The Apple Business, the „Statistical Lump in the Neck” of the Samsung Business

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These two „hypersonic” forces from the worldwide sphere of the businesses were launched at seven years distance: the Apple Inc. Company was established in April 1, 1976, by Steve Jobs, Steve Wozniak and Ronald Wayne in Silicon Valley, California, United States of America and the Samsung Electronics Company was started in January 13, 1969, by Lee Byung Chul in Samsung Town, Seoul, South Korea. Concerning the market capitalization, the Apple business touched \$ 961,3 billions in May 15, 2019, in accordance with Forbes and she is bigger than the GDP of the Netherlands, Saudi Arabia, Argentina, Turkey and Sweden. In contrast to the Apple Inc. Company, the Samsung Electronics Company touched in May 15, 2019, a value of \$ 272,4 billions regarding the market capitalization. The aim of this research follows the achievement of the comparative statistical analysis between these two „titans” from the businesses univers, which through them competition it materialize giant progresses in the sphere of the new tech and digital tendencies.

Key words: Macintosh, iPhone, iPad, iPod, iOS, Mac Pro, MacBook Pro, Apple Pro Display XDR, QLED 8KTV, the Wall Micro LED 219”, the Wall Luxury 292”

JEL Code: C1, C12, C2.

1. Introduction

I unveil in this research an original statistical analysis focused on comparison between the Apple Inc. Company and the Samsung Electronics Company, two great worldwide leaders which drive the „businesses planet” in a powerful competition with positive effects in the sphere of the „yummy tastes” for the public which present „symptom of electronic and digital adrenalin”.

The Apple Inc. Company highlights the greatest business at the worldwide level, in the sphere of the production and marketing concerning the consumer electronics, computers and communications systems. For these achievements, the Apple business represents a model in the world of the businesses.

At the Apple Inc. Company, in the top management talent, Sir Jonathan Ive is the leader of the team who achieved the design for the iMac, iPod and iPhone. The technology and the design, in the Apple Inc. Company, make a „successful team” and this has as effect the shine of our life in „true colors”. The Apple Inc. Company is a „treasure” in the land of the innovations. Her products: Mac Pro, MacBook Pro, iPhone, iPad, iPod, Apple Watch, iOS fascinate the public in each year. In June 3, 2019, at the Apple Worldwide Developers Conference (WWDC) from San Jose, California, the Apple Inc. Company highlighted the new Mac Pro and Apple Pro Display XDR. The Apple Pro Display XDR represents a 6K panel of 32” (6016x3384 resolution) which make a strong team with him „friend” Mac Pro. This 6k Apple Pro Display XDR has a contrast ratio of 1000000 to 1, a brightness of 1000 nits and a superwide angle of 89 degrees and a strong fidelity of the colors. The display of the Apple Pro XDR includes 20,4 millions LCD pixels and 576 LED and this characteristics confers a high quality of the image which cans to vanquishe any OLED. If Mac Pro is helped by the MPX modules, this manages in the same time six of these Apple Pro Display XDR.

The Samsung Electronics Company conquered the first position, at worldwide level, in the top regarding the achievement of electronic components, semiconductors, mobile phone and smartphones such as: the first, Samsung Solstice, then Samsung Galaxy and Samsung Fold. Also,

the Samsung Electronics Company creates a wide range of TV sets, computers, medical devices, digital cameras, air-conditioners, refrigerators and washing machines. At CES in Las Vegas, in January 6, 2019, the Samsung Electronics Company highlighted the biggest Samsung TV named the Wall, which contains a modular Micro LED display of 219", in contrast to CES 2018 where the Wall had 146" Micro LED display. In 2018, the Samsung Electronics Company created 85" QLED 8K Smart Tv with Quantum Processor 8K (7680x4320 resolution) and a HDR (High Dynamic Range) content at above 4000 nits. The display of the 85" QLED 8K Smart Tv contains 33 millions pixels which make an amazing resolution, a elegance and refined style in the vision of the images. In July 2019, the Samsung Electronics Company will launch on market the Wall Luxury 292" 8K Modular Tv, which includes modules joined like a LEGO and this effect achieves a spectacular picture.

The first side of this research achieves the exposure of the dynamic's configuration concerning the model which reveals the Apple's worldwide revenues between 2010-2018 and the second side displays the profile of the architecture regarding the model which unveils the dynamic of the Samsung's worldwide revenues in the same period. The third part highlights the configuration of the modelling which presents the values concerning the Apple's worldwide mobile revenues in the period 2013-2018 and the fourth section unveils the form of the model regarding the Samsung's worldwide mobile revenues in the same period. The statistical methods used in the „technique of the arsenal" for to highlight the modellings concerning the evolutions of these phenomenons are the „Least Squares Method" and the „t" test. The state of the art is „sketch" by Carl Friederich Gauss who drewed up in 1823 the „Least Squares Method" applied in statistical modellings.

2. The configuration of the modelling concerning the Apple's worldwide incomes

Table 1 The values which display the „horsepowers" in the sphere of the businesses for the both leaders Apple&Samsung concerning all the worldwide revenues

YEARS	APPLE WORLDWIDE REVENUES (BILLIONS \$)	SAMSUNG WORLDWIDE REVENUES (BILLIONS \$)
2010	65,2	134,08
2011	108,2	153,45
2012	156,5	187,02
2013	170,9	212,68
2014	182,8	191,78
2015	233,72	186,60
2016	215,64	187,74
2017	229,23	222,81
2018	265,60	219,53

The source: „Statistics Portal United States"

- if the „field of vision painted" by the values of the variable ξ = the Apple's worldwide incomes „gleams" through the „design" $\xi_{t_i} = a + b \cdot t_i$, a and b will be [3]:

$$S = \sum_{i=1}^n (\xi_i - \xi_{ti})^2 = \min \Leftrightarrow S = \sum_{i=1}^n (\xi_i - a - bt_i)^2 = \min$$

$$\begin{cases} \frac{\partial S}{\partial a} = 0 \\ \frac{\partial S}{\partial b} = 0 \end{cases} \Rightarrow \begin{cases} 2 \sum_{i=1}^n (\xi_i - a - bt_i)(-1) = 0 / (-\frac{1}{2}) \\ 2 \sum_{i=1}^n (\xi_i - a - bt_i)(-t_i) = 0 / (-\frac{1}{2}) \end{cases} \Rightarrow \begin{cases} na + b \sum_{i=1}^n t_i = \sum_{i=1}^n \xi_i \\ a \sum_{i=1}^n t_i + b \sum_{i=1}^n t_i^2 = \sum_{i=1}^n \xi_i t_i \end{cases} \Rightarrow$$

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

Table 2 The „spectral form” for the grouping of the values concerning the ξ variable, if the Apple worldwide revenues highlight a linear tendency

YEARS	APPLE WORLDWIDE REVENUES (BILLIONS \$) (ξ)	LINEAR TENDENCY				
		t_i	t_i^2	$t_i \xi_i$	$\xi_{t_i} = a + bt_i$	$ \xi_i - \xi_{t_i} $
2010	65,2	-4	16	-260,8	91,14622228	25,95
2011	108,2	-3	9	-324,6	113,5760556	5,38
2012	156,5	-2	4	-313	136,0058889	20,51
2013	170,9	-1	1	-170,9	158,4357223	12,46
2014	182,8	0	0	0	180,8655556	1,93
2015	233,72	+1	1	233,72	203,2953889	30,43
2016	215,64	+2	4	431,28	225,7252223	10,09
2017	229,23	+3	9	687,69	248,1550556	18,93
2018	265,60	+4	16	1062,4	270,5848889	4,98
TOTAL	1695,69		60	1345,79	1627,79	130,65

$$a = \frac{1627,79 \cdot 60 - 1345,79 \cdot 0}{9 \cdot 60 - 0^2} = 180,86555556$$

$$b = \frac{9 \cdot 1345,79 - 1627,79 \cdot 0}{9 \cdot 60 - 0^2} = 22,42983333$$

$$v_I = \left[\frac{\sum_{i=-m}^m |\xi_i - \xi_{t_i}|}{n} : \frac{\sum_{i=-m}^m \xi_i}{n} \right] \cdot 100 = \frac{\sum_{i=-m}^m |\xi_i - \xi_{t_i}|}{\sum_{i=-m}^m \xi_i} \cdot 100 = \frac{130,65}{1695,69} \cdot 100 = 8,03\%$$

- if the „field of vision painted” by the values of the variable ξ = the Apple’s worldwide incomes „gleams” through the „design” $\xi_{t_i} = a + b \cdot t_i + ct_i^2$, a and b will be [3]:

$$S = \sum_{i=1}^n (\xi_i - x_{ii})^2 = \min \Leftrightarrow S = \sum_{i=1}^n (\xi_i - a - bt_i - ct_i^2)^2 = \min$$

$$\begin{cases} \frac{\partial S}{\partial a} = 0 \\ \frac{\partial S}{\partial b} = 0 \\ \frac{\partial S}{\partial c} = 0 \end{cases} \Rightarrow \begin{cases} 2 \sum_{i=1}^n (\xi_i - a - bt_i - ct_i^2)(-1) = 0 / (-\frac{1}{2}) \\ 2 \sum_{i=1}^n (\xi_i - a - bt_i - ct_i^2)(-t_i) = 0 / (-\frac{1}{2}) \Rightarrow \\ 2 \sum_{i=1}^n (\xi_i - a - bt_i - ct_i^2)(-t_i^2) = 0 / (-\frac{1}{2}) \end{cases}$$

$$\begin{cases} n \cdot a + b \sum_{i=1}^n t_i + c \sum_{i=1}^n t_i^2 = \sum_{i=1}^n \xi_i \\ a \sum_{i=1}^n t_i + b \cdot \sum_{i=1}^n t_i^2 + c \sum_{i=1}^n t_i^3 = \sum_{i=1}^n t_i \cdot \xi_i \\ a \cdot \sum_{i=1}^n t_i^2 + b \sum_{i=1}^n t_i^3 + c \sum_{i=1}^n t_i^4 = \sum_{i=1}^n t_i^2 \cdot \xi_i \end{cases}$$

$$a = \frac{\sum_{i=1}^n t_i^4 \sum_{i=1}^n \xi_i - \sum_{i=1}^n t_i^2 \sum_{i=1}^n t_i^2 \cdot \xi_i}{n \sum_{i=1}^n t_i^4 - \left(\sum_{i=1}^n t_i^2 \right)^2} ; \quad b = \frac{\sum_{i=1}^n \xi_i t_i}{\sum_{i=1}^n t_i^2} ; \quad c = \frac{n \cdot \sum_{i=1}^n t_i^2 \cdot \xi_i - \sum_{i=1}^n t_i^2 \cdot \sum_{i=1}^n \xi_i}{n \sum_{i=1}^n t_i^4 - \left(\sum_{i=1}^n t_i^2 \right)^2}$$

Table 3 The „spectral form” for the grouping of the values concerning the ξ variable, if the Apple worldwide revenues highlight a quadratic tendency

YEARS	APPLE WORLDWID E REVENUES (BILLIONS \$) (ξ)	PARABOLIC TENDENCY					
		t_i	t_i^2	t_i^4	$t_i^2 \xi_i$	$\xi_{t_i} = a + bt_i + ct_i^2$	$ \xi_i - \xi_{t_i} $
2010	65,2	-4	16	256	1043,2	67,71945451	2,52
2011	108,2	-3	9	81	973,8	107,7193636	0,48
2012	156,5	-2	4	16	626	142,699251	13,8
2013	170,9	-1	1	1	170,9	172,6591168	1,76
2014	182,8	0	0	0	0	197,5989610	14,8
2015	233,72	+1	1	1	233,72	217,5187835	16,2
2016	215,64	+2	4	16	862,56	232,4185844	16,78
2017	229,23	+3	9	81	2063,07	242,2983636	13,07
2018	265,60	+4	16	256	4105,60	247,1581212	18,44
TOTAL	1695,69		60	708	10078,85	1695,69	97,85

$$a = \frac{708 \cdot 1627,79 - 60 \cdot 10078,85}{9 \cdot 708 - 60^2} = 197,598961$$

$$b = \frac{1345,79}{60} = 22,42983333 \quad c = \frac{9 \cdot 10078,85 - 60 \cdot 1627,79}{9 \cdot 708 - 60^2} = -2,510010823$$

$$v_{II} = \left[\frac{\sum_{i=-m}^m |\xi_i - \xi_{t_i}^{II}|}{n} : \frac{\sum_{i=-m}^m \xi_i}{n} \right] \cdot 100 = \frac{\sum_{i=-m}^m |\xi_i - \xi_{t_i}^{II}|}{\sum_{i=-m}^m \xi_i} \cdot 100 = \frac{97,85}{1627,79} \cdot 100 = 6,01\%$$

- if the „field of vision painted” by the values of the variable ξ = the Apple’s worldwide incomes „gleams” through the „design” $\xi_{t_i} = ab^{t_i}$, a and b will be [3]:

$$S = \sum_{i=1}^n (\lg \xi_i - \lg \xi_{t_i})^2 = \min \Leftrightarrow S = \sum_{i=1}^n (\lg \xi_i - \lg a - t_i \lg b)^2 = \min$$

$$\begin{cases} \frac{\partial S}{\partial \lg a} = 0 \\ \frac{\partial S}{\partial \lg b} = 0 \end{cases} \Rightarrow \begin{cases} 2 \sum_{i=1}^n (\lg \xi_i - \lg a - t_i \lg b)(-1) = 0 / (-\frac{1}{2}) \\ 2 \sum_{i=1}^n (\lg \xi_i - \lg a - t_i \lg b)(-t_i) = 0 / (-\frac{1}{2}) \end{cases} \Rightarrow \begin{cases} n \cdot \lg a + \lg b \cdot \sum_{i=1}^n t_i = \sum_{i=1}^n \lg \xi_i \\ \lg a \sum_{i=1}^n t_i + \lg b \cdot \sum_{i=1}^n t_i^2 = \sum_{i=1}^n t_i \cdot \lg \xi_i \end{cases}$$

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

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

Table 4 The „spectral form” for the grouping of the values concerning the ξ variable, if the Apple worldwide revenues present an exponential trend

YEAR S	APPLE WORLDWI DE REVENUE S (ξ)	EXPONENTIAL TENDENCY				
		$\lg \xi_i$	$t_i \lg \xi_i$	$\lg \xi_{t_i} = \lg a + t_i \lg b$	$\xi_{t_i} = ab^{t_i}$	$ \xi_i - \xi_{t_i} $
2010	65,2	1,814247596	-7,256990383	1,969463183	93,21014488	28,01
2011	108,2	2,034227261	-6,102681782	2,033337170	107,9784701	0,22
2012	156,5	2,194514342	-4,389028684	2,097211157	125,0867063	31,41
2013	170,9	2,232742063	-2,232742063	2,161085144	144,9055915	25,99
2014	182,8	2,261976191	0	2,224959131	167,8646043	14,94
2015	233,72	2,368695878	2,368695878	2,288833118	194,4612701	39,26
2016	215,64	2,333729323	4,667458646	2,352707105	225,2719430	9,63
2017	229,23	2,360271454	7,080814363	2,416581092	260,9642953	31,73
2018	265,60	2,424228071	9,696912283	2,480455079	392,3117860	36,71
TOTAL	1695,69	20,02463218	3,832439258			217,9

$$\lg a = \frac{20,02463218 \cdot 60 - 3,832439258 \cdot 0}{9 \cdot 60 - 0^2} = 2,224959131$$

$$\lg b = \frac{9 \cdot 3,832439258 - 20,02463218 \cdot 0}{9 \cdot 60 - 0^2} = 0,063873987$$

$$v_{\exp} = \left[\frac{\sum_{i=-m}^m |\xi_i - \xi_{t_i}^{\exp}|}{n} : \frac{\sum_{i=-m}^m \xi_i}{n} \right] \cdot 100 = \frac{\sum_{i=-m}^m |\xi_i - \xi_{t_i}^{\exp}|}{\sum_{i=-m}^m \xi_i} \cdot 100 = \frac{217,9}{1627,79} \cdot 100 = 13,39\%$$

$$v_H = 6,01\% < v_I = 8,03\% < v_{\exp} = 13,39\%$$

The „configuration” regarding the modelling reflected by ξ variable, namely the Apple’s worldwide incomes, unveils a quadratic profile $\xi_{t_i} = a + b \cdot t_i + ct_i^2$

Graph 1 The quadratic aspect concerning the Apple's worldwide incomes

3. The configuration of the modelling regarding the Samsung's worldwide incomes

- if the „field of vision painted” by the values of the variable ω = the Samsung's worldwide incomes „gleams” through the „design” $\omega_{t_i} = a + b \cdot t_i$, a and b will be [3]:

Table 5 The „spectral form” for the grouping of the values regarding the ω variable, if the Samsung worldwide revenues highlight a linear tendency

YEARS	SAMSUNG WORLDWIDE REVENUES (BILLIONS \$) (ω)	LINEAR TENDENCY				
		t_i	t_i^2	$t_i \omega_i$	$\omega_{t_i} = a + bt_i$	$ \omega_i - \omega_{t_i} $
2010	134,08	-4	16	-536,32	153,394	19,314
2011	153,45	-3	9	-460,35	162,148	8,698
2012	187,02	-2	4	-374,04	170,902	16,118
2013	212,68	-1	1	-212,68	179,656	33,024
2014	191,78	0	0	0	188,41	3,37
2015	186,60	+1	1	186,60	197,164	10,564
2016	187,74	+2	4	375,48	205,918	18,178
2017	222,81	+3	9	668,43	214,672	8,138
2018	219,53	+4	16	878,12	223,426	3,896
TOTAL	1695,69		60	525,24	1695,69	121,3

$$a = \frac{1695,69 \cdot 60 - 525,24 \cdot 0}{9 \cdot 60 - 0^2} = 188,41 ; \quad b = \frac{9 \cdot 525,24}{9 \cdot 60} = 8,754$$

$$v_I = \left[\frac{\sum_{i=-m}^m |\omega_i - \omega_{t_i}^I|}{n} : \frac{\sum_{i=-m}^m \omega_i}{n} \right] \cdot 100 = \frac{\sum_{i=-m}^m |\omega_i - \omega_{t_i}^I|}{\sum_{i=-m}^m \omega_i} \cdot 100 = \frac{121,3}{1695,69} \cdot 100 = 7,15\%$$

- if the „field of vision painted” by the values of the variable ω =the Samsung’s worldwide incomes „gleams” through the „design” $\omega_{t_i} = a + b \cdot t_i + ct_i^2$, a and b will be [3]:

Table 6 The „spectral form” for the grouping of the values regarding the ω variable, if the Samsung worldwide revenues highlight a quadratic tendency

YEARS	SAMSUNG WORLDWIDE REVENUES (BILLIONS \$) (ω_i)	PARABOLIC TENDENCY					
		t_i	t_i^2	t_i^4	$t_i^2 \omega_i$	$\omega_{t_i} = a + bt_i + ct_i^2$	$ \omega_i - \omega_{t_i} $
2010	134,08	-4	16	256	2145,28	142,4188484	18,34
2011	153,45	-3	9	81	1381,05	159,4042121	5,95
2012	187,02	-2	4	16	748,08	174,0377575	12,98
2013	212,68	-1	1	1	212,68	186,3194848	26,36
2014	191,78	0	0	0	0	196,2493939	4,47
2015	186,60	+1	1	1	186,60	203,8274848	17,23
2016	187,74	+2	4	16	750,96	209,0537575	21,31
2017	222,81	+3	9	81	2005,29	211,9282121	10,88
2018	219,53	+4	16	256	3512,48	212,4508484	7,08
TOTAL	1695,69		60	708	10942,42	1695,69	124,6

$$a = \frac{708 \cdot 1695,69 - 60 \cdot 10942,42}{9 \cdot 708 - 60^2} = 196,2493939 \quad b = \frac{525,24}{60} = 8,754$$

$$c = \frac{9 \cdot 10942,42 - 60 \cdot 1695,69}{9 \cdot 708 - 60^2} = -1,175909091$$

$$v_{II} = \left[\frac{\sum_{i=-m}^m |\omega_i - \omega_{t_i}^{II}|}{n} : \frac{\sum_{i=-m}^m \omega_i}{n} \right] \cdot 100 = \frac{\sum_{i=-m}^m |\omega_i - \omega_{t_i}^{II}|}{\sum_{i=-m}^m \omega_i} \cdot 100 = \frac{124,6}{1695,69} \cdot 100 = 7,35\%$$

- if the „field of vision painted” by the values of the variable ω =the Samsung’s worldwide incomes „gleams” through the „design” $\omega_{t_i} = ab^{t_i}$, a and b will be [3]:

Table 7 The „spectral form” for the grouping of the values regarding the ω variable, if the Samsung worldwide revenues highlight an exponential tendency

YEAR S	SAMSUNG WORLDWI DE REVENUE S (ω_i)	<i>EXPONENTIAL TENDENCY</i>				
		$\lg \omega_i$	$t_i \lg \omega_i$	$\lg \omega_i = \lg a + t_i \lg b$	$\omega_{t_i} = ab^{t_i}$	$ \omega_i - \omega_{t_i} $
2010	134,08	2,127364001	-8,509456005	2,184030970	152,7674994	18,69
2011	153,45	2,185966893	-6,557900678	2,205513392	160,5141754	7,06
2012	187,02	2,271888053	-4,543776105	2,226995814	168,6536769	18,37
2013	212,68	2,327726652	-2,327726652	2,248478236	177,2059239	34,79
2014	191,78	2,282803314	0	2,269960658	186,1918461	5,59
2015	186,60	2,270911639	2,270911639	2,291443080	195,6334348	9,03
2016	187,74	2,273556814	4,547113627	2,312925502	205,5537963	17,81
2017	222,81	2,347934679	7,043804036	2,334407924	215,9772087	6,83
2018	219,53	2,341493877	9,365975510	2,355890346	226,9291811	7,40
TOTAL	1695,69	20,42964592	1,288945372			125,57

$$\lg a = \frac{20,42964592 \cdot 60 - 1,288945372 \cdot 0}{9 \cdot 60 - 0^2} = 2,269960658$$

$$\lg b = \frac{9 \cdot 1,288945372 - 20,42964592 \cdot 0}{9 \cdot 60 - 0^2} = 0,021482422$$

$$v_{\exp} = \left[\frac{\sum_{i=-m}^m |\omega_i - \omega_{t_i}^{\exp}|}{n} : \frac{\sum_{i=-m}^m \omega_i}{n} \right] \cdot 100 = \frac{\sum_{i=-m}^m |\omega_i - \omega_{t_i}^{\exp}|}{\sum_{i=-m}^m \omega_i} \cdot 100 = \frac{125,57}{1695,69} \cdot 100 = 7,4\%$$

$$v_I = 7,15\% < v_{II} = 7,35\% < v_{\exp} = 7,4\%$$

The configuration concerning the modelling for ω factor which records the Samsung's worldwide incomes is a linear profile $\omega_{t_i} = a + b \cdot t_i$

Graph 2 The linear model regarding the Samsung's worldwide incomes

4. The configuration of the modelling concerning the Apple's mobile worldwide incomes

Table 8 The values which draw up the „top speed” of the both leaders Apple&Samsung concerning the series of victories in the sphere of the worldwide mobile revenues

YEARS	APPLE WORLDWIDE MOBILE REVENUES (BILLIONS \$)	SAMSUNG WORLDWIDE MOBILE REVENUES (BILLIONS \$)
2013	125,9	128,2
2014	148,5	98,4
2015	176,8	85,4
2016	158,5	80,9
2017	167,5	97,4
2018	176,8	86,9

The source: „Statistics Portal United States”

- if the „field of vision painted” by the values of the variable $\wp$ = the Apple's worldwide mobile incomes „gleams” through the „design” $\wp_{t_i} = a + b \cdot t_i$, a and b will be [3]:

Table 9 The „spectral form” for the grouping of the values concerning the $\wp$ variable, if the Apple worldwide mobile revenues highlight a linear tendency

YEARS	APPLE WORLDWIDE MOBILE REVENUES (BILLIONS \$) ($\wp$)	LINEAR TENDENCY				
		t_i	t_i^2	$t_i \wp_i$	$\wp_{t_i} = a + b t_i$	$ \wp_i - \wp_{t_i} $
2013	125,9	-3	9	-377,7	140,5285714	14,63
2014	148,5	-2	4	-297,0	146,6857143	1,81

2015	176,8	-1	1	-176,8	152,8428571	23,96
2016	158,5	+1	1	+158,5	165,1571429	6,66
2017	167,5	+2	4	+335,0	171,2542857	3,75
2018	176,8	+3	9	+530,4	177,4714286	0,67
TOTAL	954		28	172,4	954	51,48

$$a = \frac{954 \cdot 28 - 172,4 \cdot 0}{6 \cdot 28 - 0^2} = 159 \quad b = \frac{6 \cdot 172,4 - 954 \cdot 0}{6 \cdot 28 - 0^2} = 6,157142857$$

$$v_I = \left[\frac{\sum_{i=-m}^m |\wp_i - \wp_{t_i}^I|}{n} : \frac{\sum_{i=-m}^m \wp_i}{n} \right] \cdot 100 = \frac{\sum_{i=-m}^m |\wp_i - \wp_{t_i}^I|}{\sum_{i=-m}^m \wp_i} \cdot 100 = \frac{51,48}{954} \cdot 100 = 5,31\%$$

- if the „field of vision painted” by the values of the variable $\wp$ = the Apple’s worldwide mobile incomes „gleams” through the „design” $\wp_{t_i} = a + b \cdot t_i + ct_i^2$, a and b will be [3]:

Table 10 The „spectral form” for the grouping of the values concerning the $\wp$ variable, if the Apple worldwide mobile revenues highlight a quadratic tendency

YEARS	APPLE WORLDWIDE MOBILE REVENUES (BILLIONS \$) ($\wp$)	PARABOLIC TENDENCY					
		t_i	t_i^2	t_i^4	$t_i^2 \wp_i$	$\wp_{t_i} = a + bt_i + ct_i^2$	$ \wp_i - \wp_{t_i} $
2013	125,9	-3	9	81	1133,1	132,0122449	6,11
2014	148,5	-2	4	16	594	147,9959184	0,50
2015	176,8	-1	1	1	176,8	160,0489796	16,75
2016	158,5	+1	1	1	158,5	172,3632653	13,86
2017	167,5	+2	4	16	670	172,6244898	5,12
2018	176,8	+3	9	81	1591,2	168,9551021	7,84
TOTAL	954		28	196	4323,6	954	50,18

$$a = \frac{196 \cdot 954 - 28 \cdot 4323,6}{6 \cdot 196 - 28^2} = 168,1714286 \quad b = \frac{172,4}{28} = 6,157142857$$

$$c = \frac{6 \cdot 4323,6 - 28 \cdot 954}{6 \cdot 196 - 28^2} = -1,965306122$$

$$v_{II} = \left[\frac{\sum_{i=-m}^m |\wp_i - \wp_{t_i}^{II}|}{n} : \frac{\sum_{i=-m}^m \wp_i}{n} \right] \cdot 100 = \frac{\sum_{i=-m}^m |\wp_i - \wp_{t_i}^{II}|}{\sum_{i=-m}^m \wp_i} \cdot 100 = \frac{50,18}{954} \cdot 100 = 5,26\%$$

- if the „field of vision painted” by the values of the variable $\wp$ = the Apple’s worldwide mobile incomes „gleams” through the „design” $\wp_{t_i} = ab^{t_i}$, a and b will be [3]:

Table 11 The „spectral form” for the grouping of the values concerning the $\wp$ variable, if the Apple worldwide mobile revenues present an highlight tendency

YEARS	APPLE WORLDWIDE MOBILE REVENUES ($\wp$)	EXPONENTIAL TENDENCY				
		$\lg \wp_i$	$t_i \lg \wp_i$	$\lg \wp_i = \lg a + t_i \lg b$	$\wp_{t_i} = ab^{t_i}$	$ \wp_i - \wp_{t_i} $
2013	125,9	2,10002573	-6,30007719	2,144942992	139,6185078	13,72
2014	148,5	2,171726454	-4,343452907	2,162782038	145,4728804	3,03
2015	176,8	2,247482261	-2,247482261	2,180621084	151,5727339	25,23
2016	158,5	2,200029267	+2,200029267	2,216299176	164,5504885	6,05
2017	167,5	2,224014811	+4,448029623	2,234138222	171,4502892	3,95
2018	176,8	2,247482261	+6,742446782	2,251977268	178,6394068	1,84
TOTAL	954	13,19076078	0,499493314			53,82

$$\lg a = \frac{13,19076078 \cdot 28 - 0,499493314 \cdot 0}{6 \cdot 28 - 0^2} = 2,198 \quad \lg b = \frac{6 \cdot 0,499493314 - 13,19076078 \cdot 0}{6 \cdot 28 - 0^2} = 0,0178$$

$$v_{\exp} = \left[\frac{\sum_{i=-m}^m |\wp_i - \wp_{t_i}^{\exp}|}{n} : \frac{\sum_{i=-m}^m \wp_i}{n} \right] \cdot 100 = \frac{\sum_{i=-m}^m |\wp_i - \wp_{t_i}^{\exp}|}{\sum_{i=-m}^m \wp_i} \cdot 100 = \frac{53,82}{954} \cdot 100 = 5,64\%$$

$$v_{II} = 5,26\% < v_I = 5,4\% < v_{\exp} = 5,64\%$$

The „configuration” regarding the modelling reflected by $\wp$ variable, namely the Apple's worldwide mobile incomes, unveils a quadratic profile $\wp_{t_i} = a + b \cdot t_i + ct_i^2$

Graph 3 The quadratic aspect concerning the Apple's mobile business incomes

5. The configuration of the modelling regarding the Samsung's mobile worldwide incomes

- if the „field of vision painted” by the values of the variable γ = the Samsung's worldwide mobile incomes „gleams” through the „design” $\gamma_{t_i} = a + b \cdot t_i$, a and b will be [3]:

Table 12 The „spectral form” for the grouping of the values concerning the γ variable, if the Samsung worldwide mobile revenues highlight a linear tendency

YEARS	SAMSUNG WORLDWIDE MOBILE REVENUES (BILLIONS \$) (γ)	LINEAR TENDENCY				
		t_i	t_i^2	$t_i \gamma_i$	$\gamma_{t_i} = a + bt_i$	$ \gamma_i - \gamma_{t_i} $
2013	128,2	-3	9	-384,6	110,1714286	18,03
2014	98,4	-2	4	-196,8	105,5142857	7,11
2015	85,4	-1	1	-85,4	100,8571429	15,46
2016	80,9	+1	1	+80,9	91,54285714	10,64
2017	97,4	+2	4	+194,8	86,88571429	10,51
2018	86,9	+3	9	+260,7	82,22857143	4,67
TOTAL	577,2		28	-130,4	577,2	66,42

$$a = \frac{577,2 \cdot 28 - (-130,4) \cdot 0}{6 \cdot 28 - 0^2} = 96,2 ; b = \frac{6 \cdot (-130,4)}{6 \cdot 28} = -4,657142857$$

$$v_I = \left[\frac{\sum_{i=-m}^m |\gamma_i - \gamma_{t_i}|}{n} : \frac{\sum_{i=-m}^m \gamma_i}{n} \right] \cdot 100 = \frac{\sum_{i=-m}^m |\gamma_i - \gamma_{t_i}|}{\sum_{i=-m}^m \gamma_i} \cdot 100 = \frac{66,42}{577,2} \cdot 100 = 11,51\%$$

- if the „field of vision painted” by the values of the variable γ = the Samsung's mobile worldwide incomes „gleams” through the „design” $\gamma_{t_i} = a + b \cdot t_i + ct_i^2$, a and b will be [3]:

Table 13 The „spectral form” for the grouping of the values concerning the ω variable, if the Samsung worldwide mobile revenues highlight a quadratic tendency

YEARS	SAMSUNG WORLDWIDE MOBILE REVENUES (BILLIONS \$) (γ)	PARABOLIC TENDENCY					
		t_i	t_i^2	t_i^4	$t_i^2 \gamma_i$	$\gamma_{t_i} = a + bt_i + ct_i^2$	$ \gamma_i - \gamma_{t_i} $
2013	128,2	-3	9	81	1153,8	122,8928571	5,31
2014	98,4	-2	4	16	393,6	103,5571429	5,16
2015	85,4	-1	1	1	85,4	90,09285714	4,69
2016	80,9	+1	1	1	80,9	80,77857143	0,12
2017	97,4	+2	4	16	389,6	84,92857143	12,47
2018	86,9	+3	9	81	782,1	94,95	8,05
TOTAL	577,2		28	196	2885,4	577,2	35,8

$$a = \frac{196 \cdot 577,2 - 28 \cdot 2885,4}{6 \cdot 196 - 28^2} = 82,5$$

$$b = \frac{-130,4}{28} = -4,657142857 \quad c = \frac{6 \cdot 2885,4 - 28 \cdot 577,2}{6 \cdot 196 - 28^2} = 2,935714286$$

$$v_{II} = \left[\frac{\sum_{i=-m}^m |\gamma_i - \gamma_{t_i}^{II}|}{n} : \frac{\sum_{i=-m}^m \gamma_i}{n} \right] \cdot 100 = \frac{\sum_{i=-m}^m |\gamma_i - \gamma_{t_i}^{II}|}{\sum_{i=-m}^m \gamma_i} \cdot 100 = \frac{35,8}{577,2} \cdot 100 = 6,2\%$$

- if the „field of vision painted” by the values of the variable γ = the Samsung’s mobile worldwide incomes „gleams” through the „design” $\gamma_{t_i} = ab^{t_i}$, a and b will be [3]:

Table 14 The „spectral form” for the grouping of the values concerning the γ variable, if the Samsung worldwide mobile revenues highlight an exponential tendency

YEAR S	SAMSUNG WORLDWI DE MOBILE REVENUE S (γ_i)	EXPONENTIAL TENDENCY				
		$\lg \gamma_i$	$t_i \lg \gamma_i$	$\lg \gamma_{t_i} = \lg a + t_i \lg b$	$\gamma_{t_i} = ab^{t_i}$	$ \gamma_i - \gamma_{t_i} $
2013	128,2	2,107888025	-6,323664076	2,035726583	108,5741861	19,63
2014	98,4	1,992995098	-3,985990197	2,016477068	103,8668756	5,47
2015	85,4	1,931457871	-1,931457871	1,997227555	99,36365426	13,96
2016	80,9	1,907948522	+1,907948522	1,958728529	90,93446772	10,03
2017	97,4	1,988558957	+3,977117914	1,9394479016	86,99193998	10,41
2018	86,9	1,939019776	+5,817059329	1,920229503	83,2203433	3,68
TOTAL	577,2	11,86786825	-0,538986378			63,18

$$\lg a = \frac{11,86786825 \cdot 28 - (-0,538986378) \cdot 0}{6 \cdot 28 - 0^2} = 1,977978042$$

$$\lg b = \frac{6 \cdot (-0,538986378) - 11,86786825 \cdot 0}{6 \cdot 28 - 0^2} = -0,019249513$$

$$v_{\exp} = \left[\frac{\sum_{i=-m}^m |\gamma_i - \gamma_{t_i}^{\exp}|}{n} : \frac{\sum_{i=-m}^m \gamma_i}{n} \right] \cdot 100 = \frac{\sum_{i=-m}^m |\gamma_i - \gamma_{t_i}^{\exp}|}{\sum_{i=-m}^m \gamma_i} \cdot 100 = \frac{63,18}{577,2} \cdot 100 = 10,95\%$$

$$v_{II} = 6,2\% < v_{\exp} = 10,95\% < v_I = 11,51\%$$

The „configuration” concerning the modelling for γ factor which records the Samsung’s worldwide mobile incomes is a quadratic profile $\gamma_{t_i} = a + b \cdot t_i + ct_i^2$

Graph 4 The quadratic aspect concerning the Samsung's mobile business incomes

6. The „t” test projection between Apple and Samsung concerning the worldwide incomes and the mobile worldwide incomes

Table 15 The algorithm for to project the “t” test between the Apple business and the Samsung business concerning the worldwide incomes

YEARS	APPLE WORLDWIDE REVENUES (BILLIONS \$)	SAMSUNG WORLDWIDE REVENUES (BILLIONS \$)	$(x_i - \bar{x}_1)^2$	$(x_i - \bar{x}_2)^2$
2010	65,2	134,08	13379,5489	2951,7489
2011	108,2	153,45	5280,9289	1222,2016
2012	156,5	187,02	593,8969	1,9321
2013	170,9	212,68	99,4009	589,0329
2014	182,8	191,78	3,7249	11,3569
2015	233,72	186,60	2793,1225	3,2761
2016	215,64	187,74	1208,9529	0,4489
2017	229,23	222,81	2338,6896	1183,36
2018	265,60	219,53	7179,1729	968,4544
TOTAL	1627,79	1695,69	32877,4384	6931,8118

$$F_{\text{calculat}} = \frac{s_1^2}{s_2^2} = \frac{4109,6798}{866,476475} = 4,742979087$$

$$s_1^2 = \frac{\sum_{i=1}^n (x_i - \bar{x}_1)^2}{n_1 - 1} = \frac{32877,4384}{8} = 4109,6798$$

$$s_2^2 = \frac{\sum_{i=1}^n (x_i - \bar{x}_2)^2}{n_2 - 1} = \frac{6931,8118}{8} = 866,476475$$

$$\bar{x}_1 = \frac{\sum_{i=1}^n x_i}{n_1} = \frac{1627,79}{9} = 180,866 \quad \bar{x}_2 = \frac{\sum_{i=1}^n x_i}{n_2} = \frac{1695,69}{9} = 188,41$$

$$F_{\text{calculat}} = 4,742979087 < F_{\text{tabelat}} = F_{f_1; f_2; \alpha} = F_{8; 8; 0,01} = 6,03 \Rightarrow \sigma_1^2 = \sigma_2^2$$

$$t = \frac{\bar{x}_2 - \bar{x}_1}{\sqrt{(n_1 - 1) \cdot s_1^2 + (n_2 - 1) \cdot s_2^2}} \cdot \sqrt{\frac{n_1 n_2 (n_1 + n_2 - 2)}{n_1 + n_2}} = \frac{188,41 - 180,866}{\sqrt{8 \cdot 4109,6798 + 8 \cdot 866,476475}} \cdot \sqrt{\frac{81 \cdot 16}{18}} =$$

$$= \frac{7,544}{199,5225556} \cdot 8,485281374 = 0,3208307 \Rightarrow |t_{\text{calculat}}| = |0,3208307| = 0,3208307$$

$$\text{For } 0,8 \leq \alpha \leq 0,9 \Rightarrow |t_{\text{calculat}}| = 0,3208307 > t_{\text{tabelat}} = t_{f; \alpha}$$

$$\text{where } t_{\text{tab}} = t_{16; 0,8} = 0,258; t_{\text{tab}} = t_{16; 0,9} = 0,128$$

there is a significant contrast between the average concerning the Apple worldwide incomes and the average regarding the Samsung worldwide incomes

Table 16 The algorithm for to achieve the “t” test between the Apple business and the Samsung business concerning the worldwide mobile incomes

YEARS	APPLE WORLDWIDE MOBILE REVENUES (BILLIONS \$)	SAMSUNG WORLDWIDE MOBILE REVENUES (BILLIONS \$)	$(x_i - \bar{x}_1)^2$	$(x_i - \bar{x}_2)^2$
2013	125,9	128,2	1095,61	1024
2014	148,5	98,4	110,25	4,84
2015	176,8	85,4	316,84	116,64
2016	158,5	80,9	0,25	234,09
2017	167,5	97,4	72,25	1,44
2018	176,8	86,9	316,84	86,49
TOTAL	954	577,2	1912,04	1467,5

$$F_{\text{calculat}} = \frac{s_1^2}{s_2^2} = \frac{382,408}{293,5} = 1,302923$$

$$\bar{x}_1 = \frac{\sum_{i=1}^n x_i}{n_1} = \frac{954}{6} = 159 \quad \bar{x}_2 = \frac{\sum_{i=1}^n x_i}{n_2} = \frac{577,2}{6} = 96,2$$

$$s_1^2 = \frac{\sum_{i=1}^n (x_i - \bar{x}_1)^2}{n_1 - 1} = \frac{1912,04}{5} = 382,408 \quad s_2^2 = \frac{\sum_{i=1}^n (x_i - \bar{x}_2)^2}{n_2 - 1} = \frac{1467,5}{5} = 293,5$$

$$F_{\text{calculat}} = 1,302923 < F_{\text{tabelat}} = F_{f_1; f_2; \alpha} = F_{5; 5; 0,01} = 10,97 \Rightarrow \sigma_1^2 = \sigma_2^2$$

$$t = \frac{\bar{x}_2 - \bar{x}_1}{\sqrt{(n_1 - 1) \cdot s_1^2 + (n_2 - 1) \cdot s_2^2}} \cdot \sqrt{\frac{n_1 n_2 (n_1 + n_2 - 2)}{n_1 + n_2}} = \frac{96,2 - 159}{\sqrt{5 \cdot 382,408 + 5 \cdot 293,5}} \cdot \sqrt{\frac{36 \cdot 10}{12}} =$$

$$= -\frac{62,8}{58,13381116} \cdot 5,477225575 = -5,916862481 \Rightarrow |t_{\text{calculated}}| = |-5,916862481| = 5,916862481$$

$$\Rightarrow \text{For } 0,01 \leq \alpha \leq 0,9 \Rightarrow t_{\text{calculated}} = 5,916862481 > t_{\text{tableted}} = t_{f;\alpha}$$

$$\text{where } 0,129 \leq t_{\text{tab}} = t_{f;\alpha} \leq 3,169$$

there is a significant contrast between the average concerning the Apple worldwide mobile incomes and the average regarding the Samsung worldwide mobile incomes

7. Conclusions

The Apple Inc. Company radiates a lot of charisma because she is the „queen” enveloped by mysteries, surprises and performances on the worldwide scene. In the list: „Global 2000-2019” achieved by Forbes, the Apple Inc. Company drives in the top management concerning the market capitalization, because she touched \$ 961,3 billions in proportion to the Samsung Electronics Company which occupies the seventeen place with \$ 272,4 billions in May 15, 2019. In the same top, the Apple Inc. Company is the leader regarding the profit in relation to the Samsung Electronics Company which is on the third place. In the top: „World’s Most Valuable Brands 2019”, Forbes ranks on the first position the Apple Inc. Company and the Samsung Electronics Company occupies the seventh place.

The finesse of the statistical analysis „sculpted” through the „t” test highlights that, there is a significant contrast between the average concerning the Apple worldwide incomes and the average regarding the Samsung worldwide incomes in the period 2010-2018, respectively a significant contrast between the average concerning the Apple worldwide mobile incomes and the average regarding the Samsung worldwide mobile incomes in the period 2013-2018.

The Apple business and the Samsung business are built on a powerful mix of managements which are at high standards: strategic management, management of innovation, management of production, management of quality and management of marketing. All these types of managements achieved with powerful wizardry and which are braided with a lot of passion, intelligence, style, „tech and digital art” are the successful parameters for the both champions the Apple Inc. Company and the Samsung Electronics Company.

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