Metodološki zvezki, Vol. 14, No. 2, 2017, 49–74

Impact of Questionnaire Length and Complexity on Survey Time: Comparison of Two Business Web Questionnaire Versions

Berislav Žmuk[1]

Abstract

In case of web surveys, researchers struggle to achieve satisfactory response rates and to collect data of good quality. Those two problems could be mitigated by a thorough approach to the questionnaire design and by changing questionnaire elements that could have an impact on the questionnaire length and complexity levels. In the paper, the questionnaire length and complexity are quantified by observing survey times or the times that respondents need to complete the provided questionnaire. The questionnaire length and complexity levels have an impact on survey times and consequently on response rates. The aim of the paper is to investigate how different questionnaire lengths and complexity levels influence survey times. The selected questionnaire length and complexity determinants are observed using the case of two different questionnaire versions. Those questionnaire versions have been used in a business web survey of Croatian enterprises. The results have shown that on average the long questionnaire version is twice longer and 142% more complex than the short questionnaire version. However, due to the interaction effect of length and complexity determinants, the long questionnaire version has on average 119% higher questionnaire length and complexity level than the short questionnaire version. The analysis has shown that this increase of the questionnaire length and complexity had a different impact on enterprises with different characteristics. Furthermore, the increase of the questionnaire length and complexity level did not lead to a proportionate increase in survey time at the overall enterprises level.

1 Introduction

In survey research, a questionnaire has a role of the standardized instrument for collecting data (Trobia, 2008). A questionnaire is defined as any written instrument in which a certain number of standardized questions or statements is presented to respondents whose reactions and answers are collected (Horvat, 2011). The questionnaire length is defined as "the amount of time it takes a respondent to complete a questionnaire" (Hugick, Best, 2008). The length of a questionnaire is important from the aspects of response rates, survey costs, and data quality. Hugick and Best (2008) emphasize that longer questionnaires

[1] Department of Statistics, Faculty of Economics and Business, University of Zagreb, Zagreb, Croatia; bzmuk@net.efzg.hr

have lower response rates, higher costs and a diminished quality of response. However, those negative effects are becoming significantly present only after a certain questionnaire length and are present at all survey modes. However, depending on the observed survey mode the negative impacts can be differently described (Galešic, 2002). For example, it has been shown that an additional question in mail surveys reduces the response rate by 0.5% and each additional page by 5% (Heberlein, Baumgartner, 1978), whereas in face-to-face surveys 61% of all refusals are connected with the perceived survey duration (Burchell, Marsh, 1992).

The complexity level of a questionnaire depends on the questionnaire design characteristics. Questionnaire design is the process of shaping a questionnaire as a research instrument (Holyk, 2008). The questionnaire design process consists of certain steps out of which questionnaire formatting, question wording and response alternatives have the highest impact on questionnaire complexity. In relation to questionnaire formatting, the following issues should be considered: the cover and cover page, directions, ordering of questions, navigational path (branching) and page design (Fanning, 2005). The cover page should attract and motivate respondents to participate in the survey (Dillman, 2000). Directions are instructions to respondents on what they should do in each phase of the survey (Fanning, 2005). In order to enable respondents to follow the survey topic more easily, questions should be ordered in a logical sense (McFarland, 1981). Too many branches filter questions, loops and levels of nesting make a questionnaire more complex and could confuse respondents. Page design includes questionnaire pages and questions technical formatting, e.g. selecting text font, font size, position of text and similar. Researchers should ensure that respondents can read the questions easily and without additional effort. Complex question wording can result in unclear concepts, poorly worded questions and difficult or unclear response choices (Holyk, 2008). According to basic classification, responses can be open-ended and close-ended. Open-ended responses increase complexity of the questionnaire because they are cognitively more demanding for respondents than close-ended ones. However, in some cases, such as in case of grid questions with many difficult and/or sensitive items within a grid, close-ended question could be very complex also. The goal of a researcher should be to have a as simple as possible but, at the same time, well-formatted questionnaire (Bradburn, Sudman, Wansink, 2004). However, for example, in order to prevent cheating in principal-agent relationships, complex questionnaires are desirable (Glazer, Rubinstein, 2004).

The importance of observing the questionnaire length and complexity rises from the fact that these two elements have a great impact on survey response rates (Bogen, 1996, Galesic, Bosnjak, 2009, Fan, Yan, 2010, Rolstad, Adler, Ryden, 2011). In addition, it is known that response rates in general decline across all survey modes (Groves, 2004, Sivo et al., 2006, Shih, Fan, 2008). In order to improve response rates some actions such as sending reminder letters and incentives, reduction of survey burden, focused nonresponse follow-up and similar can be conducted (see Brennan, 1992, Christianson, Tortora, 1995, Edwards et al., 2002, Smith, Bost, 2007, Edwards et al., 2009, De Bruijne, Wijnant, 2014, Pedersen, Nielsen, 2016). However, each of those additional actions aimed at an increase in response rates requires certain amount of resources. Nevertheless, each of those actions additionally complicates the survey, making it more expensive and/or increasing the time needed to get survey answers. Still, some of those actions become vital parts of the survey process and without them conducting modern surveys could not be possible nowadays.

In addition to response rates, the questionnaire length and complexity have an impact on survey data quality also (Subar et al., 2001, Galesic, Bosnjak, 2009, Cape, 2010, Yan et al., 2010, Fricker et al., 2012). The longer the questionnaire is, the higher the presence of satisficing, fast respondents' answering without applying a cognitive thinking process is (Krosnick, 1991, Holbrook, Green, Krosnick, 2003, Heerwegh, Loosveldt, 2008, Fang, Wen, Prybutok, 2013). On the other hand, if a questionnaire is complex, some mistakes in guiding respondents through it could arise. Furthermore, if a questionnaire is very complex, respondents could become confused and misunderstand questions. In that case, they will not give the most appropriate answer and that leads to bad data quality (Otter, Mellenbergh, de Glopper, 1995, Knäuper et al., 1997, Groves, 2004, Ganassali, 2008, Alberini, 2012). Also, long and complex questionnaires tend to have higher dropout rates (Crawford, Couper, Lamias, 2001, Lozar Manfreda, Vehovar, 2002, Galesic, Bosnjak, 2009, Hoerger, 2010).

The aim of the paper is to investigate how different questionnaire lengths and complexity levels influence survey times. The focus will be given to observing those effects in the case of business web surveys, which are not so commonly investigated and represented in literature unlike web surveys in which respondents are not enterprises. The research hypothesis of the paper is that an increase of the questionnaire length and complexity level leads to a proportionate increase in survey time. If the research hypothesis could be accepted, it would mean that researchers could quite easily reach targeted survey time by adjusting the questionnaire length and complexity level. For example, if the questionnaire length and complexity level is decreased by 10%, the survey time should decrease also by the same percentage.

After a brief introduction, where the research problem and aims are presented, in the second section literature review of existing research about the questionnaire length and complexity determining and measuring is given. In the third section, the approach to analysis is explained and the background of data used in the analysis is given. In the fourth section, questionnaire length and complexity determinants are observed in the case of two different questionnaire versions that were used in a business web survey on the sample of Croatian enterprises. In the fifth section, average survey times for the two different questionnaire versions are compared. Furthermore, the differences between achieved average survey times and questionnaire length and complexity levels are compared for enterprises at an overall level and by taking into account certain specific characteristics. The final, sixth, section concludes the paper.

2 Literature Review

Experts at 1ka (2017b) define the questionnaire length as the time a respondent needs to complete the questionnaire. According to their practical experience from past surveys, experts at 1ka (2017b) make difference between very short questionnaires (less than two minutes), short questionnaires (two to five minutes), medium length questionnaires (five to 15 minutes), long questionnaires (15 to 30 minutes), and very long questionnaires (more than 30 minutes). Furthermore, according to experience from past surveys, experts at 1ka (2017a) concluded that the complexity of a questionnaire depends on the use of blocks, conditions, loops, and the levels of nesting. Accordingly, they have recognized

Table 1: Types of questions with different required levels of cognitive efforts

Easier questions	More difficult questions
One month recall	Three month recall
Unipolar scales	Bipolar scales
Shorter instructions	Longer instructions
Check all that apply	Yes/No grid
Rating	Ranking
Short list	Long list
Agree or Disagree	Pick one statement
Asking about now	Asking about the future

Source: Henning (2013)

five survey complexity levels: very simple, simple, structured, complex and very complex survey (1ka, 2017a). Experts at 1ka (2017a) emphasize that longer surveys are typically more structured and because of that more complex than shorter ones.

Henning (2013) wrote a report from CASRO webinar series (CASRO, 2014) in which Inna Burdein discussed her research on the questionnaire length and effort. According to Burdein a survey should be shorter than 20 minutes but at the same time she emphasizes that the number of tasks, the number of questions and the difficulty of the tasks determine the questionnaire length. Furthermore, she thinks that additional problems could arise if the perceived questionnaire length is different from the actual one. When the questionnaire length is considered, the experience of respondents should be also taken into account. Burdein observes the complexity of the questionnaire through different types of questions that require different levels of cognitive efforts. The examples of such questions are shown in Table 1. Similarly, the survey topic could also have an impact on the complexity level.

Brent (2011) used a random sample of about $100\,000$ web surveys that had questionnaires with one to 30 questions. In the analysis, the median time needed by respondents to complete the questionnaire was observed. It has been shown that with the increase of the number of questions, the average time spent per question is decreasing. For example, respondents have spent 75 seconds on average per questionnaire question to complete questionnaires with only one question, 40 seconds to complete questionnaires with two questions, 25 seconds to complete questionnaires with 11 to 15 questions and 19 seconds to complete questionnaires with 26 to 30 questions. Consequently, it could happen that respondents need more time to complete shorter questionnaires with a smaller number of questions than to complete a longer questionnaire with a larger number of questions. However, that could happen due to satisficing.

It is interesting that Galešic (2002) did not rank the length of the three observed questionnaires according to the total number of questions (ISPs questionnaire 28 questions, Net.Basics 19 and Net.Services 32) but according to the total number of open-ended questions (ISPs questionnaire 8 open-ended questions, Net.Basics 11 and Net.Services 16). Galešic (2002) has shown that the questionnaire length and the length of open-ended answers are positively related. Furthermore, a very small positive correlation was detected between the number of answered questions and the perception of the questionnaire

length. Galešic (2002) has also shown that the more interesting questionnaire topic was, the shorter the questionnaire was perceived to be by respondents.

Puleston (2012) emphasizes that in the research industry a common and reliable approach to questionnaire length estimation has not been developed yet. He does not recommend using the estimation that a respondent needs 24 seconds per question (2.5 questions per minute) because there are different questions. Because of that Puleston (2012) has come up with three new methods of estimating the questionnaire length. Those three methods are defined with following equations:

$$QL = [W/5 + 5 \cdot Q + 2 \cdot (D - Q) + 15 \cdot T] /60$$
$$QL = (W/5 + 1.8 \cdot R) /60$$
$$QL = W/150$$

where QL is the questionnaire length, W is the word count, Q is the number of questions, D is the total number of decisions respondents have to make, T is the number of open-ended questions, R is the total number of row options. Puleston (2012) thinks that those methods should estimate the questionnaire length well but the equations should be corrected by taking into account the fact that not all respondents can see all questions (filter questions) or some respondents have to deal with question loops, different questionnaire languages (the equations are estimated for questionnaires in English), the number of figures, presence of non-standard question formats and repetition of survey. Furthermore, the present equations are estimated for web surveys which are filled in by respondents on their personal computers.

Ganassali (2008) noticed that the general recommendation for the optimal questionnaire length is to have between 15 and 30 questions in self-administrated questionnaires. Apart from Ganassali (2008), who determines the questionnaire length based on the number of questions, others such as Couper, Traugott and Lamias (2001), Lozar Manfreda, Batagelj and Vehovar (2002), and Reips (2002) observe the questionnaire length as the number of questionnaire screens. However, the authors emphasized that the questionnaire length depends on respondents' perception also.

Deutskens et al. (2004) considered pictures in surveys and concluded that pictures could reduce but also increase the questionnaire complexity. Namely, pictures could enhance questionnaire attractiveness and improve instructions for respondents making it easier to complete it. On the other side, pictures could unnecessarily burden a questionnaire.

It is recommended to use as simple as possible grammar syntax to reduce the likelihood of misunderstanding (Molenaar, 1982, Foddy, 1993, Holbrook, Cho, Johnson, 2006). Some authors suggest that questions should not be longer than 20 words (Payne, 1951), whereas some authors suggest that a question sentence should not be longer than 16 (Brislin, 1986) or 20 words (Oppenheim, 1992). Smith (1995) has shown that respondents write longer answers at open-ended questions if they are provided with more space to write. Heerwegh and Loosveldt (2002) concluded that, at close-ended questions, drop-boxes seem to be more complex to respondents than radio-buttons. Lietz (2010) provided a detailed review of the questionnaire design literature and, among other things, emphasized the following questionnaire design elements that could have an impact on the questionnaire complexity: social desirability, double-barrelled questions, negatively

worded questions, adverbs of frequency, and the question order.

3 Data and Methods

In the paper, an impact of suggested determinants on the questionnaire length and complexity is going to be inspected. However, due to some restrictions and the fact that the analysis was based on data from the conducted business web survey, the impact of some questionnaire length and complexity determinants, such as experience of respondents, different question order and different vocabulary used in the same questions, could not be examined in detail.

For the analysis purposes, data from the business web survey conducted on a sample of Croatian enterprises in the period from October to December 2016 is used. Out of $37\,855$ enterprises invited by e-mail, 780 enterprises participated in the web survey. Accordingly, the response rate of 2.06% was achieved. The topic of the survey was the statistical methods use and the position of statistical methods in Croatian enterprises. The enterprises were stratified according to four criteria: based on their legal form into joint stock enterprises, limited liability enterprises or simple limited liability enterprises (Narodne novine, 2011); based on the size into small, medium and large enterprises (Narodne novine, 2015); based on the main activity into industrial, trade, service and other enterprises (Narodne novine, 2007); and based on the location of the headquarters into enterprises from Continental Croatia and enterprises from Adriatic Croatia (Eurostat, 2015).

For the survey purposes two questionnaire versions were developed, whereas each of them has a shorter and a longer version depending on the answer to the first, filter question. If an enterprise confirmed that statistical methods are used in its business, the enterprise had to fill in the longer questionnaire, which consists of 21 questions. On the other hand, the shorter questionnaire version with 11 questions was offered to enterprises which do not use statistical methods in their everyday business. Most questions in the questionnaires are close-ended and there are a couple of open-ended questions requiring respondents to provide brief information or put in a number.

The two main questionnaire versions differ in the number of included pictures. In the first questionnaire version no pictures were included, whereas in the second questionnaire version pictures are included. The number of included pictures is five in the longer questionnaire version, whereas only two pictures are presented to respondents in the shorter questionnaire version. The number of included pictures was kept low in order to avoid potential technical difficulties on the respondents' side.

In the first step, the most important questionnaire length and complexity determinants will be selected and observed using the mentioned questionnaire versions. In order to keep things straightforward and easy to use in the practice, individual effects of the selected determinants are going to be inspected by using the basic descriptive statistics approach. Mean survey times are going to be observed in different questionnaire versions and by taking into account different characteristics of enterprises also. Finally, the questionnaire length and complexity determinants values for the short and the long questionnaire version will be compared by using ratios. That way, it could be possible to estimate overall differences in the questionnaire length and complexity levels between the short and the long questionnaire version.

4 Determinants of the Questionnaire Length and Complexity in the Business Web Survey Questionnaire

The literature review has shown that there are many determinants which have an impact on the questionnaire length and its complexity. Unfortunately, not all can be observed in the case of the questionnaire that has been used in a business web survey in Croatian enterprises. Because of that the list of determinants has been shortened and only the most important ones have been selected. Another reason why a shortened list of determinants is going to be observed can be found in the fact that the aim is to bring some conclusions which could be used in practice easily and fast. The list of the observed questionnaire length and complexity determinants is given in Table 2.

Table 2: Selected and observed questionnaire length and complexity determinants

Questionnaire length	Questionnaire complexity
Number of questions	Number of filters (conditions)
Total questions length (words)	Number of pictures
Total questions length (characters)	The number of different types of questions that require different ways of answering
Number of open-ended questions	The different types of questions that require different levels of cognitive efforts
Total number of required tasks (decisions)	The number of given response options

The main determinant of the questionnaire length is, certainly, the number of included questions. The more questions there are in the questionnaire, the longer the questionnaire is and because of that respondents need more time to complete the questionnaire. The impact of the number of questions on the questionnaire length depends on the questions length. The length of questions could be measured by taking into account the number of words and the number of characters. If questions consist of more words, respondents need more time to read them and that has a positive impact on the questionnaire length. It has to be emphasized that when a question length is observed, words from instructions and additional explanations related to this question along with given response options should also be taken into account. Due to the fact that in a question, a word can be replaced with another one with similar or equal meaning but of a different length, measuring the questionnaire length by taking into account the number of characters is justified. The next questionnaire length determinant is the number of open-ended questions. Open-ended questions could have a significant impact on the questionnaire length. The size of this impact depends on respondents and their willingness to briefly or thoroughly share their thoughts and attitudes. The number of required tasks shows the number of actions needed to be conducted by respondents to completely answer a question. In some questions a respondent needs only to choose one answer (one task) whereas in some questions a respondent is asked to rank provided answers (more than one task). So, at some questions a respondent needs to make only one decision whereas in some questions he is asked to make more decisions. Not answering to the open-ended question does not count as a performed action, because a respondent does not spend any time answering a question

and therefore the impact on the questionnaire length is not present.

The questionnaire complexity shows the level of questionnaire difficulty for respondents to complete it. The number of filters or conditions could sometimes confuse respondents especially when a progress bar is attached to the web survey. Furthermore, observed from the researcher perspective, filters significantly increase the questionnaire complexity because the researcher should be careful to design the questionnaire so that all conditions are properly followed. Pictures that are included in the questionnaire add some complexity to the questionnaire as well. Respondents could be distracted by pictures and their answers could be influenced by provided pictures. Because of that researchers should be very careful when they choose pictures and think well about their role and position in the questionnaire. In addition, some respondents could have some technical difficulties to view pictures or other multimedia items in an appropriate way. If all questions are of the same type, respondents quickly get used to the questions and can easily give their answers. However, in case of different types of questions, respondents have to stop for a moment and think about the technical way of answering the questions. Obviously, the presence of many different types of questions, which require different ways of answering, can have a significant impact on the questionnaire complexity. Not only different types of questions, which require different ways of answering, have an impact on the questionnaire complexity but the impact is present if questions require a different level of cognitive efforts also. Different cognitive efforts can be recognized if respondents are asked about something in the near past or about something that requires respondents to recall something that happened a very long time ago. Similarly, different cognitive efforts are required by respondents in case of questions about their everyday life or in case when their professional thinking and attitude about a serious topic is required. Finally, the number of given response options could have an impact on the questionnaire complexity level. This impact is especially present when given response options have a very similar meaning making it hard for respondents to choose the most appropriate answer. Such a situation is not uncommon in case of questions with the Likert scale with more than five response options.

The selected questionnaire lengths determinants were first inspected using the case of the observed questionnaire, which was used in the business web survey, and afterwards the questionnaire complexity determinants were inspected. In Table 3 the values of the questionnaire length determinants separately for each question are shown.

In the observed questionnaire, questions have been placed in logical groups to make respondents' answering process more intuitive. In Table 3 the distribution of questions according to groups is presented. The questions with the same starting letter are placed in the same group. Furthermore, depending on their answer to the first questions, respondents were provided with different questions. Consequently, the difference between the longer questionnaire version, more questions, and the short questionnaire version, less questions, can be made. However, both, long and short, questionnaire versions had some common, demographic, questions. All questions, except the last two, were set to be obligatory.

According to Table 3 the longest questions are questions F1 (words = 83, characters = 613) and A2 (words = 78, characters = 676). The question F1 is so long because it includes additional explanations whereas the question A2 is long because it includes 13 items that should be rated by respondents. On the other hand, the shortest are questions

Table 3: The values of questionnaire length determinants of the observed questionnaire

Question	Questionnaire version	Question length (words)	Question length (characters)	Open-ended question[a]	Number of required tasks
F1	Both	83	613	No	1
A1	Long	13	93	Yes	1
A2	Long	78	676	No	13
A3	Long	28	180	Yes/No	1 to 2
A4	Long	31	235	No	1
A5	Long	17	124	No	1
A6	Long	26	217	Yes/No	1 to 5
B1	Long	55	465	No	6
B2	Long	50	395	No	6
B3	Long	36	242	No	1
B4	Long	22	166	Yes	1
B5	Long	30	220	Yes/No	1 to 2
B6	Long	44	328	No	1
C1	Long	20	155	Yes	1
C2	Long	26	199	Yes	1
D1	Short	61	483	No	7
D2	Short	35	259	Yes	1
D3	Short	37	272	Yes	1
D4	Short	48	351	Yes	1
E1	Both	16	105	No	1
E2	Both	5	23	No	1
E3	Both	7	49	Yes	1
E4	Both	33	227	No	1
E5	Both	22	147	Yes	2
E6	Both	31	181	Yes	1

[a] If a question is open-ended then the value is set to "Yes", and if a question is close-ended the value is set to "No". If a question is a close-ended one but respondents have an option to make additional comments the value is set to "Yes/No".

E2 (words = 5, characters = 23) and E3 (words = 7, characters = 49) from the demographic questions group. In the questionnaire, out of all 25 questions, 10 are open-ended and 12 are close-ended questions. Depending on the respondent's answer, the remaining three questions could be either open-ended or close-ended questions. In most cases, questions required conducting just one task, i.e. either selecting just one answer per question or providing an answer to an open-ended question.

Table 4: Basic descriptive statistics values of questionnaire length determinants for the short and the long questionnaire version

	Questionnaire version	
Statistics	Short	Long
Number of questions	11	21
Questions length (words)		
Total	378	673
Average	34	32
Standard deviation	22	20
Coefficient of variation	64	62
Questions length (characters)		
Total	2710	5040
Average	246	240
Standard deviation	172	166
Coefficient of variation	70	69
Number of open-ended questions	6	7 + 3
Number of required tasks	18	44 to 50
Average number of required tasks per question	1.64	2.09 to 2.38

Table 4 presents basic descriptive statistics of the questionnaire length determinants for the short and the long questionnaire version. Regardless of the different number of questions in the short and the long questionnaire version, the average questions length seems to be very similar when the question length is measured by taking into account words (short = 34, long = 32) or characters (short = 246, long = 240). However, the longer questionnaire version has more open-ended questions (seven questions are definitely open-ended questions whereas three questions could become open-ended in dependence on the provided answer) than the shorter questionnaire version (six open-ended questions). Furthermore, the long questionnaire version requires more than twice tasks than the shorter questionnaire version. Consequently, the average number of required tasks per question is higher at the longer questionnaire version (short = 1.64, long = 2.09 to 2.38).

In the questionnaire that was used in the business web survey only the first question was the filter question. Accordingly, it is assumed that in this case filter questions should not have any impact on the questionnaire complexity increase. According to Table 5, overall seven pictures are inserted in the questionnaire. However, in reality there are only five different pictures. Namely, pictures at questions C1 and C2 are the same as at questions D2 and D3. Respondents are not going to see any picture twice because

Table 5: The values of questionnaire complexity determinants of the observed questionnaire

Question	Questionnaire version	Picture	Question type	Cognitive effort level[a]	Number of given response options
F1	Both	No	Single answer	Simple	4
A1	Long	No	Numeric input open-ended	Intermediate	0
A2	Long	No	Single answer classic table	Very complex	7
A3	Long	No	Single answer / Text input open-ended	Complex	2
A4	Long	No	Single answer	Intermediate	3
A5	Long	Yes	Single answer	Simple	3
A6	Long	No	Multiple answer / Text input open-ended	Intermediate	4
B1	Long	No	Single answer classic table	Intermediate	2
B2	Long	No	Single answer classic table	Intermediate	2
B3	Long	Yes	Single answer	Complex	5
B4	Long	No	Numeric input open-ended	Complex	0
B5	Long	No	Single answer / Text input open-ended	Intermediate	2
B6	Long	Yes	Single answer	Complex	2
C1	Long	Yes	Numeric input open-ended	Complex	0
C2	Long	Yes	Numeric input open-ended	Complex	0
D1	Short	No	Single answer classic table	Intermediate	2
D2	Short	Yes	Text input open-ended	Complex	0
D3	Short	Yes	Text input open-ended	Complex	0
D4	Short	No	Text input open-ended	Complex	0
E1	Both	No	Single answer	Simple	5
E2	Both	No	Single answer	Very simple	2
E3	Both	No	Numeric input open-ended	Simple	0
E4	Both	No	Single answer	Simple	5
E5	Both	No	Text input open-ended	Intermediate	0
E6	Both	No	Text input open-ended	Simple	0

[a] The following characteristics of a question increase its cognitive effort level: open-ended question, close-ended question with more than four items, question longer than 30 words, referring to an event which happened more than 30 days ago, expert knowledge needed to answer the question.

questions C1 and C2 are given to the respondents who confirmed that they use statistical methods whereas questions D2 and D3 are given to respondents who do not use statistical methods.

The questionnaire included six different types of questions that require different way of answering. There are single answer questions (a respondent selects just one provided answer), numeric input open-ended questions (a respondent has to give just a numeric answer), combination of single answer and text input open-ended questions (a respondent selects just one provided answer but at some provided answers the respondent can give additional textual comments), a combination of multiple answer and text input open-ended questions (a respondent can select one or more provided answers and give additional textual comments), single answer classic table questions (a respondent selects just one provided answer for each given item), and text input open-ended questions (a respondent has to give a textual answer).

In the paper, for different types of questions five cognitive effort levels are developed: very simple, simple, intermediate, complex, and very complex. The cognitive effort levels of questions are determined by using different criteria. The cognitive effort level is increased by one level if the question is open-ended or it offers an option to become open-ended. In case of close-ended questions, the cognitive effort level is increased by one level if more than four alternatives are provided. If the question is longer than 30 words, the cognitive effort level is increased by one level. The cognitive effort level is also increased by one level if the question refers to an event that happened more than 30 days ago. Finally, the cognitive effort level is increased if expert knowledge is needed to be capable to answer the question. The results from Table 5 show that when these criteria are applied one very simple question, six simple questions, eight intermediate questions, nine complex questions, and one very complex question can be found in the questionnaire.

In order to answer a survey question, a respondent has to carry out many different cognitive tasks such as question comprehension, information retrieval, judgment, response formatting and editing (Tourangeau, Rips, Rasinski, 2000). In the process of the questionnaire design the aim was to maximally reduce cognitive effort of respondents and consequently questions were made as simple as possible. In order to reduce the cognitive burden, the attention was paid to the following text features: low-frequency words, vague or imprecise relative terms, vague or ambiguous noun phrases, complex syntax, working memory overload, low syntactic redundancy, bridging inferences (Lenzner, Kaczmirek, Lenzner, 2010). However, it is impossible to make all questions with the same required cognitive effort level.

The number of given response options per each question in the questionnaire is given in the last column of Table 5. In case of open-ended questions, the number of given response options was set to zero. It has to be emphasized that when questions given in the form of a single answer classic table are observed, the number of different choices, no matter the number of items, was observed. In the observed questionnaire, 50 response options were given in total.

In Table 6, questionnaire complexity determinants values for the short and the long questionnaire version have been summed up. From the distributions of different types of questions that require different ways of answering and of different types of questions that require different levels of cognitive efforts it can be easily concluded that the longer questionnaire version is more complex than the short one. Additionally, a proof of that

Table 6: Basic descriptive statistics values of questionnaire complexity determinants for the short and the long questionnaire version

	Questionnaire version	
Statistics	Short	Long
Number of questions	11	21
Number of pictures	2	5
The number of different types of questions that require different ways of answering		
Single answer questions	4	8
Numeric input open-ended questions	1	5
Single answer / Text input open-ended questions	0	2
Multiple answer / Text input open-ended questions	0	1
Single answer classic table questions	1	3
Text input open-ended questions	5	2
The different types of questions that require different levels of cognitive efforts		
Very simple question	1	1
Simple question	5	6
Intermediate question	2	7
Complex question	3	6
Very complex question	0	1
The number of given response options	18	48
Average number of given response options per close-ended question	3.60	3.43

can be found in the fact that respondents have more than twice given response options at the longer questionnaire version than at the short questionnaire version. However, the average number of given response options per close-ended question seems to be quite similar at both questionnaire versions.

5 Comparison of Business Web Survey Questionnaire Versions Length and Complexity

In the previous sections, determinants of the questionnaire length and complexity have been introduced and measured using the two different observed questionnaire versions. In this chapter, the achieved questionnaire length and complexity levels will be compared between the two questionnaire versions by taking into account the survey time. The survey times for all enterprises in the sample are presented in Table 7, whereas survey times for different questionnaire versions (without and with pictures) are given in Appendix as Tables 9 and 10.

Due to technical problems and limitations, the survey software has not measured survey times for 137 enterprises that completed the questionnaire. Furthermore, 15 enterprises needed more than one hour to complete the questionnaire. Obviously, the respondents have been interrupted, for example, by other employees, telephone calls or e-mails. Because of that those 15 enterprises are considered to be outliers and have also been omitted from the analysis. Consequently, Table 7 provides survey times for overall 628 enterprises.

As it was earlier mentioned, a distinction between the short and the long questionnaire version can be made. In case of the short questionnaire version, the average survey time was 239 seconds (almost 4 minutes) whereas the long questionnaire version had the average survey time of 456 seconds (about 7.5 minutes). Accordingly, it can be concluded that the long questionnaire version is about 91% longer and more complex than the short questionnaire version. The difference between the observed questionnaire versions was expected but it was not expected that the average survey times at both questionnaire versions would be so low. However, standard deviations values, which are almost the same to the average survey time, reveal that survey times among respondents differed very much. Consequently, it can be concluded that survey duration and complexity is very hard to measure exactly. The results show that the survey duration and the complexity level depend on each respondent individually and on his different characteristics.

If enterprises are observed according to their main characteristics, it can be concluded that the lowest average survey time in case of the short questionnaire version was achieved in medium sized enterprises (170 seconds) whereas in case of the long questionnaire version the lowest average survey time was reached in large enterprises (145 seconds). On the other hand, the longest average survey times were achieved in trade enterprises for the short questionnaire version (254 seconds) and in joint stock enterprises for the long questionnaire version (920 seconds). Nevertheless, in all the observed cases of different characteristics of enterprises it has been shown that the average survey times are very similar to their standard deviations. This fact confirms that the precise estimation of the questionnaire length and complexity, without including many different variables that de-

Table 7: Mean survey times observed in relation to different questionnaire versions and characteristics of enterprises - all respondents, in seconds

Characteristics of enterprises	Short questionnaire version			Long questionnaire version			Mean time long/short ratio
	Sample size	Mean time	Standard deviation	Sample size	Mean time	Standard deviation	
Overall	376	239.06	255.81	252	456.05	443.34	1.91
Legal form							
Joint stock	5	233.00	148.17	9	920.33	1054.71	3.95
Limited liability	346	242.53	263.37	236	439.68	403.60	1.81
Simple limited liability	25	192.28	138.73	7	411.14	150.97	2.14
Size							
Small	369	240.37	257.74	235	448.60	401.05	1.87
Medium	7	169.71	100.05	10	848.90	1016.59	5.00
Large	–	–	–	7	144.86	164.40	–
Main activity							
Industrial	106	248.08	290.43	74	480.28	487.35	1.94
Trade	75	254.03	212.55	55	510.55	595.92	2.01
Service	181	231.75	257.19	111	418.23	315.33	1.80
Other	14	185.07	165.97	12	406.67	367.68	2.20
Headquarters place							
Continental Croatia	237	249.17	290.99	168	448.92	427.13	1.80
Adriatic Croatia	139	221.82	180.39	84	470.32	476.44	2.12

Note: 91 short and 46 long completed questionnaires have been omitted from the analysis because the survey time was equal to 0 seconds. Furthermore, 9 short and 6 long completed questionnaires have been omitted from the analysis because respondents needed too much time to complete the questionnaire (more than 3600 seconds or 1 hour).

scribe respondents in more detail, is hard to make. Unfortunately, the problem is that it is almost impossible to get all characteristics of respondents that determine the questionnaire length and complexity level for each respondent individually. Because of that the questionnaire length and complexity will be observed and discussed using the comparison between the short and the long questionnaire version. Table 8 provides and summarizes the main questionnaire length and complexity determinants for both questionnaire versions and their ratios.

If questionnaire length determinants are observed, it can be concluded that the number of required tasks has the highest impact on the questionnaire length. To be precise in the long questionnaire version on average 178% more tasks are required than at the short questionnaire version. On the opposite side, the number of open-ended questions here seems to have on average the lowest impact on the questionnaire length. In addition to the fact that the number of open-ended questions in both questionnaire versions is small and almost the same, two additional facts should be mentioned. Almost all open-ended questions in both questionnaire versions required providing only a number or a short answer consisting of one or two words. Furthermore, when it comes to open-ended questions where enterprises could provide longer answers by giving their comments and opinions, they provided rather short answers or they did not write anything. According to Table 8 when all the observed length determinants are taken together into account, the long questionnaire version is on average exactly twice longer than the short questionnaire version. In case of complexity determinants, on average, intermediate questions have the highest impact on the complexity level, comparing the long and the short questionnaire version (+250%), whereas simple questions (+17%) have the lowest impact. The difference in the number of complex questions leads to an increase of 133% in length and complexity in case of the long questionnaire version in comparison to the short one. According to given ratios from Table 8, it can be concluded that the long questionnaire version is on average 142% more complex than the short questionnaire version. By taking into account the questionnaire length and complexity determinants together, it can be concluded that the long questionnaire version is on average 119% longer and more complex than the short questionnaire version.

In the paper it has been assumed that an increase of the questionnaire length and complexity should lead to a proportionate increase in survey time. However, the analysis results have shown that the relationship between the questionnaire length and complexity and survey time is more complex. Namely, when all enterprises overall are observed, the increase of the questionnaire length and complexity, from the short to the long questionnaire version, by 119% has resulted in the survey time increase of 91%. Consequently, the research hypothesis can be rejected on the overall enterprises level.

Still, the research hypothesis can be accepted for some kinds of enterprises such as simple limited liability enterprises, other activity enterprises and enterprises from Adriatic Croatia. At other observed kinds of enterprises, the differences between the theoretical average questionnaire length and complexity determinants ratio (2.19) and the actual mean time long/short ratio (last column in Table 8) are too high to say that they are quite similar. Consequently, this situation makes researchers' task to find the most appropriate questionnaire length and complexity level more difficult. In case of the proportional relationship presence between the questionnaire length and complexity level and the survey time, researchers could easily correct the questionnaire length and complexity level to aim

Table 8: Main questionnaire length and complexity determinants for the short and the long questionnaire versions with their ratios

Statistics	Questionnaire version		Long/short ratio
	Short	Long	
Length determinants			
Number of questions	11	21	1.91
Total questions length - words	378	673	1.78
Total questions length - characters	2710	5040	1.86
Number of open-ended questions	6	10	1.67
Number of required tasks	18	50	2.78
Complexity determinants			
Number of pictures[a]	2	5	2.50
The number of given response options	18	48	2.67
Simple questions[b]	6	7	1.17
Intermediate questions	2	7	3.50
Complex questions[b]	3	7	2.33
Average questionnaire length determinants ratio			2.00
Average questionnaire complexity determinants ratio			2.42
Average questionnaire length and complexity determinants ratio			2.19

[a] Because questionnaires with and without pictures are observed in the analysis, this criterion was omitted from the average complexity determinants ratio and the average length and complexity determinants ratio calculations.

[b] Very simple questions are merged to the simple questions category whereas very complex questions are placed into the complex questions category.

for certain survey time.

However, there are some shortcomings of the analysis which should be additionally discussed. The main problem is that all questionnaire length and complexity determinants have the same importance and weight. For example, that would mean that an additional simple question would have the same effect on the questionnaire complexity level as an additional complex question as well. Therefore, to each questionnaire length and complexity determinant a certain weight should be joined as Puleston (2012) did. But Puleston (2012) observed many different questionnaires to provide just rough estimates. Here only two questionnaire versions are observed on a quite small sample size. In order to get the precise weight of each observed questionnaire length and complexity determinant many more questionnaires should be observed. Furthermore, different characteristics of respondents in enterprises and of enterprises should be taken into account also.

6 Conclusions

In order to achieve expected survey times, researchers have to optimize the questionnaire length and complexity level. Because survey times and response rates are connected together, it is important to take care and aim for certain survey time. There are many different questionnaire length and complexity level determinants that have an influence on survey times. Because of that in the paper, only the selected determinants, which are graded as the most important ones, are observed.

The selected questionnaire length and complexity level determinants are shown using two questionnaire versions. The questionnaire versions were used in the business web survey in which Croatian enterprises were asked about statistical methods use in their business. Those two questionnaire versions were of different length and complexity level. The analysis has shown that the long questionnaire version is on average 100% longer and 142% more complex than the short questionnaire version. If questionnaire length and complexity determinants are observed together, it can be concluded that the long questionnaire version has 119% higher questionnaire length and complexity level than the short one. Despite those differences, the enterprises overall needed 91% more time to complete the long questionnaire than the short one. Accordingly, the research hypothesis that an increase of the questionnaire length and complexity level leads to a proportionate increase in survey time, can be rejected. The results suggest that researchers cannot just count on the fact that if they decrease the questionnaire length and complexity level by 10% that the survey time will be decreased by the same percentage. In spite the general conclusion, at some kinds of enterprises an increase of the questionnaire length and complexity level leads to a proportionate increase in survey time. That means that respondents' characteristics also have a certain influence on the impact of the questionnaire length and complexity level on survey times. That part is neglected in this paper, but in the future studies the characteristics of respondents such as their education level, survey participation experience and computer skills should be taken into account.

There are some shortcomings of the analysis which should be emphasized. In the analysis it is assumed that each observed length and complexity determinant has the same weight. According to that, for example, determinants such as the number of pictures and the number of given response options should have the same effect on the questionnaire

complexity level. However, that may not be true. In addition, this problem of equal weights is expressed when effects of length and complexity determinants are averaged, also. This problem arises from the fact that only two questionnaire versions are used and compared in this study. In the future research the relationship between the questionnaire length and complexity level and survey time should be observed using more questionnaire versions. Also, those questionnaire versions should be able to provide information about an individual effect of each observed questionnaire length and complexity determinant. In that way, a quite precise function between the questionnaire length and complexity level and survey time could be easily estimated. In the process of the function estimating the interaction effect between the questionnaire length and the complexity level should be also taken into account. Afterwards, by using the estimated function, researchers could easily aim for certain survey time which would lead to expected response time.

Acknowledgement

This work has been fully supported by the Croatian Science Foundation within the project STRENGTHS (project no. 9402).

References

[1] 1ka (2017a): Osnovna priporočila: Kaj pomeni kompleksnost ankete? Retrieved from http://bit.ly/2mAB3xc (17 May 2017).

[2] 1ka (2017b): Osnovna priporočila: Kako dolga naj bo moja anketa? Retrieved from http://bit.ly/2EE8plm (17 May 2017).

[3] Alberini, A. (2012): Repeated questioning in choice experiments: Are we improving statistical efficiency or getting respondents confused? *Journal of Environmental Economics and Policy*, **1**(2), 216–233.

[4] Bogen, K. (1996): The effect of questionnaire length on response rates: A review of the literature. Retrieved from http://bit.ly/2mzv8IU (13 January 2018).

[5] Bradburn, N., Sudman, S. and Wansink, B. (2004): *Asking questions: The definitive guide to questionnaire design*. San Francisco: Jossey-Bass.

[6] Brennan, M. (1992): Techniques for improving mail survey response rates. *Marketing Bulletin*, **3**, 24–37.

[7] Brent, C. (2011): How much time are respondents willing to spend on your survey? Retrieved from http://bit.ly/2mzu9s1 (18 May 2017).

[8] Brislin, R.W. (1986): The wording and translation of research instruments. In W. J. Lonner and J. W. Berry (Eds): *Field Methods in Cross-Cultural Research*, 137–164. Newbury Park: Sage.

[9] Burchell, B. and Marsh, C. (1992): The effect of questionnaire length on survey response. *Quality and Quantity*, **26**(3), 233–244.

[10] Cape, P. (2010): How Questionnaire Length Drives Respondent Fatigue. Retrieved from http://bit.ly/2D7rIap (16 May 2017).

[11] CASRO (2014): CASRO Journal 2014. Retrieved from http://bit.ly/2ECdKJS (17 October 2017).

[12] Christianson, A. and Tortora, R. D. (1995): Issues in surveying businesses: An international survey. In B. G. Cox, D. A. Binder, B. N. Chinnappa et al. (Eds): *Business Survey Methods*, 235–256. New York: John Wiley & Sons.

[13] Couper, M.P., Traugott, M. W. and Lamias, M.J. (2001): Web survey design and administration. *Public Opinion Quarterly*, **65**(2), 230–253.

[14] Crawford, S., Couper, M. P. and Lamias, M. (2001): Web surveys: Perceptions of burden. *Social Science Computer Review*, **19**(2), 146–162.

[15] De Bruijne, M. and Wijnant, A. (2014): Improving response rates and questionnaire design for mobile Web surveys. *Public Opinion Quarterly*, **7**8(4), 951–962.

[16] Deutskens, E., de Ruyter, K.,Wetzels, M. and Oosterveld, P. (2004): Response rate and response quality of internet-based surveys: An experimental study. *Marketing Letters*, **15**(1), 21–36.

[17] Dillman, D. (2000): *Constructing the questionnaire. Mail and internet surveys*. New York: John Wiley & Sons.

[18] Edwards, P. J., Roberts, I., Clarke, M., DiGuiseppi, C., Pratap, S., Wentz, R. and Kwan, I. (2002): Increasing response rates to postal questionnaires: Systematic review. *British Medical Journal*, **324**, 1–9.

[19] Edwards, P. J., Roberts, I., Clarke, M. J. et al. (2009): Methods to increase response to postal and electronic questionnaires. *Cochrane Database of Systematic Reviews*, **3**.

[20] Eurostat (2015): *Regions in the European Union: Nomenclature of territorial units for statistics NUTS 2013/EU-28*. Luxembourg: Publications Office of the European Union.

[21] Fan, W. and Yan, Z. (2010): Factors affecting response rates of the web survey: A systematic review. *Computers in Human Behaviour*, **26**(2), 132–139.

[22] Fang, J., Wen, C. and Prybutok, V. (2013): Equivalence of internet and paper-based surveys in IT/IS adoption research in collectivistic cultures: The impact of satisficing. *Behaviour & Information Technology*, **32**(5), 480–490.

[23] Fanning, E. (2005): Formatting a paper-based survey questionnaire: Best practices. *Practical Assessment Research & Evaluation*, **10**(12), 1–14.

[24] Foddy, W. (1993): *Constructing questions for interviews and questionnaires*. Cambridge: University Press.

[25] Fricker, S., Creech, B., Davis, J., Gonzalez, J., Tan, L. and To, N. (2012): Does Length Really Matter? Exploring the Effects of a Shorter Interview on Data Quality, Nonresponse, and Respondent Burden. Retrieved from http://bit.ly/2myOPAy (16 May 2017).

[26] Galešic, M. (2002): Effects of questionnaire length on response rates: Review of findings and guidelines for future research. Retrieved from http://bit.ly/2mu230n (18 May 2017).

[27] Galesic, M. and Bosnjak, M. (2009): Effects of questionnaire length on participation and indicators of response quality in a Web survey. *Public Opinion Quarterly*, **73**(2), 349–360.

[28] Ganassali, S. (2008): The influence of the design of Web survey questionnaires on the quality of responses. *Survey Research Methods*, **2**(1), 21–32.

[29] Glazer, J. and Rubinstein, A. (2004): Complex questionnaires. *Econometrica*, **82**(4), 1529–1541.

[30] Groves, R. M. (2004): *Survey Errors and Survey Costs*. Hoboken: John Wiley & Sons.

[31] Heberlein, T. and Baumgartner, R. (1978): Factors affecting response rates to mailed questionnaires: A quantitative analysis of the published literature. *American Sociological Review*, **43**(4), 447–462.

[32] Heerwegh, D. and Loosveldt, G. (2002): An evaluation of the effect of response formats on data quality in Web surveys. *Social Science Computer Review*, **20**(4), 471–485.

[33] Heerwegh, D. and Loosveldt, G. (2008): Face-to-face versus Web surveying in a high-internet-coverage population: Differences in response quality. *Public Opinion Quarterly*, **72**(5), 836–846.

[34] Henning, J. (2013): Is the ideal survey length 20 minutes?. Retrieved from http://bit.ly/2FBjhSn (17 May 2017).

[35] Hoerger, M. (2010): Participant dropout as a function of survey length in internet-mediated university studies: Implications for study design and voluntary participation in psychological research. *Cyberpsychology, Behavior, and Social Networking*, **13**(6), 697–700.

[36] Holbrook, A., Cho, Y. I. and Johnson, T. (2006): The impact of question and respondent characteristics on comprehension and mapping difficulties. *Public Opinion Quarterly*, **70**(4), 565–595.

[37] Holbrook, A. L., Green, M. C. and Krosnick, J. A. (2003): Telephone versus face-to-face interviewing of national probability samples with long questionnaires: Comparisons of respondent satisficing and social desirability response bias. *Public Opinion Quarterly*, **67**(1), 79–125.

[38] Holyk, G.G. (2008): Questionnaire Design. In P. J. Lavrakas (Ed): *Encyclopedia of Survey Research Methods*, 656–659. Thousand Oaks: SAGE.

[39] Horvat, J. (2011): Questionnaire. In M. Lovric (Ed): *International Encyclopedia of Statistical Science*, 1154–1156. Heidelberg: Springer.

[40] Hugick, L. and Best, J. (2008): Questionnaire Length. In P. J. Lavrakas (Ed): *Encyclopedia of Survey Research Methods*, 659-660. Thousand Oaks: SAGE Publications.

[41] Knäuper, B., Belli, R. F., Hill, D. H. and Herzog, A. R. (1997): Question difficulty and respondents' cognitive ability: The effect on data quality. *Journal of Official Statistics*, **13**(2), 181–199.

[42] Krosnick, J.A. (1991): Response strategies for coping with the cognitive demands of attitude measures in surveys. *Applied Cognitive Psychology*, **5**(3), 213–236.

[43] Lenzner, T., Kaczmirek, L. and Lenzner, A. (2010): Cognitive burden of survey questions and response times: A psycholinguistic experiment. *Applied Cognitive Psychology*, **24**(7), 1003–1020.

[44] Lietz, P. (2010): Research into questionnaire design: A summary of the literature. *International Journal of Market Research*, **52**(2), 249–272.

[45] Lozar Manfreda, K. and Vehovar, V. (2002): Survey design features influencing response rates in Web survey. Retrieved from http://bit.ly/2Db1Quj (17 May 2017).

[46] Lozar Manfreda, K., Batagelj, Z. and Vehovar, V. (2002): Design of Web survey questionnaires: Three basic experiments. *Journal of Computer Mediated Communication*, **7**(3), 0.

[47] McFarland, S.G. (1981): Effects of question order on survey responses. *Public Opinion Quarterly*, **45**(2), 208–215.

[48] Molenaar, N.J. (1982): Response-effects of formal characteristics of questions. In W. Dijkstra and J. Van der Zouwen (Eds): *Response behaviour in the survey-interview*, 49–89. London: Academic Press.

[49] Narodne novine (2007): The National Classification of Economic Activities. *Official Gazette*, **16**(58).

[50] Narodne novine (2011): The Enterprises Act. *Official Gazette*, **20**(152).

[51] Narodne novine (2015): The Accounting Act. *Official Gazette*, **24**(78).

[52] Oppenheim, A. N. (1992): *Questionnaire Design, Interviewing and Attitude Measurement*. London: Pinter.

[53] Otter, M. E., Mellenbergh, G. J. and de Glopper, K. (1995): The relation between information-processing variables and test-retest stability for questionnaire items. *Journal of Educational Measurement*, **32**(2), 199–216.

[54] Payne, S. (1951): *The Art of Asking Questions*. New Jersey: Princeton University.

[55] Pedersen, M. J. and Nielsen, C. V. (2016): Improving survey response rates in online panels: Effects of low-cost incentives and cost-free text appeal interventions. *Social Science Computer Review*, **34**(2), 229–243.

[56] Puleston, J. (2012): How to calculate the length of a survey. Retrieved from http://bit.ly/2Dbx6cw (19 May 2017).

[57] Reips, U. D. (2002): Context effects in Web surveys. In B. Batinic, U. D. Reips and M. Bosnjak (Eds): *Online Social Sciences*, 69–80. Cambridge: Hogrefe & Huber Publishers.

[58] Rolstad, S., Adler, J. and Ryden, A. (2011): Response burden and questionnaire length: Is shorter better? A review and meta-analysis. *Value in Health*, **14**(8), 1101–1108.

[59] Shih, T. H. and Fan, X. (2008): Comparing response rates from Web and mail surveys: A meta-analysis. *Field Methods*, **20**(3), 249–271.

[60] Sivo, S. A., Saunders, C., Chang, Q. and Jiang, J. J. (2006): How low should you go? Low response rates and the validity of inference in IS questionnaire research. *Journal of the Association for Information Systems*, **7**(6), 351–414.

[61] Smith, S. C. and Bost, L. W. (2007): Collecting post-school outcome data: Strategies for increasing response rates. Retrieved from http://bit.ly/2mzvS0q (16 May 2017).

[62] Smith, T. W. (1995): Little things matter: A sampler of how differences in questionnaire format can affect survey responses. Retrieved from http://bit.ly/2EDIlH5 (19 May 2017).

[63] Subar, A. F., Ziegler, R. G., Thompson, F. E. et al. (2001): Is shorter always better? Relative importance of questionnaire length and cognitive ease on response rates and data quality for two dietary questionnaires. *American Journal of Epidemiology*, **153**(4), 404–409.

[64] Tourangeau, R., Rips, L. J. and Rasinski, K. (2000): *The Psychology of Survey Response*. Cambridge: University Press.

[65] Trobia, A. (2008): Questionnaire. In P. J. Lavrakas (Ed): *Encyclopedia of Survey Research Methods*, 652–655. Thousand Oaks: SAGE.

[66] Yan, T., Conrad, F. G., Tourangeau, R. and Couper, M. P. (2010): Should I stay or should I go: The effects of progress feedback, promised task duration, and length of questionnaire on completing web surveys. *International Journal of Public Opinion Research*, **23**(2), 131–147.

A Appendix

Table 9: Mean survey times observed by different questionnaire versions and characteristics of enterprises - respondents who got the questionnaire without pictures, in seconds

Characteristics of enterprises	Short questionnaire version			Long questionnaire version		
	Sample size	Mean time	Standard deviation	Sample size	Mean time	Standard deviation
Overall	121	243.38	305.53	102	412.07	407.59
Legal form						
Joint stock	4	284.75	106.85	1	146.00	–
Limited liability	109	245.86	319.15	99	416.18	412.55
Simple limited liability	8	188.88	139.09	2	341.50	132.23
Size						
Small	117	245.68	309.82	96	428.71	412.43
Medium	4	176.25	126.90	2	328.00	257.39
Large	–	–	–	4	54.75	23.92
Main activity						
Industrial	33	219.82	239.97	27	385.56	278.82
Trade	19	209.32	105.99	24	482.87	613.76
Service	65	267.60	375.41	44	388.89	335.92
Other	4	206.00	132.76	7	417.29	423.96
Headquarters place						
Continental Croatia	69	261.32	358.71	70	402.19	404.28
Adriatic Croatia	52	219.58	216.95	32	433.69	420.44

Table 10: Mean survey times observed by different questionnaire versions and characteristics of enterprises - respondents who got the questionnaire with pictures, in seconds

Characteristics of enterprises	Short questionnaire version			Long questionnaire version		
	Sample size	Mean time	Standard deviation	Sample size	Mean time	Standard deviation
Overall	255	237.01	229.13	150	485.96	465.04
Legal form						
Joint stock	1	26.00	–	8	1017.13	1083.96
Limited liability	237	240.99	234.06	137	456.66	397.67
Simple limited liability	17	193.88	142.82	5	439.00	162.55
Size						
Small	252	237.91	230.24	139	462.35	393.91
Medium	3	161.00	75.35	8	979.12	1105.60
Large	–	–	–	3	265.00	205.76
Main activity						
Industrial	73	260.86	311.27	47	534.70	569.81
Trade	56	269.20	237.03	31	531.97	591.04
Service	116	211.66	154.80	67	437.51	302.07
Other	10	176.70	183.42	5	391.80	318.89
Headquarters place						
Continental Croatia	168	244.18	259.20	98	482.30	441.74
Adriatic Croatia	87	223.16	155.89	52	492.87	510.50