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## Journal of Librarianship and Information Science

### The perceived value of library services is stationary in the time of Covid-19: Empirical evidence from the Municipal Library in Prague

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Abstract:	Public libraries represent a specific sector of public service provision, where library management is limited in its ability to influence consumers' perceptions of the value of borrowed books. This study expands previous research on consumers' perceived value and its measurement and focuses on the nature of the data examined, which has not yet received much attention. We fill this research gap and examine whether the perceived value of public library services remains stationary over time by considering a sample of readers from the Municipal Library in Prague, Czech Republic. Moreover, we analyse whether the Covid-19 pandemic has affected the perceived value of public library services. Our results contribute to the discussion an important finding that consumers' perceptions of public library services are stable and do not change over time. Interestingly, we also find that the Covid-19 pandemic has not led to a change in consumers' perceived value. This study thus creates both theoretical and practical contributions and leads to the definition of several practical implications for managers of (public) library organizations.

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# The perceived value of library services is stationary in the time of Covid-19: Empirical evidence from the Municipal Library in Prague

## 1. Introduction

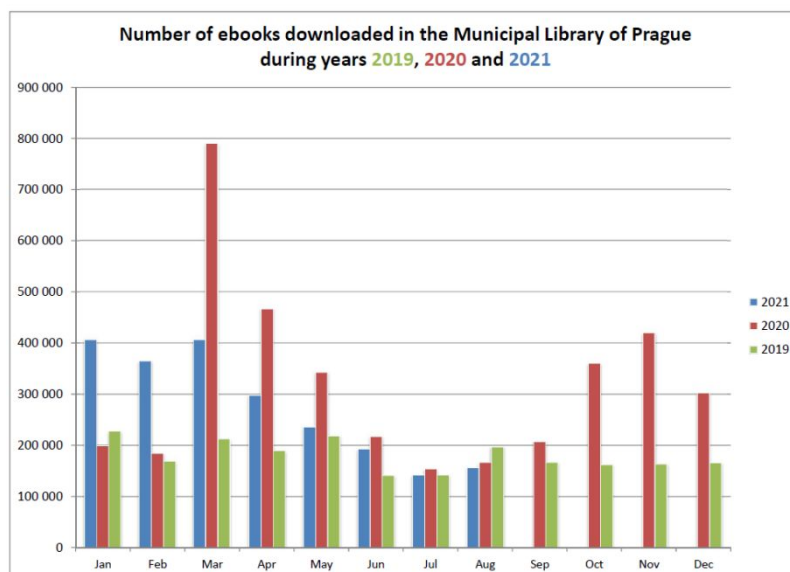
The Covid-19 pandemic situation has affected all sectors of the national economies in countries across the world (Susilawati, Falefi & Purwoko, 2020; Sahoo & Ashwani, 2020; Liu, 2021). As a result, researchers have focused on the pandemic's impacts, including also economic, sociologic, or political science research. From this point of view, an important line of previous research has explored the effects of government restrictions, which have been triggered by the severity of the Covid-19 pandemic, particularly in terms of consumers' behaviour (Mason, Narcum & Mason, 2020). According to Gordon-Wilson (2021), these consumers began to behave differently when they substituted inaccessible goods and services with their variants, which did not require a personal presence at the time of purchase or consumption.

Such effects were particularly pronounced in the case of public library services, where it was possible to observe interesting changes in consumers' behaviours (Jones, 2020; Wang & Lund, 2020; Garner et al., 2021). Restrictions, as well as the fear of infection, have led consumers to consider how to deal with the situation. Two options emerged as the main solutions: (i) stop borrowing books and find another leisure activity or (ii) borrow books in a way that is more accessible. The second option is more favourable as readers can find alternative ways to read books, such as borrowing books via distribution (to-go) windows or borrowing e-books (Nageswari & Thanuskodi, 2021).

A specific example of such behaviour is the Municipal Library in Prague, Czech Republic (MLP), which was affected by government restrictions applied in the Czech Republic (from March 2020 to April 2021) and whose readers were thus affected before they could determine whether and how to borrow books. Czech public libraries were closed by a state decision, although during a certain part of this period they were opened for "grab-n-go" windows (the reader ordered the books electronically and picked them up physically from the library "window"). In this situation, readers' physical presence in the library was not allowed, so library services were reduced to the absentee borrowing of books and the provision of e-books.

The consequences of such behaviours and the decisions of readers attending MLP are depicted in Figure 1. We can see that the number of downloaded e-books increased by 432% in March 2020 due to their substitution for the unavailable paper books, triggered by the lockdown and the most stringent restrictions at the beginning of the crisis in the Czech Republic. The gradual decline in these loans can be traced back to August 2020. Figure 1 also shows that the subsequent winter lockdowns again triggered the same behaviours among consumers. We can therefore assume that the Covid-19 pandemic and the resulting restrictions affected the behaviour of readers attending MLP in the following ways: readers ceased to be interested in books, some substituted e-books for paper books, but as soon as it was possible to pick up paper books (albeit through the lending windows), they returned to paper books.

**Figure 1: Comparison of absentee borrowings of paper books and e-books in MLP, 2019–2021**



Source: Municipal Library in Prague (2021)

Compared to 2019, the MLP was open for fewer than half of its regular operating hours (only 52% of the original situation) and loaned out only half the normal rate of its absentee book borrowings (52.7%). However, an interesting finding shown in Figure 1 is (apart from the extremes caused by Covid-19) is that the numbers of annual e-book borrowings in the next period sustain the normal trend (the approximately 20% year-on-year increase in the volume of downloaded e-books is maintained). Thus, it seems that readers are aware of the value of public library services even in times of crisis. The number of borrowings and readers' substitution behaviour have been documented by statistics.

In light of such arguments, an important question arises: has the perceived value of public library services changed during the crisis? To the best of our knowledge, few previous studies have been able to answer this question. In essence, one might expect that the perceived value of public services will increase during a crisis due to, for example, the unavailability of other services. However, this study uses MLP data from the pre-pandemic period (2018 and 2019) as well as during the pandemic (2020) to contribute important findings to the discussion that the perceived value of consumed public library services is stable and does not change over time (including during a crisis). These findings make an important practical contribution and are important primarily for managers of public organizations and public policymakers. We argue that, for several consecutive years, it is possible to work with the same values expressing perceived benefits and that it is not necessary to calculate the value of expected benefits every year. In addition, our study also makes a theoretical contribution by expanding the theoretical knowledge about the value of public (specifically, library) services.

The remainder of this paper is structured as follows. In the next section, we present the theoretical background for perceived value of public libraries' services. Section 3 provides the methodology of the empirical survey and identifies the characteristics of the data set. Section 4 presents the research results. In Section 5, we discuss the results obtained, and Section 6 concludes the paper, offering suggestions for future research.

## 2. Theoretical Background

### 2.1 Determining consumers' perceived value

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3 Perceived value represents an economic concept whose significance can be seen from several  
4 perspectives. It can be used as a determinant of (i) consumers' behaviour; (ii) firms' business  
5 strategies creation; and (iii) firms' marketing strategies differentiation (Sweeney et al., 1999; Jen &  
6 Hu, 2003). In general, perceived value and its expression can be used to better understand the  
7 relationship between the customer and the provided good. However, this use is not sufficient.  
8 Perceived value should also help capture the more complex effects that reflect the impact of the  
9 overall environment and other related processes and services that accompany the consumption of  
10 goods (Cronin et al., 1997; Ladhari & Morales, 2008). In many cases, these effects are hidden, and the  
11 consumer does not even realize that he is consuming them, even though he subsequently includes  
12 them in his perception of the value of goods and/or services. This whole complex (good/service +  
13 environment + processes) determines consumers' satisfaction, whereas rational customers should  
14 compare costs with benefits and unknowingly perform a value-for-money analysis (Zeithaml, 1988;  
15 Sweeney et al., 1999).

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19 Prior research has primarily focused on consumers' perceived value of goods/services provided by  
20 the private sectors, when value is formed under the influence of traditional market forces. Another  
21 stream of studies followed these analyses with an emphasis on relationships, processes, and  
22 decisions occurring during the consumption of goods/services provided by public sector  
23 organizations. As a result, we can say that the absence of easy measurability of outputs and the lack  
24 of methods suitable for economic analysis in the public sector create fundamental differences  
25 between the public and private (business) sectors. This is due to the nature of the services provided  
26 by the public sector organizations (as they are immeasurable, they are not material in nature,  
27 meaning the moment of production is also the moment of consumption). The expected value of  
28 public services is far more dependent on the environment and processes than on the service.

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32 Public libraries are an example of such public organizations. Their role is defined differently in  
33 different countries, but the essence is the same: public libraries provide library services to the  
34 inhabitants (e.g., loaning paper and electronic books). Moreover, they also provide educational and  
35 information services. However, the behaviour and development of libraries is determined by the  
36 local (country) conditions in which they exist (operate). This usually leads to such behaviour that  
37 libraries have their own medium- and long-term strategies, provide a prescribed range of services,  
38 and often operate within limited budgets compiled annually and, moreover, approved by politicians.  
39 Therefore, library management plays a crucial role because managers must be able to analyse the  
40 expectations of their customers in order to provide them with adequate services. In practice, it is a  
41 compromise between quality and price (costs), whereas determining the perceived value is an  
42 important activity, because it allows library management to effectively value the services provided.

## 43 **2.2 Perceived value of public (library) services**

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47 An interesting feature that can be seen in the behaviour of public library service consumers is that  
48 they often perceive the value of public goods (books) based on whether the book met their  
49 expectations. However, library management is very limited in its ability to influence whether a book  
50 meets customers' expectations. In particular, they can affect additional services and the environment  
51 in which users borrow books. These facts lead to the finding that there is a need for specific methods  
52 to conduct economic analyses.

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56 Contingent valuation method (CVM) is one of the most often used methods of economic analyses in  
57 public libraries (see, e.g., Aabø, 2005; Hájek & Stejskal, 2015; Fujiwara, Lawton & Mourato, 2019;  
58 Satterley & Woellhaf, 2020). This method assumes that the reader (consumer of library services) is  
59 aware of the perceived value of this service and can therefore evaluate and express it. To express the  
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3 perceived value within the CVM, the willingness-to-pay (WTP) principle is considered suitable and is  
4 therefore also often used. One of the main advantages of this method is the fact that, if the surveys  
5 (used to determine the perceived value of readers) are carefully designed and managed, CVM can  
6 produce estimates that are as compelling as estimates made by other valuation methods (Hider,  
7 2008).  
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10 However, other studies (see Champ et al., 1997; Chung, 2008; Lee, Chung & Jung, 2010; McCahill,  
11 Birdi & Jones, 2020) point out the negatives of the CVM, such as the low plausibility of the results.  
12 Such results occur for a number of reasons; for example, WTP works with subjective expressions of  
13 consumers' preferences (readers are often unable to exactly express their preferences), yea-saying,  
14 protest answers, and bias in understanding the question. Therefore, in light of this critical view, CVM  
15 is not able to eliminate the overestimation or underestimation of answers obtained by the WTP  
16 method. For these reasons, some scholars have suggested the modification of the CVM to avoid bias.  
17 For example, Blamey et al. (1999) proposed a dissonance-minimizing procedure for minimizing yea-  
18 saying bias. It is basically an adjustment of the format of the questions and the offer of possible  
19 answers in the survey.  
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23 Previous research has primarily examined the methods used to express readers' perceived value of  
24 library services, including the pros and cons. However, to the best of our knowledge, prior studies  
25 have paid little attention to the nature of the research data used for these analyses. More  
26 specifically, there is a research gap as to whether the data used for CVM and other methods (e.g.,  
27 cost-benefit analyses) are stationary or not. The importance of answering this question is that, if the  
28 WTP values are stationary over time, the original benefit values can be repeatedly used in economic  
29 analyses without compromising the significance of the results. It is important mainly because it  
30 would make it easier for library management to perform annual analyses and at the same time save  
31 funds that must be allocated to ascertain the perceived value of readers. For these purposes, we  
32 defined our first research question as follows:  
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35 *RQ<sub>1</sub>: Is the perceived value of public library services stationary over time?*  
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37 Summing up, the main contribution that arises from answering this research question can be seen  
38 from a practical perspective, as it will help prevent the inefficiencies and losses that are often  
39 associated with using methods such as CVM or cost-benefit analyses—namely, time, personnel, and  
40 even financial inefficiencies. Such inefficiencies lead to the use of these methods being limited in  
41 practice.  
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### 44 **2.3 Impact of the Covid-19 pandemic on perceived value of public (library) services**

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46 Generally speaking, a period of crisis is another important factor that influences consumers'  
47 behaviour and the associated understanding of the value of goods and services. Support for such an  
48 argument can be found in several previous studies. For example, Ma et al. (2014) analysed the  
49 effects of a product harm crisis on customers' perceived value of crisis and non-crisis brands in China.  
50 The authors showed that crisis could have a negative impact on the customers' perceived value of  
51 the crisis brand. Moreover, Stefanska and Bilinska-Reformat (2015) analysed how a global crisis  
52 stimulates customers' purchase behaviours in the Polish retail market and confirmed that  
53 consumers' internal conviction about the crisis influences their behaviours and encourages their  
54 efforts to find cheaper offers and places of supply. In addition, Deb and Chavali (2010) analysed the  
55 influence of a financial crisis on customers' behaviour in the case of Indian banks. However, there is a  
56 lack of studies examining the impact of a crisis on customers' perceived value of public goods and  
57 services.  
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Putting this study into the context of the current Covid-19 crisis, Majercakova and Rostasova (2021) confirmed that the emergence of the Covid-19 pandemic (a global crisis) influenced (i.e., changed) consumers' behaviours and sentiments. For example, some customers have become more dependent on online shopping and e-payment methods (Hashem, 2020). Gómez-Carmona et al. (2021) demonstrated the relationship between the confidence in Covid-19 safety protocols and perceived value by using an online survey with respondents using both public and private healthcare services. Uzir et al. (2021) analysed the effects of perceived value on customer satisfaction under the current Covid-19 pandemic conditions.

Based on a literature search, we can confirm that the crisis can be reflected in customers' perceptions of the value of goods. However, the search also indicates that most previous research has focused on perceived value in the private sector, whereas studies on the perceived value of goods and services in the public sector are lacking. The same can be said about the analysis of the impact of the crisis on the perceived value of library services. Therefore, following these arguments, another research question arises:

*RQ<sub>2</sub>: Does the Covid-19 pandemic affect the perceived value of public library services?*

### **3. Data and Methodology**

#### **3.1 Description of data and research procedure**

The data for the analysis were obtained from the questionnaire survey among MLP readers (aged 15+) conducted from 2018 to 2020 (for social and economic characteristics of the respondents, please see Table 2 in Sub-section 3.2). To meet the needs of the research, the data were collected in weekly intervals throughout the time period studied. The questionnaire was created by the research team and verified in a pilot study. The questionnaire was sent electronically to randomly selected readers who had borrowed a book from MLP. The interval between borrowing a book and sending the questionnaire was 14 days to ensure that individuals had time to use the service (i.e., reading or using a book). The questions from the questionnaire relate exclusively to one specific book that the reader borrowed.

The aim of the questionnaire was, among other things, to determine the perceived value of the book borrowing by the respondent and to analyse these values over time. More specifically, the following WTP-type question was asked:

*What is the highest amount you would be willing to pay to borrow a particular book?*

From the amounts obtained, expressing the customers' willingness to pay (perceived value of the book), the average values of the borrowings were calculated for each week. Questionnaires containing book evaluation amounts greater than CZK 10,000 (approx. EUR 400), which were marked as extreme values by expert assessment, were excluded from the analysed data. However, it should be noted that there were only a few such values (approximately 10 or fewer) in each year.

On the other hand, each year included a group of respondents (9.4% in 2018, 7.1% in 2019, and 9.2% in 2020) who did not state any amount. For these reasons, in our analyses, we created two research models, Model 1 and Model 2, to capture whether missing and/or replaced values lead to different results. The specifics of these models working with two different average borrowing values are as follows:

- Model 1: extreme values (> 10 000) and respondents who did not answer the questions were excluded;

- Model 2: extreme values ( $> 10\,000$ ) were excluded; the missing values of the borrowing value were replaced with zero, which reduced the resulting average valuation value.

Both approaches leading to the creation of Models 1 and 2 are described in the professional literature and are considered correct, which led us to this procedure.

A description of the data obtained is given in Table 1.

**Table 1: Description of data set**

	2018	2019	2020
Number of questionnaires sent	75 354	45 926	45 853
Rate of return	30.1 %	31.8 %	31.2 %
Model 1: $N_0$ – without extreme values ( $> 10\,000$ ), and excluded missing values	20 550	13 547	13 004
Model 2: $N$ – without extreme values ( $> 10\,000$ ), but with missing values replaced by zeros	22 687	14 586	14 319

Source: authors' own research

During 2020, the MLP was closed twice due to government Covid-19 regulations: 7 weeks in spring (week nos. 12–18) and 4 weeks in autumn (week nos. 44–47). During these weeks, no questionnaires were sent and, therefore, no data were collected. The time series of the average weekly values of the borrowing valuation were thus interrupted. To address this problem, the mean of nearby points method (see, for example, Mertler & Vannatta, 2005, for details) was used to impute the missing values. Using this method, the missing time series value is replaced by the average of the surrounding original (non-missing) values. Because it was necessary to replace several consecutive values of the time series (7 weeks in spring and 4 weeks in autumn), the moving averages from  $k+1$  of the surrounding (non-missing) values were used, where  $k$  indicates the number of missing values. For example, the first missing value was calculated as an average of  $k$  previous and 1 following non-missing values (the last one as an average of 1 previous and  $k$  following non-missing values). Thus, in the spring, the missing values were determined as a moving average of the surrounding 8 values whereas in the autumn it was the surrounding 5 values. In total, 157 average weekly values (including 11 supplemented values) were analysed.

### 3.2 Employed methods

The Box–Jenkins methodology was used to analyse the stationarity (non-stationarity) of the time series (i.e., to determine whether the perceived value of the book borrowing develops over time), where the presence of the so-called stochastic trend in the time series was examined. If the presence of this trend is proven, it can be argued that the given time series is non-stationary, indicating that its level (mean) develops over time.

For this purpose, a graphical inspection of the so-called autocorrelation (ACF) and partial autocorrelation function (PACF) is most often used, which shows a specific shape in the case of non-stationarity. Thus, for a non-stationary time series, the first PACF value is close to one while the other values are close to zero; on the contrary, the ACF values show a slow linear decrease from the first value, which is of course also close to one (Box et al., 2008).

A more objective method is the use of tests for the presence of the so-called unit root test, which indicates non-stationarity. In this case, the Augmented Dickey-Fuller (ADF) test is most often used,

the null hypothesis of which is the presence of a unit root (i.e. the non-stationarity of the time series). For more details, see Dickey and Fuller (1979).

The ADF test is based on the following regression model:

$$\Delta y_t = c_t + \beta y_{t-1} + \sum_{i=1}^{p-1} \phi_i \Delta y_{t-i} + \varepsilon_t \quad (1)$$

where  $\Delta y_t$  denotes the first difference of time series  $y_t$ ,  $p$  is the order of an autoregressive model AR( $p$ ), and  $c_t$  can be zero or a constant or  $c_t = \omega_0 + \omega_1 t$  (deterministic time trend). In practice, however, the model where  $c_t = 0$  is essentially not used. To verify the existence of a unit root in the AR( $p$ ) process (i.e., the non-stationarity of time series), one can test the hypothesis  $H_0: \beta = 0$  vs.  $H_1: \beta < 0$ , which indicates the stationarity of time series (Tsay, 2010). To perform the ADF test correctly, the most suitable order  $p$  of AR process (means time lag of the  $\Delta y_t$ ) and the form of  $c_t$  must be selected. Selecting the order  $p$  is the most commonly applied information criteria, such as AIC criterion (Akaike, 1973). If the form  $c_t = \omega_0 + \omega_1 t$  in Eq. (1) is used, the presence of the (deterministic) time trend is also tested.

All time series analyses were performed using the Gretl software.

#### 4. Experimental Results

In order to answer both research questions, it was necessary to prove that the analysed data sets were similar in individual years. This is a fundamental prerequisite for the actual implementation of further research steps. The similarity of the data sets in individual years is shown in Table 2, which demonstrates that the structure of readers did not significantly change according to gender or age.

**Table 2: Frequency tables and descriptive statistics of the samples**

	2018	2019	2020
<b>Gender</b>			
Male	5 104 (22.50%)	3 104 (21.28%)	2 920 (20.39%)
Female	17 853 (77.50%)	11 482 (78.72%)	11 399 (79.61%)
Total	22 687 (100%)	14 586 (100%)	14 319 (100%)
<b>Age category</b>			
15-25	2 857 (12.59%)	1 389 (9.52%)	1 432 (10.00%)
26-45	9 118 (40.19%)	5 692 (39.03%)	5 325 (37.19%)
46-65	6 448 (28.42%)	4 280 (29.34%)	4 371 (30.53%)
>65	4 264 (18.80%)	3 225 (22.11%)	3 191 (22.28%)
Total	22 687 (100%)	14 586 (100%)	14 319 (100%)
Mean	46.52	48.55	48.76
St. dev.	17.42	17.32	17.47
Median	44	46	47

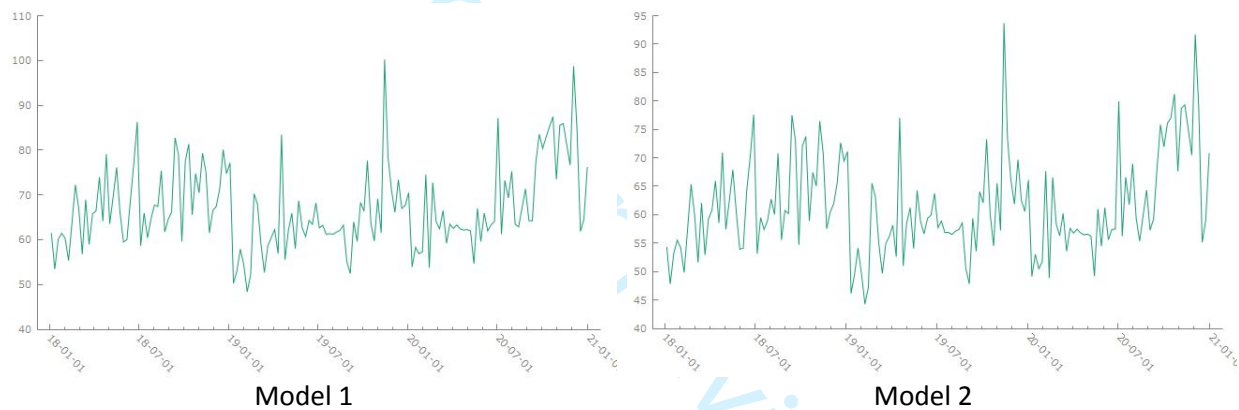
Within the questionnaire, respondents indicated the highest amount they would be willing to pay to borrow a particular book in order to help us determine the perceived values of library services. The obtained values for both models are shown in Table 3.

**Table 3: Perceived value of library service - book borrowing in 2018–2020**

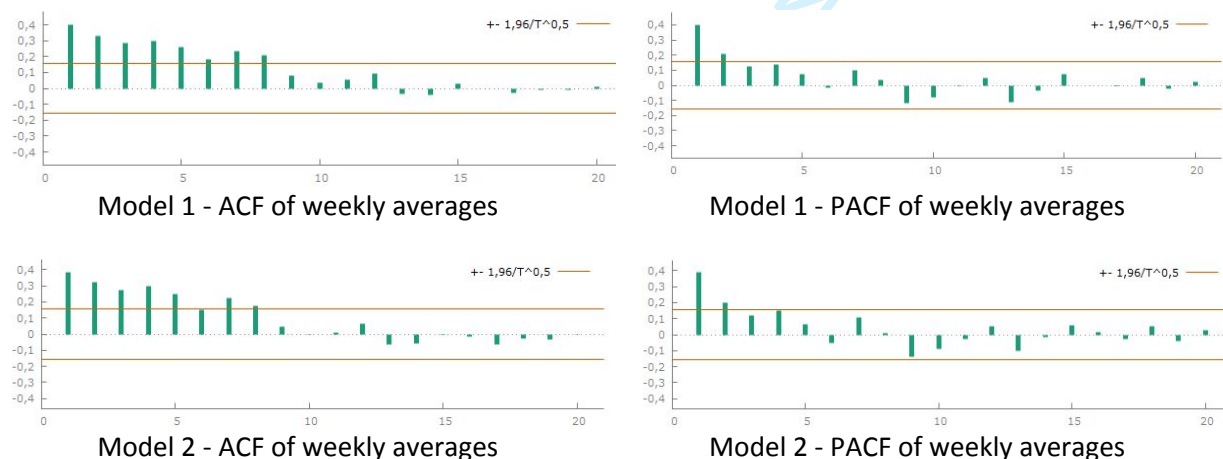
Time series	2018		2019		2020	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Mean	66.37	60.12	63.53	59.02	68.01	61.77
St. dev.	133.10	129.09	139.44	135.39	133.50	128.73
Median	50	30	30	30	50	30

The results summarized in Table 3 show that the average perceived value of book borrowing is between 60 and 68 CZK. Interestingly, we found differences in the evolution of the average values of the perceived value of library services between Model 1 and Model 2. On the one hand, Model 1 shows that the perceived value of library services varies slightly. On the other hand, Model 2 shows that the perceived value of library services is stable over the years analysed. Taking into account a certain error resulting from the sample size, it can be assumed that the value is stationary.

A time series analysis should be performed to confirm the assumption of data stationarity.

**Figure 2: Time series graphs of weekly averages – comparison of Model 1 and Model 2**

Note:  $T=157$  weeks. Source: authors' own processing

**Figure 3: Graphical representation of ACF and PACF time series analyses**

Note:  $T=157$  weeks, 20 lags. Source: authors' own processing

From both the time series graphs and the ACF and PACF graphs, it is clear that both are stationary time series. The graphs of both time series fluctuate around the mean value (mean), while the PACF values in the first lag approach the value 0.4 for both series (not the value 1, which would indicate non-stationarity). ACF values do not show a slow linear decrease from the value close to 1 on the first delay.

To support the statement about the stationarity of the analysed time series, an ADF test was performed, the null hypothesis of which indicates the non-stationarity of the time series. For both time series, two variants of the ADF test were considered—namely, two variants of the model given by (1): 1)  $c_t = \omega_0 + \omega_1 t$ ; 2)  $c_t = \text{const.} \neq 0$ . Thus, in the first variant, simultaneously with the presence of a stochastic trend, the presence of a deterministic trend is also examined (see Subsection 3.2 Employed Methods). The presence of a deterministic trend was not proved in (1) for any time series; therefore, variant 1:  $c_t = \omega_0 + \omega_1 t$  is not suitable in this case for ADF testing. The ADF test was therefore performed in variant 2:  $c_t = \text{const.} \neq 0$ . Based on the AIC criterion, the delay in (1) was chosen as the most appropriate for both time series  $p = 3$ . Results of the ADF test with null hypothesis  $H_0: \beta = 0$  (means non-stationarity) for both time series are summarized in Table 4.

**Table 4: Summary of the results of data stationarity analysis**

Time series	Estimate of $\beta$	p-value	$H_0: \beta = 0$
Model 1	- 0.362	0.006	rejected
Model 2	- 0.371	0.005	rejected

The results show that, in both cases, the hypothesis of non-stationary time series is rejected at both the 0.05 and 0.01 significance levels, which supports our previous findings based on ACF and PACF.

Based on the obtained results, in the examined years, there was no statistically significant systematic increase (decrease) in the valuation of the book borrow. Whether the observed fluctuations in the weekly time series are only random (unsystematic) or have some cyclical (e.g. seasonal) character, such as increase before the Christmas holidays, cannot yet be correctly determined. To examine the presence of seasonality in time series, the minimum recommended length of the time series is five years, which is currently not available.

In addition, as we previously stated, the MLP was closed twice in 2020 due to government Covid-19 regulations. –Thus, to prove and confirm the stationarity of data, we performed an additional analysis, where the missing values were not replaced. As a result, the following average values “shifted” instead of the missing ones. These values did not correspond exactly to the weeks when the questionnaires were sent. On the other hand, such time series did not contain any artificially added values, which logically shortened the time series. In order to verify that the addition of missing values did not distort the properties of the analysed time series, in this step, the time series contained only the original values (i.e., no addition of the 11 missing values from 2020). In total, 146 average weekly values were analysed. The results of these additional tests are presented in Appendix A. The results of these additional analyses are identical to those of our previously presented analysis; therefore, we can confirm the stationarity of our data. In the second case, the tests of non-stationarity have even smaller p-values, indicating that the hypotheses about non-stationarity are even more certain.

## 5. Discussion and Practical Implications

In our research, we focused on the issue of perceived value of public library services, however, compared to previous studies (e.g., Aabø, 2005; Hájek & Stejskal, 2015; Fujiwara, Lawton & Mourato, 2019), which expressed readers’ perceived value of library services, we asked different questions

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3 that have not yet received as much research attention. More specifically, we focused on the nature  
4 of data expressing consumers' perceived value obtained through the WTP method and asked  
5 whether the perceived value of public library services remains stationary over time. In the case of the  
6 MLP, the results showed no statistically significant systematic increases (decreases) in the perceived  
7 value of public library services. Therefore, we can confirm the stationarity of the data obtained from  
8 the MLP. These results make a significant contribution, especially for public library managers, who  
9 face the annual question of consumers' perceived value of library services.  
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12 Such insights can make a major difference in the use of economic analyses of library performance. In  
13 theory, many methods can be applied (typically cost-benefit analysis [CBA]), but when used in  
14 practice there is a fundamental (often insurmountable) barrier: the inability of the library to evaluate  
15 its own performance (determine the value of benefits). Therefore, cost-based analyses are used in  
16 practice (a cost minimization analysis is applied in the public sector). The results of this study clearly  
17 lead to the possibility of using other analytical methods based on performance evaluating and using  
18 the measured benefit values in the next two years (because three years of stationary data were  
19 demonstrated in this case study). This can lead to savings in financial, time, and personnel costs.  
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22 Referring to the second research question (i.e., Does the Covid-19 pandemic affect the perceived  
23 value of public library services?), when taking into account the case of the MLP and data stationarity,  
24 we can state that the Covid-19 pandemic and resulting state regulations related to this crisis did not  
25 affect the perceived value of public library services. These findings, for the very specific analysed  
26 sample of the MLP, yield an interesting result that contradicts previous studies (see, for example,  
27 Stefanska & Bilinska-Reformat, 2015; Majercakova & Rostasova, 2021; Gómez-Carmona et al., 2021)  
28 confirming the impact of crises on the perceived value of goods and services or on consumers'  
29 behaviours. These findings provide a new and interesting impetus to the debate (as well as future  
30 research), such as what factors, in addition to the crisis, may affect the perceived value of  
31 library/public goods and consumers' behaviours. Another interesting question is what differences  
32 exist across the public service sectors and what the variability of customers' perceived values is.  
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36 This study significantly contributes to both theory and practice. From the theoretical point of view,  
37 we extend the theory to the valuation of public services and perceived value of public services,  
38 primarily library services, by adding a new perspective of research—namely, the nature of research  
39 data and data usability over time. This in turn allows us to produce practical implications in the form  
40 of recommendations for library management. The main findings are a key element that will enable  
41 public libraries to trust the values of the CVM survey and carry out their economic analyses more  
42 often, thereby providing them with sufficient quality arguments for budget negotiations, design,  
43 reinforcement, or reward of the provided library services and other managerial decisions.  
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46 Another contribution of this study is that we conducted our analysis in the context of the Covid-19  
47 pandemic and proved that the crisis situation may not be reflected in a change in customers'  
48 perceived value of public services, albeit in specific cases. These results call for further in-depth  
49 analyses of the impacts of Covid-19 on consumers' behaviours related to public goods and services.  
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## 52 **6. Conclusion**

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54 The presented research is completely unique, as there are no multi-year or longitudinal studies on  
55 the use of WTP-type CVM methods in public libraries that allow for the comparison of measured  
56 values and provide strong results influencing further research in public libraries. Our results confirm  
57 that the perceived values are stationary in nature and did not change significantly due to the Covid-  
58 19 pandemic. We perceive this crisis (and limited access to the full version of services) as a  
59 fundamental circumstance in which it is possible to assume a fundamental impact on the possibility  
60

of consuming services and on their perceived value. These results are important for practical use in economic analyses evaluating the performance of public libraries as input for responsible and sustainable managerial decision-making.

The limitations of our research must be taken into account when using and discussing the presented results. The first limitation results from the data file. The results relate only to the case study (from one library in one city) and do not prove causal links in the whole public librarianship sector or throughout the Czech Republic. The results cannot be generalized and used to describe readers' general behaviours. The second group of limitations are statistical limitations. Based on the available data, we have shown that the perceived value of book borrowing does not systematically increase (decrease) over time. However, we are currently unable to demonstrate and/or disprove whether there are any cyclical (seasonal) fluctuations in the time series. When examining the presence of seasonality in time series, the minimum recommended length of the time series is five years, which is currently not available. If sufficient data are collected, further research should focus on examining the presence of seasonality. The third group of limitations is the fact that the period under study, which takes into account the Covid-19 pandemic, ended in 2020, although the Covid-19 crisis had not ended at that point. The prolongation of the Covid-19 pandemic may have other (hitherto undescribed) effects on the readers' behaviours.

Future research should (a) continue to analyse the behaviour of readers affected by the Covid-19 pandemic as consequences stemming from the ongoing restrictions are expected to occur in addition to positive effects resulting from the new services that libraries have started to offer, thereby expanding their portfolio of services; and (b) explore new services that libraries are introducing in response to the constraints arising from the Covid-19 pandemic as well as the newly defined demand of library readers in order to determine whether libraries can transform their services internally to start offering services online in addition to any problems associated with this transformation. This specific situation does not allow for feasibility studies, as offerings are shaped by the skills, creativity, and flexibility of management and library staff. Finally, a special topic for future research is to discover whether consumers of other public services perceive the value of these services similarly and if, in a multiyear study, the values continue to be stationary.

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## Appendix A

Figure: Time series graphs of weekly averages – comparison of Model 1 and Model 2

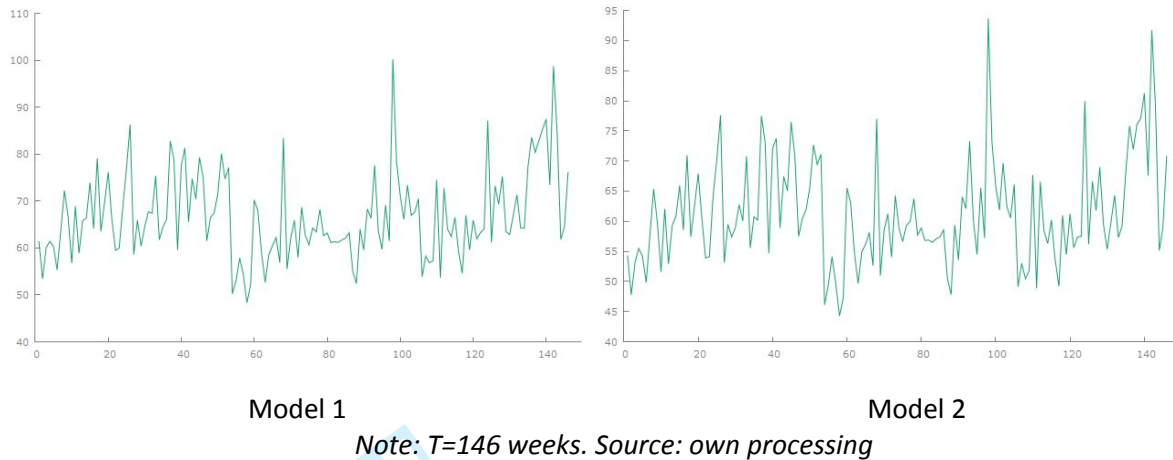
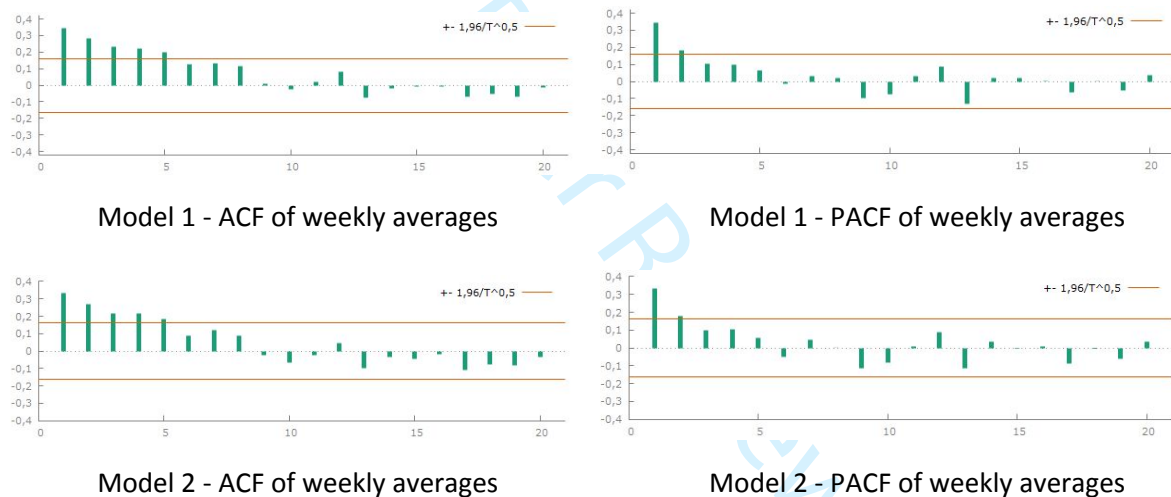


Figure: Graphical representation of ACF and PACF time series analyses



The ADF test performed in variant:  $c_t = const. \neq 0$ . Based on the AIC criterion, the delay in (1) was chosen as the most appropriate for both time series  $p = 1$ . Results of ADF test with null hypothesis  $H_0: \beta = 0$  (means non-stationarity) for both time series are summarized in following table.

Table: Summary of the results of data stationarity analysis

Time series	Estimate of $\beta$	p-value	$H_0: \beta = 0$
Model 1	-0.535	0.000	rejected
Model 2	-0.552	0.000	rejected