Annals of "Dunarea de Jos" University of Galati
Fascicle I. Economics and Applied Informatics
Years XXVI – nº1/2020
ISSN-L 1584-0409 ISSN-Online 2344-441X
www.eia.feaa.ugal.ro

DOI https://doi.org/10.35219/eai1584040997

The Coca-Cola and Pepsi-Cola Businesses, „Fizzy Meeting" in the Management of the Pole Position

Gabriela OPAIT*

ARTICLE INFO

Article history:
Accepted March 2020
Available online May 2020
JEL Classification
C1, C12, C2

Keywords:
Electronic Coke Bottle „Star Wars", Energy-Drinks, Portfolio of Brands, Rockstar Energy

ABSTRACT

The Coca-Cola was interpolated in the "jungle of the businesses" by the pharmacist John Stith Pemberton in January 29, 1886, in Atlanta, and under the profile of company, she was included by Asa Griggs Candler in 1892, in the same town from the United States of America. The establishment of the Pepsi-Cola business was achieved by Caleb Bradham, in August 28,1898, at New Bern, North Carolina and today, PepsiCo Inc. has the seat in Harrison, New York, the United States of America. The Coca-Cola Company and the PepsiCo Inc. are two stars which keep the them competition at the parameters very high in the galaxy of the businesses.

1. Introduction

The Coca-Cola Company brings on the first worldwide place, which has as target the beverage industry, because this business is the biggest on Terra. On the worldwide scale of the net revenue issued from the cash-flow which belongs to the food and beverage sphere, PepsiCo Inc. ocuppies the second level, after Nestlé. If we focuse the cooling drink sphere, PepsiCo Inc. is positioned on the same second place, after the Coca Cola Company. Beyond 200 countries „savour" with pleasure the products offered by PepsiCo Inc. and this effect it materializes since the PepsiCo business is fond to bring a smile to all the people from the world. In April 2020, the Coca-Cola Company innovated at worldwide level, the first electronic Coke bottle with the name „Star Wars", wich has a LED on the line of the sword designed on her tag. The statistical target in this research follows the achievement of the comparison between these two „giants" which conquered the „cooling drink planet" and also, the „sketching" of predictions concerning the worldwide revenues for these two forces. In the first „archaeological step" of this original approach, we can go „trekking" in the sphere of the previsions and we can see the worldwide revenues in 2020 for the Coca-Cola Company. In the second step, we access the „land" which offers us the model of prediction and the value in 2020 of the worldwide revenues for PepsiCo Inc. For materialize these objectives, we seted and used the method of prevision which was positioned in value by the „Least Squares Method". Johann Carl Friedrich Gauss was the inventor, in 1823, of the „Least Squares Method", which is the „accelerator of particles" through we have the possibility to „illuminate" the profiles of the values for the equations's parameters.

2. The „spectral analyse" concerning the worldwide revenues for the Coca-ColaCompany, which has as target them estimation in 2020

Table 1. The „ranking" concerning the Coca-Cola's worldwide revenues, in 2006-2019

YEARS	COCA-COLA'S WORLDWIDE REVENUES (Billions $) (ξ_i)
2006	24,088
2007	28,857
2008	31,944
2009	30,990
2010	35,119
2011	46,542
2012	48,017
2013	46,854

*Dunarea de Jos University of Galati, Romania. E-mail address: gabriela.opait@ugal.ro (G. Opait)

YEARS	COCA-COLA'S WORLDWIDE REVENUES
2014	**45,998**
2015	**44,294**
2016	**41,863**
2017	**35,410**
2018	**31,856**
2019	**37,266**

Source: „Statista Portal the United States of America"

- if the „arsenal" of the mathematical operations for the ξ variable, where ξ = **the Coca-Cola's worldwide revenues,** exposes as effect a linear itinerary, $\xi_{t_i} = a + b \cdot t_i$, *a* and *b* will be [2]:

Table 2. The rank regarding the Coca-Cola's worldwide revenues, if this brings forward a linear itinerary

YEARS	COCA-COLA'S WORLDWIDE REVENUES (Billions $) (ξ_i)	LINEAR TENDENCY				
		t_i	t_i^2	$t_i\xi_i$	$\xi_{t_i} = a + bt_i$	$\lvert\xi_i - \xi_{t_i}\rvert$
2006	**24,088**	-7	49	-168,616	32,88431429	8,796
2007	**28,857**	-6	36	-173,142	33,58551429	4,729
2008	**31,944**	-5	25	-159,720	34,28671429	2,343
2009	**30,990**	-4	16	-123,960	34,98791429	3,998
2010	**35,119**	-3	9	-105,357	35,68911429	0,570
2011	**46,542**	-2	4	-93,084	36,39031429	10,152
2012	**48,017**	-1	1	-48,017	37,09151429	10,925
2013	**46,854**	+1	1	+46,854	38,49391429	8,360
2014	**45,998**	+2	4	+91,996	39,19511429	6,803
2015	**44,294**	+3	9	+132,882	39,89631429	4,398
2016	**41,863**	+4	16	+167,452	40,59751429	1,265
2017	**35,410**	+5	25	+177,050	41,29871429	5,889
2018	**31,856**	+6	36	+191,136	41,99991429	10,144
2019	**37,266**	+7	49	+260,862	42,70111429	5,435
TOTAL	**529,098**	0	280	196,336	529,098	83,807

$$a = \frac{\sum_{i=1}^{n}\xi_i \sum_{i=1}^{n} t_i^{\,2} - \sum_{i=1}^{n}\xi_i t_i \sum_{i=1}^{n} t_i}{n\sum_{i=1}^{n} t_i^{\,2} - \left(\sum_{i=1}^{n} t_i\right)^2} = \frac{529{,}098 \cdot 280}{14 \cdot 280} = 37{,}79271429 \quad b = \frac{n\sum_{i=1}^{n}\xi_i t_i - \sum_{i=1}^{n} t_i \sum_{i=1}^{n}\xi_i}{n\sum_{i=1}^{n} t_i^{\,2} - \left(\sum_{i=1}^{n} t_i\right)^2} = \frac{14 \cdot 196{,}336}{14 \cdot 280} = 0{,}7012$$

$$v_I = \left[\frac{\sum_{i=1}^{m}\left|\xi_i - \xi_{t_i}^{I}\right|}{n} : \frac{\sum_{i=1}^{m}\xi_i}{n}\right] \cdot 100 = \frac{\sum_{i=1}^{m}\left|\xi_i - \xi_{t_i}^{I}\right|}{\sum_{i=1}^{m}\xi_i} \cdot 100 = \frac{83{,}807}{529{,}098} \cdot 100 = 15{,}84\%$$

- if the „arsenal" of the mathematical operations for ξ variable, where ξ = **the Coca-Cola's worldwide revenues,** „exposes" as effect a parabolic itinerary, $\xi_{t_i} = a + b \cdot t_i + ct_i^2$, *a* and *b* will be [2]:

Table 3. The rank concerning the Coca-Cola's worldwide revenues, if this brings forward a quadratic itinerary

YEARS	COCA-COLA'S WORLDWIDE REVENUES (Billions $) (ξ_i)	PARABOLIC TENDENCY					
		t_i	t_i^2	t_i^4	$t_i^2\xi_i$	$\xi_{t_i} = a + bt_i + ct_i^2$	$\lvert\xi_i - \xi_{t_i}\rvert$
2006	**24,088**	-7	49	2401	1180,312	22,36717679	6,490
2007	**28,857**	-6	36	1296	1038,852	27,78295568	1,074
2008	**31,944**	-5	25	625	798,600	32,47341473	0,529
2009	**30,990**	-4	16	256	495,840	36,43855396	5,449

YEARS	COCA-COLA'S WORLDWIDE REVENUES (Billions $) (ξ_i)	PARABOLIC TENDENCY					
		t_i	t_i^2	t_i^4	$t_i^2\xi_i$	$\xi_{t_i} = a + bt_i + ct_i^2$	$\lvert\xi_i - \xi_{t_i}\rvert$
2010	**35,119**	-3	9	81	316,071	39,67837335	4,559
2011	**46,542**	-2	4	16	186,168	42,19287292	4,349
2012	**48,017**	-1	1	1	48,017	43,98205267	4,035
2013	**46,854**	+1	1	1	46,854	45,38445267	1,470
2014	**45,998**	+2	4	16	183,992	44,99767292	1,000
2015	**44,294**	+3	9	81	398,646	43,88557335	0,408
2016	**41,863**	+4	16	256	669,808	42,04815396	0,185
2017	**35,410**	+5	25	625	885,250	39,48541473	4,075
2018	**31,856**	+6	36	1296	1146,816	36,19735568	4,341
2019	**37,266**	+7	49	2401	1826,034	32,18446679	5,081
TOTAL	**529,098**	0	280	9352	9221,260	529,098	43,045

$$a = \frac{\sum_{i=1}^{n} t_i^4 \sum_{i=1}^{n} \xi_i - \sum_{i=1}^{n} t_i^2 \sum_{i=1}^{n} t_i^2 \cdot \xi_i}{n\sum_{i=1}^{n} t_i^{\,4} - \left(\sum_{i=1}^{n} t_i^2\right)^2} = \frac{9352 \cdot 529{,}098 - 280 \cdot 9221{,}26}{14 \cdot 9352 - 280^2} = 45{,}04591258$$

$$b = \frac{\sum_{i=1}^{n} \xi_i t_i}{\sum_{i=1}^{n} t_i^{\,2}} = \frac{196{,}336}{280} = 0{,}7012$$

$$c = \frac{n \cdot \sum_{i=1}^{n} t_i^2 \cdot \xi_i - \sum_{i=1}^{n} t_i^2 \cdot \sum_{i=1}^{n} \xi_i}{n\sum_{i=1}^{n} t_i^{\,4} - \left(\sum_{i=1}^{n} t_i^2\right)^2} = \frac{14 \cdot 9221{,}26 - 280 \cdot 529{,}098}{14 \cdot 9352 - 280^2} = -0{,}362659914$$

$$v_{II} = \left[\frac{\sum_{i=1}^{m} \left|\xi_i - \xi_{t_i}^{II}\right|}{n} : \frac{\sum_{i=1}^{m} \xi_i}{n}\right] \cdot 100 = \frac{\sum_{i=1}^{m} \left|\xi_i - \xi_{t_i}^{II}\right|}{\sum_{i=1}^{m} \xi_i} \cdot 100 = \frac{43{,}045}{529{,}098} \cdot 100 = 8{,}14\%$$

- if the „arsenal" of the mathematical operations for ξ variable, where ξ **= the Coca-Cola's worldwide revenues,** „exposes" as effect a parabolic itinerary of three degree, $\xi_{t_i} = a + b \cdot t_i + ct_i^2 + dt_i^3$, *a, b, c* and *d* will be [2]:

Table 4. The rank regarding the Coca-Cola's worldwide revenues, if this brings forward a quadratic itinerary of three degree

YEARS	COCA-COLA'S WORLDWIDE REVENUES (Billions $) (ξ_i)	PARABOLIC TENDENCY OF THREE DEGREE							
		t_i	t_i^2	t_i^3	t_i^4	t_i^6	$t_i^3\xi_i$	$\xi_{t_i} = a + b \cdot t_i + ct_i^2 + dt_i^3$	$\lvert\xi_i - \xi_{t_i}\rvert$
2006	**24,088**	-7	49	-343	2401	117649	-8262,184	-0,202321997	24,290
2007	**28,857**	-6	36	-216	1296	46656	-6233,112	5,632220038	23,225
2008	**31,944**	-5	25	-125	625	15625	-3993,000	12,03626577	19,908
2009	**30,990**	-4	16	-64	256	4096	-1983,360	18,79401126	12,200
2010	**35,119**	-3	9	-27	81	729	-9482,130	25,68965262	9,429
2011	**46,542**	-2	4	-8	16	64	-372,336	31,93190878	14,610
2012	**48,017**	-1	1	-1	1	1	-48,017	39,03140719	8,986
2013	**46,854**	+1	1	+1	1	1	+46,854	50,33509840	3,481
2014	**45,998**	+2	4	+8	16	64	+367,984	54,68315995	8,685

YEARS	COCA-COLA'S WORLDWIDE REVENUES (Billions $) (ξ_i)	PARABOLIC TENDENCY OF THREE DEGREE							
		t_i	t_i^2	t_i^3	t_i^4	t_i^6	$t_i^3\xi_i$	$\xi_{t_i} = a + b \cdot t_i + ct_i^2 + dt_i^3$	$\lvert\xi_i - \xi_{t_i}\rvert$
2015	**44,294**	+3	9	+27	81	729	+1195,938	57,87429409	13,580
2016	**41,863**	+4	16	+64	256	4096	+2679,232	59,69269665	17,830
2017	**35,410**	+5	25	+125	625	15625	+4426,250	59,92256370	24,513
2018	**31,856**	+6	36	+216	1296	46656	+6880,896	58,34809131	26,492
2019	**37,266**	+7	49	+343	2401	117649	+12782,238	54,75347559	17,488
TOTAL	**529,098**	0	280		9352	369640	-1994,747	529,098	224,717

$$a = \frac{\sum_{i=1}^{n} t_i^4 \sum_{i=1}^{n} \xi_i - \sum_{i=1}^{n} t_i^2 \sum_{i=1}^{n} t_i^2 \cdot \xi_i}{n\sum_{i=1}^{n} t_i{}^4 - \left(\sum_{i=1}^{n} t_i^2\right)^2} = \frac{9352 \cdot 529098 - 280 \cdot 9221{,}26}{14 \cdot 9352 - 280^2} = 45{,}04591258$$

$$b = \frac{\sum_{i=1}^{n} t_i^6 \cdot \sum_{i=1}^{n} t_i \cdot \xi_i - \sum_{i=1}^{n} t_i^4 \cdot \sum_{i=1}^{n} t_i^3 \cdot \xi_i}{\sum_{i=1}^{n} t_i{}^2 \cdot \sum_{i=1}^{n} t_i^6 - \left(\sum_{i=1}^{n} t_i^4\right)^2} = \frac{369640 \cdot 196{,}336 - 9352 \cdot (-1994{,}747)}{280 \cdot 369640 - 9352^2} = 5{,}687812793$$

$$c = \frac{n \cdot \sum_{i=1}^{n} t_i^2 \cdot \xi_i - \sum_{i=1}^{n} t_i^2 \cdot \sum_{i=1}^{n} \xi_i}{n\sum_{i=1}^{n} t_i{}^4 - \left(\sum_{i=1}^{n} t_i^2\right)^2} = \frac{14 \cdot 9221{,}26 - 280 \cdot 529{,}098}{14 \cdot 9352 - 280^2} = -0{,}362659914$$

$$d = \frac{\sum_{i=1}^{n} t_i^2 \cdot \sum_{i=1}^{n} t_i^3 \cdot \xi_i - \sum_{i=1}^{n} t_i^4 \cdot \sum_{i=1}^{n} t_i \cdot \xi_i}{\sum_{i=1}^{n} t_i{}^2 \cdot \sum_{i=1}^{n} t_i^6 - \left(\sum_{i=1}^{n} t_i^4\right)^2} = \frac{280 \cdot (-1994{,}747) - 9352 \cdot 196{,}336}{280 \cdot 369640 - 9352^2} = -0{,}03596732$$

$$v_{III} = \left[\frac{\sum_{i=1}^{m} \left|\xi_i - \xi_{t_i}^{III}\right|}{n} : \frac{\sum_{i=1}^{m} \xi_i}{n}\right] \cdot 100 = \frac{\sum_{i=1}^{m} \left|\xi_i - \xi_{t_i}^{III}\right|}{\sum_{i=1}^{m} \xi_i} \cdot 100 = \frac{224{,}717}{529{,}098} \cdot 100 = 42{,}47\%$$

- if the „arsenal" of the mathematical operations for ξ variable, where ξ **= the Coca-Cola's worldwide revenues,** „exposes" as effect an exponential itinerary, $\xi_{t_i} = ab^{t_i}$, *a* and *b* will be [2]:

$$\lg a = \frac{\begin{vmatrix} \sum_{i=1}^{n} \lg \xi_i & \sum_{i=1}^{n} t_i \\ \sum_{i=1}^{n} t_i \lg \xi_i & \sum_{i=1}^{n} t_i{}^2 \end{vmatrix}}{\begin{vmatrix} n & \sum_{i=1}^{n} t_i \\ \sum_{i=1}^{n} t_i & \sum_{i=1}^{n} t_i{}^2 \end{vmatrix}} = \frac{\sum_{i=1}^{n} \lg \xi_i \sum_{i=1}^{n} t_i{}^2 - \sum_{i=1}^{n} t_i \lg \xi_i \sum_{i=1}^{n} t_i}{n\sum_{i=1}^{n} t_i{}^2 - \left(\sum_{i=1}^{n} t_i\right)^2} \qquad \lg b = \frac{\begin{vmatrix} n & \sum_{i=1}^{n} \lg \xi_i \\ \sum_{i=1}^{n} t_i & \sum_{i=1}^{n} t_i \lg \xi_i \end{vmatrix}}{\begin{vmatrix} n & \sum_{i=1}^{n} t_i \\ \sum_{i=1}^{n} t_i & \sum_{i=1}^{n} t_i{}^2 \end{vmatrix}} = \frac{n \cdot \sum_{i=1}^{n} t_i \lg \xi_i - \sum_{i=1}^{n} \lg \xi_i \sum_{i=1}^{n} t_i}{n\sum_{i=1}^{n} t_i{}^2 - \left(\sum_{i=1}^{n} t_i\right)^2}$$

Table 5. The rank concerning the Coca-Cola's worldwide revenues, if this brings forward an exponential itinerary

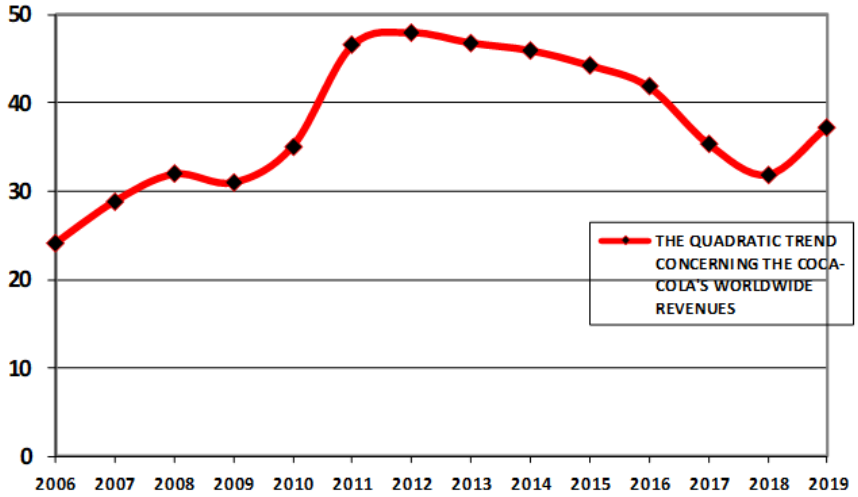
YEARS	COCA-COLA'S WORLDWIDE REVENUES (Billions $) (ξ_i)	EXPONENTIAL TENDENCY					
		t_i	$\lg \xi_i$	$t_i \lg \xi_i$	$\lg \xi_{t_i} = \lg a + t_i \lg b$	$\xi_{t_i} = ab^{t_i}$	$\lvert \xi_i - \xi_{t_i} \rvert$
2006	**24,088**	-7	1,381800743	-9,672605198	1,111328882	12,92197457	11,166
2007	**28,857**	-6	1,460251179	-8,761507077	1,512440622	32,54172885	3,685
2008	**31,944**	-5	1,504389297	-7,521946486	1,521768802	33,24825081	1,304
2009	**30,990**	-4	1,491221576	-5,964886305	1,531096982	33,97011225	2,980
2010	**35,119**	-3	1,545542141	-4,636626423	1,540425162	34,70764622	0,411
2011	**46,542**	-2	1,667845042	-3,335690084	1,549753342	35,46119298	11,081
2012	**48,017**	-1	1,681395023	-1,681395023	1,559081522	36,23110019	11,786
2013	**46,854**	+1	1,670746673	1,670746673	1,577737882	37,82142450	9,033
2014	**45,998**	+2	1,662738949	3,325477898	1,587066062	38,64257531	7,355
2015	**44,294**	+3	1,646344901	4,939034704	1,596394242	39,48155434	4,812
2016	**41,863**	+4	1,621830348	6,487321391	1,605722422	40,33874867	1,524
2017	**35,410**	+5	1,549125927	7,745629634	1,615050602	41,21455376	5,805
2018	**31,856**	+6	1,503191243	9,019147456	1,624378782	42,10937369	10,253
2019	**37,266**	+7	1,571312780	10,99918946	1,633706962	43,02362128	5,758
TOTAL	**529,098**	0	21,95773582	2,611890617			86,953

$$\lg a = \frac{21{,}95773582 \cdot 280}{14 \cdot 280} = 1{,}568409702 \quad \lg b = \frac{14 \cdot 2{,}611890617}{14 \cdot 280} = 0{,}00932818$$

$$v_{\exp} = \left[\frac{\sum_{i=1}^{n} \left| \xi_i - \xi_{t_i}^{\exp} \right|}{n} : \frac{\sum_{i=1}^{n} \xi_i}{n} \right] \cdot 100 = \frac{\sum_{i=1}^{n} \left| \xi_i - \xi_{t_i}^{\exp} \right|}{\sum_{i=1}^{n} \xi_i} \cdot 100 = \frac{86{,}953}{529{,}098} \cdot 100 = 16{,}43\%$$

$$v_{II} = 8{,}14 < v_I = 15{,}84\% < v_{\exp} = 16{,}43\% < v_{III} = 42{,}47\%$$

The „portfolio of the mathematical operations", which supervisas **the Coca-Cola's worldwide revenues**, brings forward a quadratic itinerary $\xi_{t_i} = a + b \cdot t_i + ct_i^2$



Graph 1. The quadratic itinerary for the values which stipulate the dynamics of the Coca-Cola's worldwide revenues

$$\xi_{2020}^{COCA\text{-}COLA'S\_REVENUES} = 45{,}04591258 + 0{,}7012 \cdot 8 + (-0{,}362659914) \cdot 8^2 = 27{,}445\_\$billions$$

3. The „spectral analyse" regarding the worldwide revenues for the PepsiCo Inc., which has as target them estimation in 2020

Table 6. The „ranking" regarding the PepsiCo Inc.'s worldwide revenues, in 2006-2019

YEARS	PEPSICO INC.'S WORLDWIDE REVENUES (billions $) (ω_i)
2006	**35,137**
2007	**39,474**
2008	**43,251**
2009	**43,232**
2010	**57,838**
2011	**66,504**
2012	**65,492**
2013	**66,415**
2014	**66,683**
2015	**63,056**
2016	**62,799**
2017	**63,525**
2018	**64,661**
2019	**67,161**

Source: „Statista Portal the United States of America"

- if the „arsenal" of the mathematical operations for ω variable, where ω = **the PepsiCo Inc.'s worldwide revenues**, „exposes" as effect a linear itinerary, $\omega_{t_i} = a + b \cdot t_i$, *a* and *b* will be [2]:

Table 7. The rank of numbers concerning the PepsiCo Inc.'s worldwide revenues, if this brings forward a linear itinerary

YEARS	PEPSICO INC.'S WORLDWIDE REVENUES (billions $) (ω_i)	LINEAR TENDENCY				
		t_i	t_i^2	$t_i\omega_i$	$\omega_{t_i} = a + bt_i$	$\lvert\omega_i - \omega_{t_i}\rvert$
2006	**35,137**	-7	49	-245,959	43,21971071	8,083
2007	**39,474**	-6	36	-236,844	45,26207857	5,788
2008	**43,251**	-5	25	-216,255	47,30444643	4,053
2009	**43,232**	-4	16	-172,928	49,34681428	6,115
2010	**57,838**	-3	9	-173,514	51,38918214	6,449
2011	**66,504**	-2	4	-133,008	53,43155000	13,072
2012	**65,492**	-1	1	-65,492	55,47391785	10,018
2013	**66,415**	+1	1	+66,415	59,55865357	6,856
2014	**66,683**	+2	4	+133,366	61,60102142	5,082
2015	**63,056**	+3	9	+189,168	63,64338928	0,587
2016	**62,799**	+4	16	+251,196	65,68575714	2,887
2017	**63,525**	+5	25	+317,625	67,72812500	4,203
2018	**64,661**	+6	36	+387,966	69,77049285	5,110
2019	**67,161**	+7	49	+470,127	71,81286071	4,652
TOTAL	**805,228**	0	280	571,863	**805,228**	82,955

$$a = \frac{\sum_{i=1}^{n}\omega_i \sum_{i=1}^{n} t_i^{\,2} - \sum_{i=1}^{n}\omega_i t_i \sum_{i=1}^{n} t_i}{n\sum_{i=1}^{n} t_i^{\,2} - \left(\sum_{i=1}^{n} t_i\right)^2} = \frac{805{,}228 \cdot 280}{14 \cdot 280} = 57{,}51628571$$

$$b=\frac{n\sum_{i=1}^{n}\omega_i t_i-\sum_{i=1}^{n}t_i\sum_{i=1}^{n}\omega_i}{n\sum_{i=1}^{n}t_i{}^2-\left(\sum_{i=1}^{n}t_i\right)^2}=\frac{14\cdot 571{,}863}{14\cdot 280}=2{,}042367857$$

$$v_I=\left[\frac{\sum_{i=1}^{n}\left|\omega_i-y_{t_i}^{I}\right|}{n}:\frac{\sum_{i=1}^{n}\omega_i}{n}\right]\cdot 100=\frac{\sum_{i=1}^{n}\left|\omega_i-\omega_{t_i}^{I}\right|}{\sum_{i=1}^{n}\omega_i}\cdot 100=\frac{82{,}955}{805{,}228}\cdot 100=10{,}30\%$$

- if the „arsenal" of the mathematical operations for ω variable, where ω = **the PepsiCo Inc.'s worldwide revenues**, „exposes" as effect a quadratic itinerary, $\omega_{t_i}=a+b\cdot t_i+ct_i^2$, *a* and *b* will be [2]:

Table 8. The rank of numbers regarding the PepsiCo Inc.'s worldwide revenues, if this brings forward a quadratic itinerary

YEARS	PEPSICO INC.'S WORLDWIDE REVENUES (billions $) (ω_i)	PARABOLIC TENDENCY					
		t_i	t_i^2	t_i^4	$t_i^2\omega_i$	$\omega_{t_i}=a+bt_i+ct_i^2$	$\left\|\omega_i-\omega_{t_i}\right\|$
2006	**35,137**	-7	49	2401	1721,713	33,75528404	1,382
2007	**39,474**	-6	36	1296	1421,064	40,04032593	0,566
2008	**43,251**	-5	25	625	1081,275	45,67264874	2,422
2009	**43,232**	-4	16	256	691,712	50,65225247	7,421
2010	**57,838**	-3	9	81	520,542	54,97913711	2,859
2011	**66,504**	-2	4	16	266,016	58,65330267	7,851
2012	**65,492**	-1	1	1	65,492	61,67474915	3,817
2013	**66,415**	+1	1	1	66,415	65,75948487	0,655
2014	**66,683**	+2	4	16	266,732	66,82277410	0,140
2015	**63,056**	+3	9	81	567,504	67,23334425	4,177
2016	**62,799**	+4	16	256	1004,784	66,99119532	4,192
2017	**63,525**	+5	25	625	1588,125	66,09632731	2,571
2018	**64,661**	+6	36	1296	2327,796	64,54874022	0,112
2019	**67,161**	+7	49	2401	3290,889	62,34843404	4,813
TOTAL	**805,228**	0	280	9352	14880,059		42,978

$$a=\frac{\sum_{i=1}^{n}t_i^4\sum_{i=1}^{n}\omega_i-\sum_{i=1}^{n}t_i^2\sum_{i=1}^{n}t_i^2\cdot\omega_i}{n\sum_{i=1}^{n}t_i{}^4-\left(\sum_{i=1}^{n}t_i^2\right)^2}=\frac{9352\cdot 805{,}228-280\cdot 14880{,}059}{14\cdot 9352-280^2}=64{,}04347655$$

$$b=\frac{\sum_{i=1}^{n}\omega_i t_i}{\sum_{i=1}^{n}t_i{}^2}=\frac{571{,}863}{280}=2{,}042367857$$

$$c=\frac{n\cdot\sum_{i=1}^{n}t_i^2\cdot\omega_i-\sum_{i=1}^{n}t_i^2\cdot\sum_{i=1}^{n}\omega_i}{n\sum_{i=1}^{n}t_i{}^4-\left(\sum_{i=1}^{n}t_i^2\right)^2}=\frac{14\cdot 14880{,}059-280\cdot 805{,}228}{14\cdot 9352-280^2}=-0{,}326359541$$

$$v_{II}=\left[\frac{\sum_{i=1}^{n}\left|\omega_i-\omega_{t_i}^{II}\right|}{n}:\frac{\sum_{i=1}^{n}\omega_i}{n}\right]\cdot 100=\frac{\sum_{i=1}^{n}\left|\omega_i-\omega_{t_i}^{II}\right|}{\sum_{i=1}^{n}\omega_i}\cdot 100=\frac{42{,}978}{805{,}228}\cdot 100=5{,}34\%$$

- if the „arsenal" of the mathematical operations for ω variable, where ω **= the PepsiCo Inc's worldwide revenues,** „exposes" as effect a parabolic itinerary of three degree, $\omega_{t_i} = a + b \cdot t_i + ct_i^2 + dt_i^3$, *a, b, c* and *d* will be [2]:

Table 9. The rank of numbers concerning the PepsiCo Inc.'s worldwide revenues, if this brings forward a quadratic itinerary of three degree

YEARS	PEPSICO INC.'S WORLDWIDE REVENUES (billions $) (ω_i)	PARABOLIC TENDENCY OF THREE DEGREE							
		t_i	t_i^2	t_i^3	t_i^4	t_i^6	$t_i^3\omega_i$	$\omega_{t_i} = a + b \cdot t_i + ct_i^2 + dt_i^3$	$\lvert\omega_i - \omega_{t_i}\rvert$
2006	**35,137**	-7	49	-343	2401	117649	-12051,991	31,36442048	3,773
2007	**39,474**	-6	36	-216	1296	46656	-8526,384	39,69877407	0,225
2008	**43,251**	-5	25	-125	625	15625	-5406,375	46,59221177	3,341
2009	**43,232**	-4	16	-64	256	4096	-2766,848	50,86500336	7,633
2010	**57,838**	-3	9	-27	81	729	-1561,626	56,58180402	1,256
2011	**66,504**	-2	4	-8	16	64	-532,032	59,94069084	6,563
2012	**65,492**	-1	1	-1	1	1	-65,492	62,38412630	3,108
2013	**66,415**	+1	1	+1	1	1	+66,415	65,05010772	1,365
2014	**66,683**	+2	4	+8	16	64	+533,464	65,53538594	1,148
2015	**63,056**	+3	9	+27	81	729	+1702,512	65,63067735	2,575
2016	**62,799**	+4	16	+64	256	4096	+4019,136	65,46734808	2,668
2017	**63,525**	+5	25	+125	625	15625	+7940,625	65,17676428	1,652
2018	**64,661**	+6	36	+216	1296	46656	+13966,776	64,89029208	0,229
2019	**67,161**	+7	49	+343	2401	117649	+23036,223	64,73929761	2,422
TOTAL	**805,228**	0	280		9352	369640	20354,403		37,958

$$a = \frac{\sum_{i=1}^{n} t_i^4 \sum_{i=1}^{n} \omega_i - \sum_{i=1}^{n} t_i^2 \sum_{i=1}^{n} t_i^2 \cdot \omega_i}{n\sum_{i=1}^{n} t_i^{\,4} - \left(\sum_{i=1}^{n} t_i^2\right)^2} = \frac{9352 \cdot 805{,}228 - 280 \cdot 14880{,}059}{14 \cdot 9352 - 280^2} = 64{,}04347655$$

$$b = \frac{\sum_{i=1}^{n} t_i^6 \cdot \sum_{i=1}^{n} t_i \cdot \omega_i - \sum_{i=1}^{n} t_i^4 \cdot \sum_{i=1}^{n} t_i^3 \cdot \omega_i}{\sum_{i=1}^{n} t_i^{\,2} \cdot \sum_{i=1}^{n} t_i^6 - \left(\sum_{i=1}^{n} t_i^4\right)^2} = \frac{369640 \cdot 571{,}863 - 9352 \cdot 20354{,}403}{280 \cdot 369640 - 9352^{\,2}} = 1{,}311096351$$

$$c = \frac{n \cdot \sum_{i=1}^{n} t_i^2 \cdot \omega_i - \sum_{i=1}^{n} t_i^2 \cdot \sum_{i=1}^{n} \omega_i}{n\sum_{i=1}^{n} t_i^{\,4} - \left(\sum_{i=1}^{n} t_i^2\right)^2} = \frac{14 \cdot 14880{,}059 - 280 \cdot 805{,}228}{14 \cdot 9352 - 280^2} = -0{,}326359541$$

$$d = \frac{\sum_{i=1}^{n} t_i^2 \cdot \sum_{i=1}^{n} t_i^3 \cdot \omega_i - \sum_{i=1}^{n} t_i^4 \cdot \sum_{i=1}^{n} t_i \cdot \omega_i}{\sum_{i=1}^{n} t_i^{\,2} \cdot \sum_{i=1}^{n} t_i^6 - \left(\sum_{i=1}^{n} t_i^4\right)^2} = \frac{280 \cdot 20354{,}403 - 9352 \cdot 571{,}863}{280 \cdot 369640 - 9352^{\,2}} = 0{,}021894356$$

$$v_{III} = \left[\frac{\sum_{i=1}^{m} \left|\omega_i - \omega_{t_i}^{III}\right|}{n} : \frac{\sum_{i=1}^{m} \omega_i}{n}\right] \cdot 100 = \frac{\sum_{i=1}^{m} \left|\omega_i - \omega_{t_i}^{III}\right|}{\sum_{i=1}^{m} \omega_i} \cdot 100 = \frac{37{,}958}{805{,}228} \cdot 100 = 4{,}71\%$$

- if the „arsenal" of the mathematical operations for ω variable, where ω = **the PepsiCo Inc.'s worldwide revenues**, „exposes" as effect an exponential itinerary, $\omega_{t_i} = ab^{t_i}$, *a* and *b* will be [2]:

Table 10. The rank of numbers regarding the PepsiCo Inc.'s worldwide revenues, if this brings forward an exponential itinerary

YEARS	PEPSICO INC.'S WORLDWIDE REVENUES (billions $) (ω_i)	EXPONENTIAL TENDENCY					
		t_i	$\lg \omega_i$	$t_i \lg \omega_i$	$\lg \omega_{t_i} = \lg a + t_i \lg b$	$\omega_{t_i} = ab^{t_i}$	$\lvert \omega_i - \omega_{t_i} \rvert$
2006	**35,137**	-7	1,545764679	- 10,82035275	1,628491614	42,51004983	7,373
2007	**39,474**	-6	1,596311137	-9,577866821	1,645847825	44,24333184	4,769
2008	**43,251**	-5	1,635996153	-8,179980766	1,663204036	46,04728576	2,796
2009	**43,232**	-4	1,635805327	-6,543221309	1,680560247	47,92479314	4,693
2010	**57,838**	-3	1,762213267	-5,286639801	1,697916458	49,87885300	7,959
2011	**66,504**	-2	1,822847767	-3,645695535	1,715272669	51,91258665	14,591
2012	**65,492**	-1	1,816188253	-1,816188253	1,732628880	54,02924266	11,463
2013	**66,415**	+1	1,822266177	+1,822266177	1,767341302	58,52498378	7,890
2014	**66,683**	+2	1,824015130	+3,648030260	1,784697513	60,91125014	5,772
2015	**63,056**	+3	1,799726418	+5,399179253	1,802053724	63,39481284	0,339
2016	**62,799**	+4	1,797952728	+7,191810913	1,819409935	65,97963900	3,181
2017	**63,525**	+5	1,802944674	+9,014723369	1,836766146	68,66985747	5,145
2018	**64,661**	+6	1,810642417	+10,863854500	1,854122357	71,46976548	6,809
2019	**67,161**	+7	1,827117154	+12,789820080	1,871478568	74,38383543	7,223
TOTAL	**805,228**		24,49979128	4,859739315			90,003

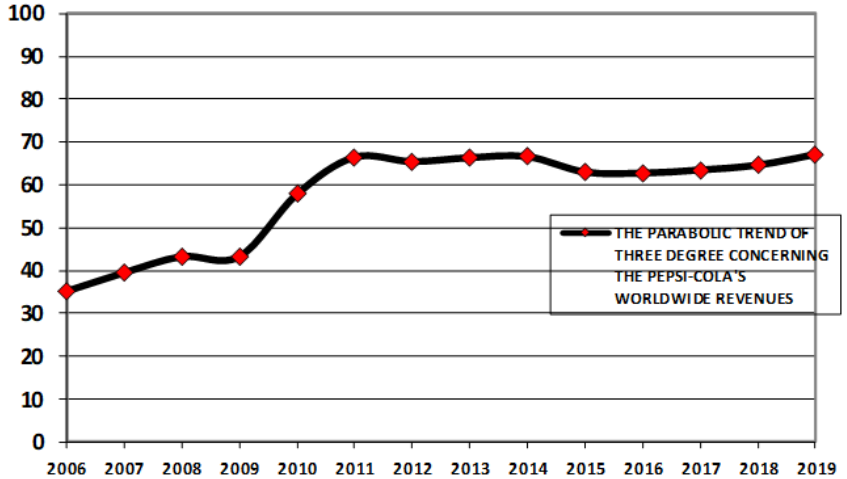
$$\lg a = \frac{\sum_{i=1}^{n} \lg \omega_i \sum_{i=1}^{n} t_i^2 - \sum_{i=1}^{n} t_i \lg \omega_i \sum_{i=1}^{n} t_i}{n\sum_{i=1}^{n} t_i^2 - \left(\sum_{i=1}^{n} t_i\right)^2} = \frac{24,49979128 \cdot 280}{14 \cdot 280} = 1,749985091$$

$$\lg b = \frac{n \cdot \sum_{i=1}^{n} t_i \lg \omega_i - \sum_{i=1}^{n} \lg \omega_i \sum_{i=1}^{n} t_i}{n\sum_{i=1}^{n} t_i^2 - \left(\sum_{i=1}^{n} t_i\right)^2} = \frac{14 \cdot 4,859739315}{14 \cdot 280} = 0,017356211$$

$$v_{\exp} = \left[\frac{\sum_{i=1}^{n} \left| \omega_i - \omega_{t_i}^{\exp} \right|}{n} : \frac{\sum_{i=1}^{n} \omega_i}{n} \right] \cdot 100 = \frac{\sum_{i=1}^{n} \left| \omega_i - \omega_{t_i}^{\exp} \right|}{\sum_{i=1}^{n} \omega_i} \cdot 100 = \frac{90,003}{805,228} \cdot 100 = 11,18\%$$

$$v_{III} = 4,71\% < v_{II} = 5,34\% < v_I = 10,30\% < v_{\exp} = 11,18\%$$

The „portfolio of the mathematical operations" which supervisas the evolution of the values concerning **the PepsiCo Inc. worldwide revenues**, brings forward a parabolic itinerary of three degree $\omega_{t_i} = a + b \cdot t_i + ct_i^2 + dt_i^3$



Graph 2. The quadratic itinerary of three degrees for the values which stipulate the dynamics of the PepsiCo Inc.'s worldwide revenues

$$\omega_{20202}^{PEPSICO\_REVENUES} = 64{,}04347655 + 1{,}311096351 \cdot 8 + (-0{,}326359541) \cdot 8^2 + 0{,}021894356 \cdot 8^3 = 64{,}855\_\$billions$$

4. Conclusions

While the Forbes top headed „the World's Most Brands 2019" shows that, the Coca-Cola Company is pinpointed on the sixth place and the PepsiCo Inc. is on the twenty-nine position, the Forbes display concerning „the World's Largest Public Companies 2019" pinpoints the PepsiCo. Inc on the eighty-six level and the Coca-Cola Company on the one hundred and thirty-three level. We can observe that in 2020, the Coca-Cola's worldwide revenues tend to 27,445 $ billions and the PepsiCo Inc.'s worldwide revenues reach to 64,855 $ billions. In 2019, the PepsiCo Inc. launched the new brand „For the Love of It" in 100 countries and through this action, the PepsiCo Inc. conquered the hearts of the public which have oscillations of the adrenalyne as effects of the fervent loves for the Pepsi's brands. The Coca-Cola Company and the Pepsico Inc. are two huge businesses, in a permanent competition which has positive effects in the hearts of the fans.

References

1. *Allen F. – "Secret Formula: The Inside Story of How Coca-Cola Became the Best-Known Brand in the World", Open Road Media Publishing House, New-York, 2015.*
2. *Gauss C.F. - „Disquisitiones Arithmeticae and other papers on number theory", english translation Springer Publishing House, New-York, 1986.*
3. *Gill M. – „Coke or Pepsi? 1000 Coke or Pepsi Questions 2 Ask Your Friends", Fine Print Pub Co. Publishing House, New-York, 2006.*
4. *Neville E.I., Beasley D. – „Inside Coca-Cola: A CEO's Life Story of Building the World's Most Popular Brand", St. Martins's Press Publishing House, New-York, 2011.*
5. *Stoddard B. – „Pepsi: 100 years", General Group Publishing House, Los Angeles, 1997.*