LONG-TERM FORECASTING OF THE SPA AND WELLNESS SUBSECTOR OF THE BULGARIAN TOURISM INDUSTRY

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ABSTRACT

In the past twelve years Bulgaria has managed to capitalize on the good results achieved in certain subsectors of its tourism industry, such as the spa and wellness industry. The fluctuations in the international tourism markets due to the world economic crisis, however, still provoke hesitations for the investors in the Bulgarian tourism industry. This uncertainty and the fear of possible negative outcomes in Bulgaria's spa and wellness tourism could be diminished if there are comparatively true long-term forecasts for what is to happen in the coming 10 or 12 years.

The present paper regards the application of some forecasting methods in the spa and wellness sub-sector of the Bulgarian tourism industry such as linear trend forecasting and double exponential forecasting (Holt's method). A specially designed model for estimation of the weight coefficient needed for determining the size of the sector of the spa and wellness tourism in the time series of the available data and in the forecast values is presented. A time series and past period predictions have been constructed based on statistical records since 1964 in order to test the forecasting methods presented in the paper and to produce forecasts up to the year 2022.

KEYWORDS

Forecasting, Exponential Smoothing, Spa and Wellness Industry.

RESUMO

Nos últimos doze anos a Bulgária conseguiu capitalizar os bons resultados alcançados em alguns subsetores da sua indústria do turismo, como a indústria de SPA e bem-estar. As flutuações nos mercados internacionais de turismo devido à crise económica mundial, no entanto, ainda provocam a hesitação dos investidores na indústria do turismo búlgaro. Esta incerteza e o medo de possíveis resultados negativos no turismo de SPA e bem-estar da Bulgária poderiam ser diminuídos se houvesse, comparativamente, verdadeiras previsões de longo prazo para o que vai acontecer nos próximos 10 ou 12 anos.

O presente trabalho refere-se à aplicação de alguns métodos de previsão no sub-setor de SPA e bem-estar da indústria do turismo búlgara como a previsão de tendência linear e previsão exponencial dupla (método de Holt). É apresentado um modelo especialmente concebido para a estimativa do coeficiente de peso necessário para determinar o tamanho do sector do SPA e do turismo de bem-estar na série temporal dos dados disponíveis e nos valores de previsão. Foram construídas séries temporais e previsões de período passado com base em registos estatísticos desde 1964, a fim de testar os métodos de previsão apresentados no artigo e produzir previsões até ao ano de 2022.

PALAVRAS-CHAVE

Previsão, Suavização Exponencial, Indústria de SPA e Bem-Estar.

1. INTRODUCTION

In the past twelve years the Bulgarian tourism industry reached a stage of a bubbling increase, which was followed by the negative impact of the world financial and economic crisis. Bulgaria however succeeded to capitalize on the good results achieved in certain subsectors of its tourism industry, such as the spa and well industry, and has recently lined up in the top three suppliers of spa and wellness services in Europe, alongside with France and Romania. As it was estimated in 2008, France, Bulgaria and France jointly provided some 60% of the supply in the spa and wellness subsector of the tourism industry in Europe (Pugin, Pachoud, Kaneva, Dimitrov et al., 2010).

The fluctuations on the international tourism markets emitting tourists to Bulgaria, which were felt as a disturbing aftermath of the economic crisis, still provoke hesitations in the investment decisions of a significant part of the investors in the Bulgarian tourism industry (banks, investment funds, and holding companies). This uncertainty and the fear of possible negative outcomes could be diminished to some extent if there are convincing and comparatively true long-term forecasts for what is to happen in the coming 10 or 12 year. And this refers also to the best performing sub-sectors of the Bulgarian tourism, i.e. the spa and wellness tourism.

Graphic 1: Bulgaria's geographic situation in the region of South-East Europe

Source: https://www.cia.gov/library/publications/the-world-factbook/geos/bu.html

2. OBJECTIVES

The task of creating a forecast model for the long-term development of a certain subsector of the tourism industry, such as the spa and wellness tourism in Bulgaria, meets with the solving of five major problems:

(i) Finding of a suitable general indicator, on the basis of which to build the long-term forecasts (the forecast for periods longer than 5 years);
(ii) Selecting and using of suitable forecasting techniques;
(iii) Calculating of long-term forecasts for the value of the above-mentioned general indicator (up to the year 2022);
(iv) Comparing the results of the forecast techniques (the forecast models) on the basis of the errors in the forecasts.
(v) Estimating the size of the Bulgarian spa and wellness tourism in certain terms, so that the forecast(s) of the above-mentioned general indicator could be particularized especially for this sub-sector.

3. METHODOLOGY AND MAIN RESULTS

The difficulties in finding of a general suitable indicator, on the basis of which to make the forecast, come mainly from the reliability and the sustainability of the existing data for the separate types of indicators for tourism demand, especially in terms of time.

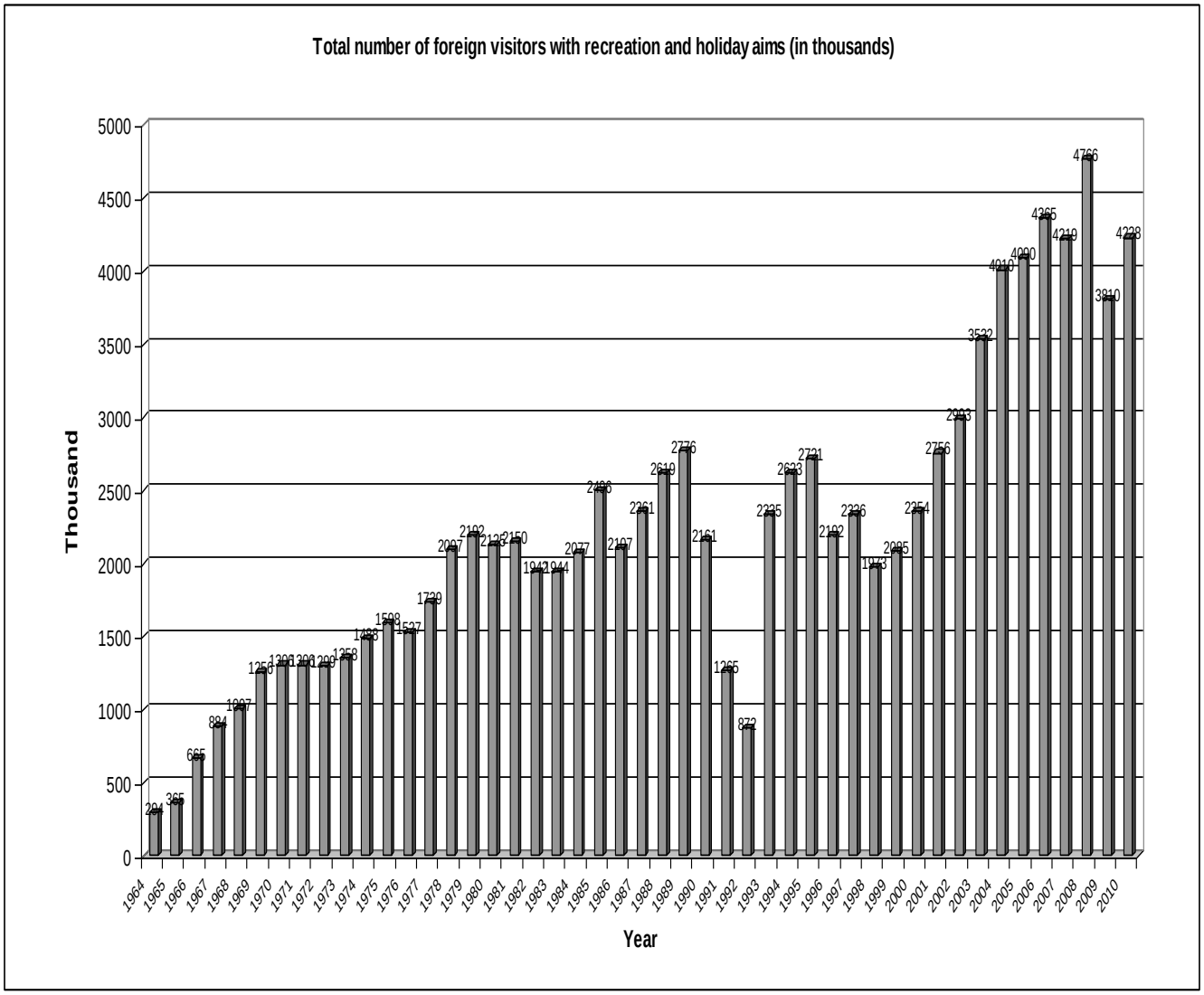
A greater part of the existing indicators are inconsistent in time and they lack enough data which would allow the building of sufficiently long time series.

Here one could refer to certain indicators such as the "volume of the tourism receipts", which was calculated for different periods of time in different currencies – non-denominated Bulgarian leva, US dollars, German marks and Euros. At the same time, the indicator "number of tourism arrivals", respectively "number of foreign tourists", as per the definition of the United Nations World Tourism Organization, was introduced and implemented in the Bulgarian statistical system in the end of 1990s.

The sole indicator which allows a comparatively long and sustainable time series to be built is the indicator "number of foreign visitors with recreation and holiday aims", which continues to be recorded by both the former State Tourism Agency

(now part of Bulgaria's Ministry of Economy, Energy and Tourism) and the Bulgarian National Statistic Institute as a part of the indicator "number of the foreign citizens visiting Bulgaria with tourism aims". Taking into account the annual data available for the indicator "number of foreign visitors with recreation and holiday aims", one can build a time series of 47 time periods (Graphic 2 and Graphic 3) – from 1964 to the last year with recorded value 2010.

Graphic 2: Number of foreign visitors in Bulgaria with recreation and holiday aims for the time period 1964 – 2010 (in thousands)



Source: Dimitrov, P., 2011, based on data provided by the Bulgarian National Statistic Institute and the former State Tourism Agency

As for the selection and usage of a suitable forecasting technique, by applying of statistical software, such as SPSS ©, it is possible quite easy to draw both the development curve of the actually observed values of the indicator and the linear trend line.

The trend line could be notated by the following line equation:

(1) $$Y(t) = b_0 + b_1(t),$$

Where:

$Y(t)$ is the trend value of the indicator "number of foreign visitors with recreation and holiday aims" as a linear function of time measured in years;

b_0 – the value of the interception (segment) point between the line (the trend line) and the ordinate (the Y-axis) of the coordinate system;

b_1 – the value of the angle coefficient of the line (trend line);

t – time in terms of years.

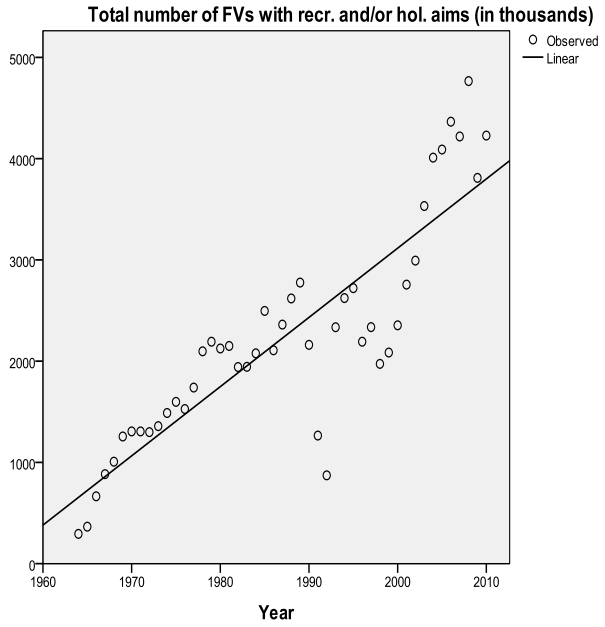
Graphic 3: The actually observed values of the times series of the foreign visitors in Bulgaria with recreation and holiday aims and the trend line calculated by the use of SPSS

Model Summary and Parameter Estimates

Dependent Variable:Total number of FVs with recr. and/or hol. aims (in thousands)

Equation	Model Summary					Parameter Estimates	
	R Square	F	df1	df2	Sig.	Constant	b1
Linear	,754	137,829	1	45	,000	-133653,761	68,385

The independent variable is Year.



Source: Dimitrov, P., 2011, based on data provided by the Bulgarian National Statistic Institute and the former State Tourism Agency

The values of b_0 and b_1, which define in full the line (the trend line), are calculated by the help of the least squares method and in this particular case for this task the SPSS software product was applied. As it becomes evident from Chart 4, the values of b_0 and b_1 are "–133653.761" and "68.385" respectfully and thus the trend line equation achieves the following notation:

(2) $$Y(t) = -133653{,}761 + 68.385(t)$$

The value of b_0 should not make any surprise as the ordinate (the Y-axis) on Graphic 3 just for convenience does not intercept the abscissa (the X-axis) at its value "0" point.

Equation (2) could be used for a long-term forecasting of the regarded market situation indicator. The extent of the error, however, if this method is applied for already past time periods, such as the past twenty years, is quite big. This is also obvious from Graphic 3.

In the regarded herein time series of the indicator "number of foreign visitors with recreation and holidays aims", in which a definite linear trend of increase could be distinguished, one could apply also the method of **double exponential smoothing** in the presence of a linear trend, known as the **Holt's method**. The mathematical notation of this method is as follows:

- The smoothing of **the level (the base) – "L"**:

(3) $$L_t = \alpha Y_t + (1-\alpha)(L_{t-1} + T_{t-1})$$
$$0 \le \alpha \le 1$$

- The smoothing of **the trend – "T"**:

(4) $$T_t = \beta(L_t - L_{t-1}) + (1-\beta)T_{t-1}$$
$$0 \le \beta \le 1$$

- The **achieving of the final forecast "F_{t+m}"** for **"t+m" periods ahead in the future**:

(5) $$F_{t+m} = L_t + mT_t,$$

Where:

„α" and „β" are the smoothing constants for the level and the trend respectfully which could take values between 0 and 1.

There are also other possible methods for long-term forecasting through the use of the exponential smoothing, however, here they are practically inapplicable either due the lack of seasonality, or because of the presence of a trend in the regarded time series. In the number of these methods comes also the method of the single exponential smoothing, which is unsuitable for long-term forecasting because of the very same presence of a trend in the time series.

In this situation, it would be useful if the selected method for forecasting through exponential smoothing – the method of the double exponential order to minimize the forecast error. One of the criteria for this minimizing could be the mean absolute percentage of error (MAPE). For the purpose of visualization of the results from the different forecast methods for past and future periods, as well as the extent of achieved error (in comparison of the forecast values with the actually observed ones for the past periods of time), these results are presented in table and graphic form in Table 1, Graphic 4 and Graphic 5. As it is obvious from the table and the both graphics, the existing statistical software products could be used for defining of an optimal best-fit forecast model, i.e. for defining of the optimal values of the smoothing constants (used for calculations in column 7 of Table 1 and for plotting the black-dotted forecast curve in Graphic 4 and the Graphic 5). Of course, the inherent capacities of the statistical software products in this regard should not be overestimated and over-praised. Table 1, Graphic 4 and 5 provide also a solution for the third and the fourth task set in the present paper, i.e. "(iii) Calculating of long-term forecasts for the value of the above-mentioned general indicator (up to the year 2022)"; and iv "Comparing the results of the forecast techniques (the forecast models) on the basis of the errors in the forecasts".

Based on the results in Table 1 and Graphic 4, one can outline three major types of forecasts for the number of the foreign visitors with recreation and holiday aims for 2022, as follows:

- A pessimistic forecast (the forecast with the lowest value) – calculated by the linear trend equation method:
  4 621 000 foreign visitors;

- The forecast (calculated by the use of SPSS) with the lowest mean absolute percentage of error (MAPE) – calculated by the method of the double exponential smoothing with $\alpha=0.999$ and $\beta=1.599\text{x}10^{-5}$:
  5 049 000 foreign visitors;

- The most optimistic forecast (the forecast with highest value) – calculated by the method of the smoothing (the Holt's method) is tested in different values of the smoothing constants "α" and "β" in

  one-parameter double exponential smoothing with $\alpha=\beta=0.30$:
  6 283 000 foreign visitors.

All these forecasts, as well as the forecasts presented in Table 1 and Graphic 4, have one major disadvantage – they are produced for the general indicator "number of foreign visitors in Bulgaria with recreation and holiday aims", which means that it refers to the whole of Bulgarian tourism industry and not to the sub-sector of spa and wellness tourism. In order to overcome this disadvantage, a certain modification is needed.

One way of doing so is by the use of a weight coefficient which shall indicate the share of the foreign visitors with intention to practice spa and wellness tourism. Or, as it has been mentioned in the initial part of this paper, an estimation of the sizes of the Bulgarian spa and wellness tourism is needed to make the above general indicator more particularized (task v). Thus, equation (5) can be modified into equation (6), as follows:

$$F_{t+m}^{swt} = K_{swt}\left(L_t + mT_t\right), \quad (6)$$

Where:

F^{swt}_{T+1} is the forecast for time period "T+1" for the number of foreign visitors with cultural tourism aims;

K_{swt} is the coefficient of the share of foreign visitors with spa and wellness tourism aims;

L_t – the level (the base);

T_t – the trend;

t – time expressed in terms of years.

m – the number of periods ahead in the future for the forecast in concern.

Neither the Bulgarian National Statistical Institute (NSI), nor the Bulgarian State Agency on Tourism, nor any other Bulgarian government institution keeps a regular statistical record of the foreign visitors with spa and wellness tourism aims. However, there are six consequent surveys on the foreign visitors in both the winter and conducted by the market research companies "NOEMA", MBMD and the "Sinesta" Consortium in Bulgaria. These six surveys, though based on samples of

approximately 3000 foreign citizens visiting Bulgaria, provide two sets of important figures: (i) a percentage shares of the foreign visitors practicing spa and wellness activities in the months of the winter tourism season and (ii) a percentage share of the foreign visitor practicing spa and wellness activities in the months of the summer tourism season. Based on these two sets of figures, a model for calculating the K_{swt} (the coefficient of the share of foreign visitors with spa and wellness tourism aims) can be built (Table 2).

Table 1: Calculating of long-term forecasts – through the linear trend equation and miscellaneous variations of the double exponential smoothing (Holt's method)

			Level initilization (L0=Y1)	Trend initilization (T0=Y2-Y1)					
			294	71					
Year / number of foreign visitors	Total number of foreign visitors with recreation and holiday aims (in thousands)	Forecast through a trend line by the use of a linear trend equation	The Level (L) in one-parameter double exponential smoothening, α=0,30	The Trend (T) in one-parameter double exponential smoothing, α=β=0,30	Forecast (Ft+1; Ft+m) in one-parameter double exponential smoothing, α=β=0,30	Forecast (Ft+1; Ft+m) in two-parameter double exponential smoothing (best model fit by SPSS)	The Level (L) in one-parameter double exponential smoothening, α=β=0,10	The Trend (T) in one-parameter double exponential smoothing, α=β=0,10	Forecast (Ft+1; Ft+m) in one-parameter double exponential smoothing, α=β=0,10
I	II	III	IV	V	VI	VII	VIII	IX	X
1964	294	654				294			
1965	365	723	344	65	408	362	358	70	428
1966	665	791	395	61	456	433	422	70	492
1967	884	860	519	80	598	733	509	71	580
1968	1007	928	684	105	789	952	611	74	685
1969	1256	996	855	125	979	1075	717	78	795
1970	1306	1065	1062	150	1212	1324	841	82	923
1971	1306	1133	1240	158	1398	1374	962	86	1048
1972	1299	1201	1371	150	1521	1374	1073	89	1162
1973	1358	1270	1454	130	1584	1367	1176	90	1266
1974	1488	1338	1516	110	1626	1426	1275	91	1366
1975	1598	1407	1584	97	1682	1556	1378	92	1470
1976	1527	1475	1657	90	1746	1666	1483	93	1577
1977	1739	1543	1680	70	1750	1596	1572	93	1665
1978	2097	1612	1747	69	1816	1807	1672	94	1766
1979	2192	1680	1900	94	1994	2165	1799	97	1896
1980	2125	1749	2054	112	2166	2260	1926	100	2025
1981	2150	1817	2153	108	2262	2194	2035	101	2136
1982	1942	1885	2228	98	2327	2218	2138	101	2239
1983	1944	1954	2211	64	2275	2011	2209	98	2307
1984	2077	2022	2176	34	2209	2012	2271	95	2366
1985	2496	2090	2170	22	2192	2145	2337	92	2428
1986	2107	2159	2283	49	2332	2564	2435	92	2527
1987	2361	2227	2265	29	2294	2176	2485	88	2573
1988	2619	2296	2314	35	2349	2429	2552	86	2638
1989	2776	2364	2430	59	2489	2687	2636	86	2722
1990	2161	2432	2575	85	2661	2844	2727	86	2814
1991	1265	2501	2511	40	2551	2230	2748	80	2828
1992	872	2569	2165	-76	2090	1334	2672	64	2736
1993	2335	2638	1724	-185	1539	941	2550	46	2595
1994	2623	2706	1778	-113	1665	2402	2569	43	2612
1995	2721	2774	1952	-27	1925	2691	2613	43	2656
1996	2192	2843	2164	44	2208	2789	2663	44	2706
1997	2336	2911	2203	43	2246	2261	2655	39	2693
1998	1973	2979	2273	51	2324	2404	2658	35	2693
1999	2085	3048	2219	19	2238	2042	2621	28	2648
2000	2354	3116	2192	6	2198	2153	2592	22	2614
2001	2756	3185	2245	20	2264	2422	2588	20	2608
2002	2993	3253	2412	64	2476	2824	2623	21	2644
2003	3532	3321	2631	110	2741	3061	2679	24	2703
2004	4010	3390	2979	182	3160	3600	2786	33	2819
2005	4090	3458	3415	258	3673	4078	2938	45	2983
2006	4365	3527	3798	296	4094	4158	3093	56	3149
2007	4219	3595	4175	320	4495	4433	3271	68	3339
2008	4766	3663	4412	295	4707	4288	3427	77	3503
2009	3810	3732	4725	300	5025	4834	3630	89	3719
2010	4228	3800	4661	191	4852	3880	3728	90	3818
2011		3868	4665	135	4800	4296	3859	94	3954
2012		3937			4934	4364			4048
2013		4005			5069	4433			4142
2014		4074			5204	4501			4237
2015		4142			5339	4570			4331
2016		4210			5474	4638			4426
2017		4279			5609	4706			4520
2018		4347			5744	4775			4614
2019		4416			5879	4843			4709
2020		4484			6013	4912			4803
2021		4552			6148	4980			4897
2022		4621			6283	5049			4992

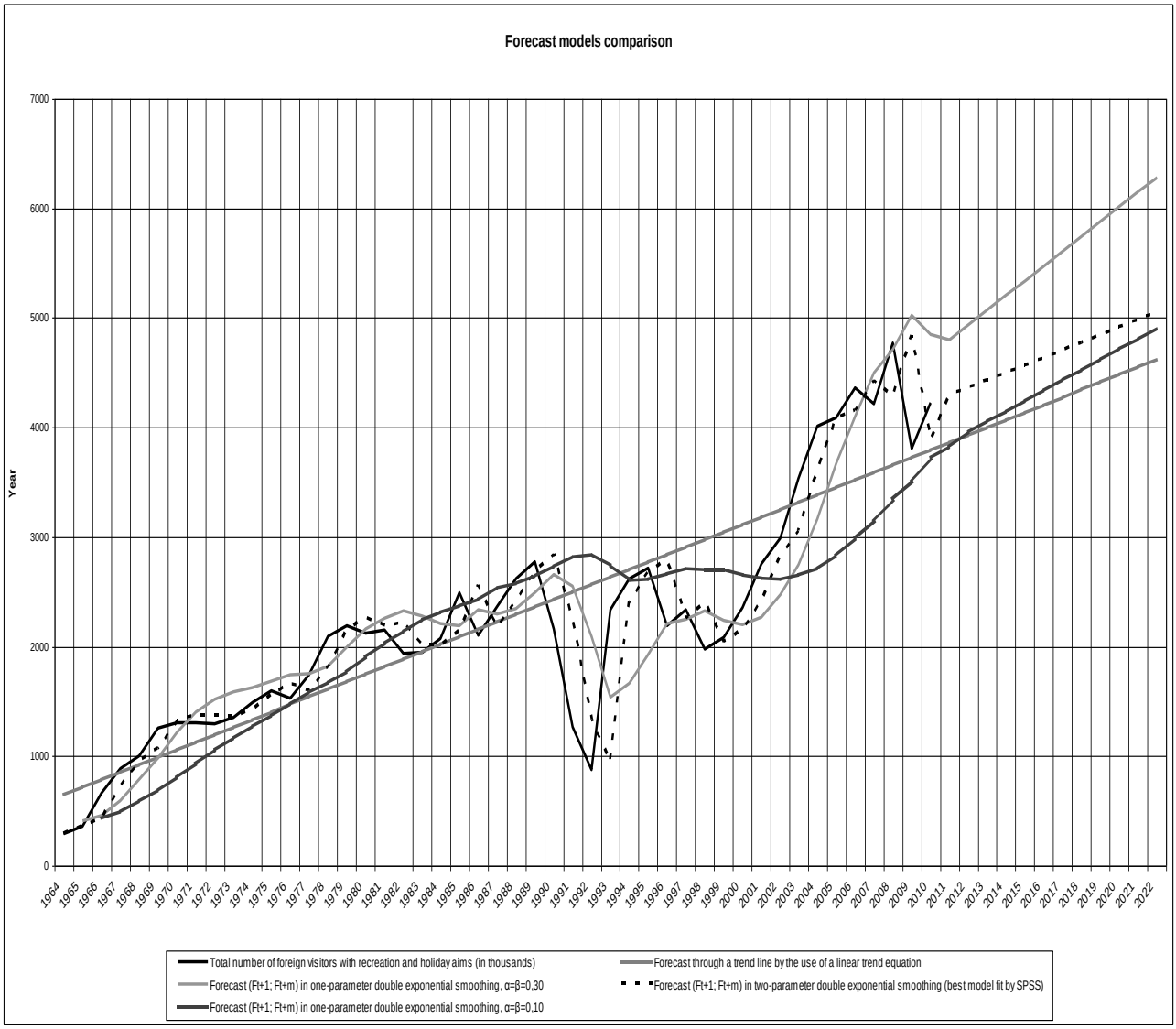
Source: Dimitrov, P., 2011, based on data provided by the Bulgarian National Statistic Institute and the former State Tourism Agency

Table 2: K_{bswt} calculation model

Balneo, Spa and Wellness tourism, agregate percentage shares:							
Calculation periods Tourism subtypes	Year 2007		Year 2008		Year 2009		
	Winter 2007	Summer 2007	Winter 2008	Summer 2008	Winter 2009	Summer 2009	
SPA	n.a.	n.a.	18,50	25,10	n.a.	n.a.	
Wellness	n.a.	n.a.	6,50	14,30	n.a.	n.a.	
Balneological tourism	n.a.	n.a.	4,90	4,60	n.a.	n.a.	**Average % share for the observed period - Kbswt**
Total:	12,80	30,80	29,90	44,00	26,60	14,60	
Annual average:	**21,80**		**36,95**		**20,60**		**26,45**

Source: Dimitrov, P., 2010, Data by "NOEMA", MBMD and "Sinesta" Consortium

Graphic 4: Plotting of the results form the miscellaneous forecast methods for past and future time periods



Source: Dimitrov, P., 2011

The model, presented in Table 2, have of course many weak points. The first consideration in this regard is the fact that the coefficient K_{swt} is calculated on the assumption that it will remain constant in value throughout all the forecast periods. The only reason for accepting of such a

rough assumption is the scarcity of statistical records on which to build a separate model for the development of the coefficient in the course of time. The second week point is that the coefficient K_{swt} is calculated on the basis of data received from sample surveys, which on the other hand are conducted by different companies and thus there are: (i) probability errors in the data collected; and (ii) some, though not quite big, differences in the size of the samples and in the methodologies of surveys. The third week point comes in the fact that due to the already mentioned lack of previous data only three consequent years have been used for the calculation of the coefficient K_{swt}. However, this is yet a try to overcome the entire lack of regular statistic data for the spa and wellness tourism in Bulgaria.

Graphic 5: Double exponential smoothing through SPSS – best-fit model in regard to the mean absolute percentage of error (MAPE)

Model Description

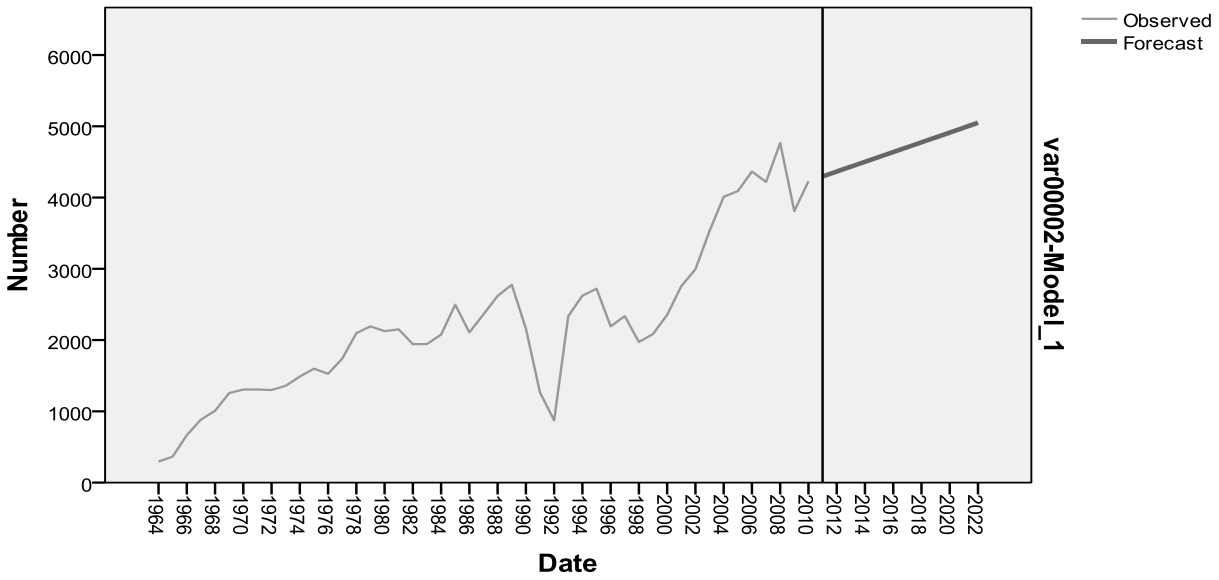
			Model Type
Model ID	Total number of FVs with recr. and/or hol. aims (in thousands)	Model_1	Holt

Model Statistics

Model	Number of Predictors	Model Fit statistics		Ljung-Box Q(18)			Number of Outliers
		Stationary R-squared	MAPE	Statistics	DF	Sig.	
Total number of FVs with recr. and/or hol. aims (in thousands)-Model_1	0	,499	12,715	15,039	16	,522	0

Exponential Smoothing Model Parameters

Model			Estimate	SE	t	Sig.
Total number of FVs with recr. and/or hol. aims (in thousands)-Model_1	No Transformation	Alpha (Level)	,999	,153	6,534	,000
		Gamma (Trend)	1,599E-5	,049	,000	1,000



Source: Dimitrov, P., 2011

Having calculated the value of K_{swt} and using equation (6), as well as the data in Graphic 1 and 2 and Table 1, the forecasts of the number of the foreign visitors with spa and wellness tourism aims to Bulgaria for 2022 can be easily made. An even simpler way to do some of the necessary calculations is to multiply the already presented pessimistic, most optimistic and lowest MAPE level forecasts for the general indicator "number of

foreign visitors with recreation and holiday aims" by the decimal value of K_{swt}, i.e. 0.2645, as follows:

- The pessimistic forecast for 2022 (the forecast with the lowest value) – calculated by the linear trend equation method:
  F^{swt}_{T+1} = 0.2645 x 4 621 000 = 1222 255 foreign visitors with spa and wellness aims;

- The forecast (calculated by the use of SPSS) with the lowest mean absolute percentage of error (MAPE) – calculated by the method of the double exponential smoothing with α=0.999 and β=1.599x10^{-5}:
  F^{swt}_{T+1} = 0.2645 x 5 049 000 = 1 335 461 foreign visitors with spa and wellness aims;

- The most optimistic forecast (the forecast with highest value) – calculated by the method of the one-parameter double exponential smoothing with α=β=0.30:
  F^{swt}_{T+1} = 0.2645 x 6 283 000 = 1 661 853 foreign visitors.

4. CONCLUSIONS

The presented pessimistic, most optimistic and lowest MAPE level forecasts for the number of foreign visitors in Bulgaria with aims to practice spa and wellness tourism suggest that by 2022 it will vary roughly between 1 million 222 thousand and 1 million 662 thousand. Thus the steady growth of the Bulgarian spa and wellness tourism industry will continue with the presence of certain fluctuations which however will not endanger the positive long-term investment decisions in this subsector.

The presented in the paper forecasting technology, though having many shortcomings, could be applied also for other countries, which have unsteady and insufficient statistical records on the spa and wellness tourism. The main precondition for using this forecasting technology is to have a sustainable time series of a general tourism indicator such as "number of foreign visitors" and at least some clue about the size, the impact of the cultural tourism on this very same indicator. This clue could be produced out either of a market research, or as a by-product of another type of economic study.

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