s – number of statements entered in table *Statements*.

Depending on the number in auxiliary column *H12*, the formula in column *Code* retrieves the right respondent code from table *Respondents*. Making use of the number in auxiliary column *H13*, the formula in column *ItemNo* retrieves the corresponding item number from table *Statements,* while the formula in column *Type* retrieves the corresponding statement type from the same table. The formula in auxiliary column *H14* retrieves the pre-established master table column number from the same row in table *Statements*. This column always contains answers concerning the given statement. Depending on the numbers in columns *H12* and *H14*, the formula in column *H15* retrieves the right answer from the master table. Additionally, the formula in column *H16* retrieves the value of attribute *Reverse* of the item to which the given statement pertains. This attribute determines if the statement associated with the given item is positive or negative, and whether or not it is necessary to reverse the rating scale prior to the analysis. Taking the value of this attribute into account, the formula in column *Score* puts an adjusted answer into the table.



	A	B	C	D	E	F	G	H	I	J
1	Code	ItemNo	Type	Score		H12	H13	H14	H15	H16
2	1	1	EXP	5		1	1	13	5	0
3	1	2	EXP	5		1	2	14	5	0
4	1	3	EXP	7		1	3	21	7	0

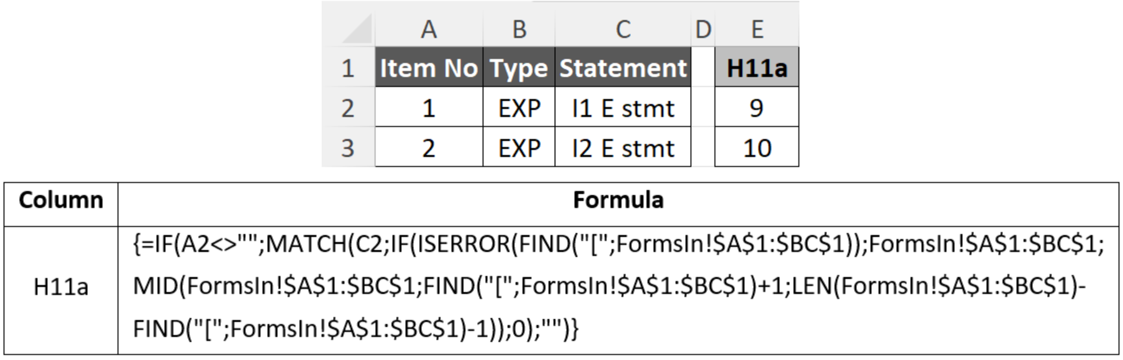
Column	Formula

H12	=IF(ROW(A1)<=(COUNTA(Statements!$A$2:$A$80)*
	(ROWS(Respondents!$A$2:$A$120)-
	COUNTBLANK(Respondents!$A$2:$A$120)));
	QUOTIENT(ROW(A1)-1;COUNTA(Statements!$A$2:$A$80))+1;"")

H13	=IF(F2<>"";MOD(ROW(A1)-1;COUNTA(Statements!$A$2:$A$80))+1;"")
H14	=IF(F2<>"";INDEX(Statements!$E$2:$E$80;G2;1);"")
H15	=IF(F2<>"";VALUE(INDEX(FormsIn!$B$2:$BD$120;F2;H2));"")
H16	=IF(F5<>"";VLOOKUP(B5;Items!$A$2:$D$31;4;FALSE);"")
Code	=IF(F2<>"";INDEX(Respondents!$A$2:$A$120;F2;1);"")
ItemNo	=IF(F2<>"";INDEX(Statements!$A$2:$A$80;G2;1);"")
Type	=IF(F2<>"";INDEX(Statements!$B$2:$B$80;G2;1);"")
Score	=IF(F2<>"";IF(J2=0;I2;8-I2);"")

Figure 9. Auxiliary columns and formulas in worksheet *SAnswers.*

The above solution must be slightly modified if one intends to use Google forms. In the event that Google forms are used in line with option 1, two adjustments should be introduced in parts 3 and 4 to ensure that the solution proposed works properly. One pertains to the respondent code, which the master table simply lacks in this case. For that reason, the formula presented in Figure 5 and found in column *Code* should generate the code as a sequence of consecutive integers, instead of retrieving it from the master table. This effect can be achieved by adding the ROW() function to the formula. The second modification is connected with the extended form of the headers of the master table columns which contain the answers to the questions from the form's parts 3 and 4. In order that the number of the column containing answers provided against a certain statement to be identified correctly, the formula in auxiliary column *H11* requires a considerable adjustment. Both the column in question and its modified formula have been shown in Figure 10.



	A	B	C	D	E
1	Item No	Type	Statement		H11a
2	1	EXP	I1 E stmt		9
3	2	EXP	I2 E stmt		10

Column	Formula
H11a	{=IF(A2<>"";MATCH(C2;IF(ISERROR(FIND("[";FormsIn!$A$1:$BC$1));FormsIn!$A$1:$BC$1;MID(FormsIn!$A$1:$BC$1;FIND("[";FormsIn!$A$1:$BC$1)+1;LEN(FormsIn!$A$1:$BC$1)-FIND("[";FormsIn!$A$1:$BC$1)-1));0);"")}

Figure 10. Auxiliary column in worksheet *Statements* along with its modified formula.

What the formula does in the first place is create a one-row table containing master table headers. They become modified to the point that, as far as the questions from parts 3 and 4 are concerned, they are only left with the text which can be found in square brackets. With reference to the row containing the headers, modified as above, the next step consists in establishing the number of the column which contains the answers provided against a given statement. For the mechanism proposed to work properly, it is assumed that no square brackets should appear in the main phrases used in the form's questions. When using Google forms according to option 2, one must only modify the formula in column *Code* of worksheet *Respondents* in parts 3 and 4 of the form.

4. Conclusions

The solutions proposed and discussed above demonstrate that the data needed for purposes of the SERVQUAL analysis, supported by a tool created in a spreadsheet according to the MiRel concept, can be successfully acquired by means of commonly available online forms from providers such as Microsoft or Google, representing variants 1 and 2. The features of the solutions analysed in the paper make it possible to build forms capable of collecting all the required data. In both variants, two form options were taken into consideration, differing in terms of the items used to acquire answers concerning expected and perceived quality. The structure of the data obtained in all cases was very similar, save for certain minor differences. The basic structure was assumed to be that which variant 1 yielded. Irrespective of the option chosen, it was precisely the same, enabling the least complicated data migration from the master table to the tool's tables. In variant 2, there is no answer identifier in the master table, and consequently the respondent code must be generated at the data migration stage. If variant 2 is bundled with option 1, the headers of some of the master table columns become considerably extended, which makes it necessary to also extend one of the formulas of the data migration mechanism. Where this was the case, a table formula had to be applied instead of the standard formula.

There was also a certain discrepancy identified in how the relevance of individual dimensions was assessed. The SERVQUAL method is based on the assumption that the respondent should distribute 100 points between them. Unfortunately, none of the solutions analysed offers an item which would make it possible to verify if the sum of the points assigned indeed meets that assumption. Therefore, it was necessary to move the verification and the potential adjustment of the assessments to the mechanism providing data migration from the master table to the tool's tables.

All the solutions enabling data migration from the master table to the tables created in the tool were successfully built in line with the MiRel concept, i.e. using a rather small range of built-in spreadsheet features. At no point, none of the solutions thus created made it necessary to use a code developed in any programming language. The foregoing supports an argument that a solution such as the one proposed can be successfully deployed and extended by persons who are familiar with spreadsheets but who have no command of programming.

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