Electronic Art concerning the Sony's Performances in Businesses

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ARTICLE INFO

Article history:

Accepted March 2021

Available online May 2021

JEL Classification

C1, C12, C2

Keywords:

Sony Electronics, Sony Pictures

Entertainment, Sony Music

Entertainment

ABSTRACT

The Sony Corporation exhibits a magnificent brand which fascinates through a lot of electronics products and a marvellous quality concerning the music and motion picture which reached out to the loving public. In the "electronic land", the Sony Corporation shines through the performances of the televisions with android, computers, telecommunication and audio-video devices. The aim of this original research consists in to show through the forecasts the excellency in businesses as effect of the strategic management which "chairs" in the Sony Corporation.

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1. Introduction

The Sony Corporation's establishment was achieved in 1946, by Akio Morita and Masaru Ibuka, in the „flowers of cherry's country", namely Japan, with the headquarters in Tokyo. From the start, this Japanese conglomerate was a real treasure of inventions, where we can identify: the Walkman, the first radio transistor, the first mobile CD player, the first cassette with magnetic tape and the Playstation game console. In the first segment of this original article, we can see the protocol which must be applied for to achieve the worldwide revenues's forecast between 2021-2025, concerning the Sony Corporation. In the second episode of this research, we can observe the algorithm used for to project the worldwide revenues's prognosis, in the same period 2021-2025, regarding the Sony's Imaging Product&Solutions. In the third segment of this article, we can remark the technique applied for to sculpt the forecasts between 2021-2025, concerning the worldwide revenues for Sony's Home Entertainment and Sound Products&Solutions. In the fourth episode of this paper, we can make out the tactics through we can build the worldwide revenues's forecast concerning the Sony's Music Entertainment, between 2021-2025. The prediction's method was applied in this article for to display the excellent performances achieved by the Sony Corporation in the businesses's world. The past master who shaped the constitution of the „Least Squares Method", which is the „best ingredient" for to pattern previsions, was Johann Carl Friedrich Gauss.

2. The survey concerning the worldwide revenues for the Sony Corporation, in the period 2007-2020, which has as target them estimation between 2021-2025

Table 1. The Sony Corporation's worldwide revenues, between 2007-2020

YEARS	THE SONY CORPORATION'S WORLDWIDE REVENUES (billions \$) (ξ_i)
2007	88,71
2008	78,88
2009	77,57
2010	86,52
2011	79,19
2012	72,35
2013	75,41
2014	68,47
2015	71,73
2016	67,89
2017	77,04

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YEARS	THE SONY CORPORATION'S WORLDWIDE REVENUES (billions \$) (ξ_i)
2018	78,14
2019	76,92
2020	75,99

Source: „Statista Portal the United States of America”

- if the proceeding's structure, which draws up the trend for the ξ variable, where ξ = **the Sony Corporation's worldwide revenues**, selects a linear exposure, $\xi_{t_i} = a + b \cdot t_i$, a and b will be [2]:

Table 2. The „esplanade” regarding the Sony Corporation's worldwide revenues, if this brings forward a linear „rally”

YEARS	THE SONY CORPORATION'S WORLDWIDE REVENUES (billions \$) (ξ_i)	LINEAR TENDENCY				
		t_i	t_i^2	$t_i \xi_i$	$\xi_{t_i} = a + bt_i$	$ \xi_i - \xi_{t_i} $
2007	88,71	-7	49	-620,97	80,99589286	7,71
2008	78,88	-6	36	-473,28	80,39250000	1,51
2009	77,57	-5	25	-378,85	79,78910715	2,22
2010	86,52	-4	16	-346,08	79,18571429	7,33
2011	79,19	-3	9	-237,57	78,58232143	0,61
2012	72,35	-2	4	-144,70	77,97892857	5,63
2013	75,41	-1	1	-75,41	77,37553572	1,97
2014	68,47	+1	1	+68,47	76,16875000	7,70
2015	71,73	+2	4	+143,46	75,56535715	3,84
2016	67,89	+3	9	+203,67	74,96196429	7,07
2017	77,04	+4	16	+308,16	74,35857143	2,68
2018	78,14	+5	25	+390,70	73,75517858	4,38
2019	76,92	+6	36	+461,52	73,15178572	3,77
2020	75,99	+7	49	+531,93	72,54839286	3,44
TOTAL	1074,81	0	280	-168,95		59,86

$$a = \frac{\sum_{i=1}^n \xi_i \sum_{i=1}^n t_i^2 - \sum_{i=1}^n \xi_i t_i \sum_{i=1}^n t_i}{n \sum_{i=1}^n t_i^2 - \left(\sum_{i=1}^n t_i \right)^2} = \frac{1074,81 \cdot 280}{14 \cdot 280} = 76,77214286 \quad b = \frac{n \sum_{i=1}^n \xi_i t_i - \sum_{i=1}^n t_i \sum_{i=1}^n \xi_i}{n \sum_{i=1}^n t_i^2 - \left(\sum_{i=1}^n t_i \right)^2} = \frac{14 \cdot (-168,95)}{14 \cdot 280} = -0,603392857$$

$$v_l = \left[\frac{\sum_{i=1}^m |\xi_i - \xi_{t_i}|}{n} : \frac{\sum_{i=1}^m \xi_i}{n} \right] \cdot 100 = \frac{\sum_{i=1}^m |\xi_i - \xi_{t_i}|}{\sum_{i=1}^m \xi_i} \cdot 100 = \frac{59,86}{1074,81} \cdot 100 = 5,57\%$$

- if the proceeding's structure, which draws up the trend for ξ variable, where ξ = **the Sony Corporation's worldwide revenues**, selects a parabolic exposure, $\xi_{t_i} = a + b \cdot t_i + ct_i^2$, a and b will be [2]:

Table 3. The „esplanade” concerning the Sony Corporation's worldwide revenues, if this brings forward a quadratic „rally”

YEARS	THE SONY CORPORATION'S WORLDWIDE REVENUES (billions \$) (ξ_i)	PARABOLIC TENDENCY					
		t_i	t_i^2	t_i^4	$t_i^2 \xi_i$	$\xi_{t_i} = a + bt_i + ct_i^2$	$ \xi_i - \xi_{t_i} $
2007	88,71	-7	49	2401	4346,79	86,68868866	2,02
2008	78,88	-6	36	1296	2839,68	83,53335285	4,65
2009	77,57	-5	25	625	1939,25	80,77062365	3,20
2010	86,52	-4	16	256	1384,32	78,40050105	8,12
2011	79,19	-3	9	81	712,71	76,42298507	2,77
2012	72,35	-2	4	16	289,40	74,83807569	2,49
2013	75,41	-1	1	1	75,41	73,64577292	1,76
2014	68,47	+1	1	1	68,47	72,43898721	3,97

YEARS	THE SONY CORPORATION'S WORLDWIDE REVENUES (billions \$) (ξ_i)	PARABOLIC TENDENCY					
		t_i	t_i^2	t_i^4	$t_i^2 \xi_i$	$\xi_{t_i} = a + bt_i + ct_i^2$	$ \xi_i - \xi_{t_i} $
2015	71,73	+2	4	16	286,92	72,42450426	0,69
2016	67,89	+3	9	81	611,01	72,80262793	4,91
2017	77,04	+4	16	256	1232,64	73,57335820	3,47
2018	78,14	+5	25	625	1953,50	74,73669508	3,40
2019	76,92	+6	36	1296	2769,12	76,29263856	0,63
2020	75,99	+7	49	2401	3723,51	78,24118866	2,25
TOTAL	1074,81	0	280	9352	22232,73		44,33

$$a = \frac{\sum_{i=1}^n t_i^4 \sum_{i=1}^n \xi_i - \sum_{i=1}^n t_i^2 \sum_{i=1}^n t_i^2 \cdot \xi_i}{n \sum_{i=1}^n t_i^4 - \left(\sum_{i=1}^n t_i^2 \right)^2} = \frac{9352 \cdot 1074,81 - 280 \cdot 22232,73}{14 \cdot 9352 - 280^2} = 72,84607676$$

$$b = \frac{\sum_{i=1}^n \xi_i t_i}{\sum_{i=1}^n t_i^2} = -\frac{168,95}{280} = -0,603392857$$

$$c = \frac{n \cdot \sum_{i=1}^n t_i^2 \cdot \xi_i - \sum_{i=1}^n t_i^2 \cdot \sum_{i=1}^n \xi_i}{n \sum_{i=1}^n t_i^4 - \left(\sum_{i=1}^n t_i^2 \right)^2} = \frac{14 \cdot 22232,73 - 280 \cdot 1074,81}{14 \cdot 9352 - 280^2} = 0,196303304$$

$$v_{II} = \left[\frac{\sum_{i=1}^m |\xi_i - \xi_{t_i}^{II}|}{n} : \frac{\sum_{i=1}^m \xi_i}{n} \right] \cdot 100 = \frac{\sum_{i=1}^m |\xi_i - \xi_{t_i}^{II}|}{\sum_{i=1}^m \xi_i} \cdot 100 = \frac{44,33}{1074,81} \cdot 100 = 4,12\%$$

- if the proceeding's structure, which draws up the trend for ξ variable, where ξ = **the Sony Corporation's worldwide revenues**, selects an exponential exposure, $\xi_{t_i} = ab^{t_i}$, a and b will be [2]:

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

Table 4. The „esplanade” concerning the Sony Corporation's worldwide revenues, if this brings forward an exponential „rally”

YEARS	THE SONY CORPORATION'S WORLDWIDE REVENUES (billions\$) (ξ_i)	EXPONENTIAL TENDENCY					
		t_i	$\lg \xi_i$	$t_i \lg \xi_i$	$\lg \xi_{t_i} = \lg a + t_i \lg b$	$\xi_{t_i} = ab^{t_i}$	$ \xi_i - \xi_{t_i} $
2007	88,71	-7	1,947972579	-13,63580805	1,908343049	80,97352558	7,74
2008	78,88	-6	1,896966902	-11,38180141	1,904872403	80,32900785	1,45
2009	77,57	-5	1,889693791	-9,448468957	1,901401764	79,68962149	2,12
2010	86,52	-4	1,937116511	-7,748466043	1,897931125	79,05532438	7,46
2011	79,19	-3	1,898670343	-5,696011029	1,894460486	78,42607602	0,76
2012	72,35	-2	1,859438535	-3,718877071	1,890989847	77,80183623	5,45
2013	75,41	-1	1,877428941	-1,877428941	1,887519208	77,18256512	1,77
2014	68,47	+1	1,835500328	+1,835500328	1,880577930	75,95877112	7,49

YEARS	THE SONY CORPORATION'S WORLDWIDE REVENUES (billions\$) (ξ_i)	EXPONENTIAL TENDENCY					
		t_i	$\lg \xi_i$	$t_i \lg \xi_i$	$\lg \xi_{t_i} = \lg a + t_i \lg b$	$\xi_{t_i} = ab^{t_i}$	$ \xi_i - \xi_{t_i} $
2015	71,73	+2	1,855700831	+3,711401662	1,877107291	75,35417007	3,62
2016	67,89	+3	1,831805809	+5,495417426	1,873636652	74,75438140	6,86
2017	77,04	+4	1,886716274	+7,546865096	1,897931125	79,05532438	2,02
2018	78,14	+5	1,892873407	+9,464367034	1,866695374	73,56908828	4,57
2019	76,92	+6	1,886039276	+11,31623565	1,863224735	72,98350814	3,94
2020	75,99	+7	1,880756445	+13,16529511	1,859754096	72,40258898	3,59
TOTAL	1074,81	0	26,37667997	-0,971779193			58,84

$$\lg a = \frac{26,37667997 \cdot 280}{14 \cdot 280} = 1,884048569 \quad \lg b = \frac{14 \cdot (-0,971779193)}{14 \cdot 280} = -0,003470639$$

$$v_{\exp} = \left[\frac{\sum_{i=1}^n |\xi_i - \xi_{t_i}^{\exp}|}{n} : \frac{\sum_{i=1}^n \xi_i}{n} \right] \cdot 100 = \frac{\sum_{i=1}^n |\xi_i - \xi_{t_i}^{\exp}|}{\sum_{i=1}^n \xi_i} \cdot 100 = \frac{58,84}{1074,81} \cdot 100 = 5,47\%$$

$$v_{II} = 4,12\% < v_{\exp} = 5,47\% < v_I = 5,57\%$$

The values regarding **the Sony Corporation's worldwide revenues** cover a quadratic „rally”

$$\xi_{t_i} = a + b \cdot t_i + ct_i^2$$

Graph 1. The quadratic „rally” for the values which show us the evolution concerning the Sony Corporation's worldwide revenues

$$\xi_{2021}^{SONY'S_REVENUES} = 72,84607676 + (-0,603392857) \cdot 8 + 0,196303304 \cdot 8^2 = \$80,58_billions$$

$$\xi_{2022}^{SONY'S_REVENUES} = 72,84607676 + (-0,603392857) \cdot 9 + 0,196303304 \cdot 9^2 = \$83,32_billions$$

$$\xi_{2023}^{SONY'S_REVENUES} = 72,84607676 + (-0,603392857) \cdot 10 + 0,196303304 \cdot 10^2 = \$86,44_billions$$

$$\xi_{2024}^{SONY'S_REVENUES} = 72,84607676 + (-0,603392857) \cdot 11 + 0,196303304 \cdot 11^2 = \$89,96_billions$$

$$\xi_{2025}^{SONY'S_REVENUES} = 72,84607676 + (-0,603392857) \cdot 12 + 0,196303304 \cdot 12^2 = \$93,87_billions$$

3. The survey regarding the worldwide revenues for Sony Corporation regarding Imaging Product&Solutions, which has as target them estimation between 2021-2025

Table 5. The Sony's Imaging Product&Solutions worldwide revenues, between 2011-2019

YEARS	SONY'S IMAGING PRODUCTS&SOLUTIONS WORLDWIDE REVENUES (billions\$) (ω_i)
2011	7,16
2012	7,77
2013	7,20
2014	6,00
2015	6,29
2016	5,18
2017	5,91
2018	6,05
2019	9,85

Source: „Statista Portal the United States of America”

- if the proceeding's structure, which draws up the trend for ω variable, where ω = **the Sony's Imaging Product&Solutions worldwide revenues**, selects a linear exposure, $\omega_{t_i} = a + b \cdot t_i$, a and b will be [2]:

Table 6. The „esplanade” concerning the Sony's Imaging Product&Solutions worldwide revenues, if these make a linear „rally”

YEARS	SONY'S IMAGING PRODUCTS&SOLUTIONS WORLDWIDE REVENUES (billions \$) (ω_i)	LINEAR TENDENCY				
		t_i	t_i^2	$t_i \omega_i$	$\omega_i = a + bt_i$	$ \omega_i - \omega_{t_i} $
2011	7,16	-4	16	-28,64	6,676666666	0,48
2012	7,77	-3	9	-23,31	6,713333333	1,06
2013	7,20	-2	4	-14,40	6,750000000	0,45
2014	6,00	-1	1	-6,00	6,786666666	0,79
2015	6,29	0	0	0	6,823333333	0,53
2016	5,18	+1	1	+5,18	6,860000000	1,68
2017	5,91	+2	4	+11,82	6,896666666	0,99
2018	6,05	+3	9	+18,15	6,933333333	0,88
2019	9,85	+4	16	+39,40	6,970000000	2,88
TOTAL	61,41	0	60	2,20		9,74

$$a = \frac{\sum_{i=1}^n \omega_i \sum_{i=1}^n t_i^2 - \sum_{i=1}^n \omega_i t_i \sum_{i=1}^n t_i}{n \sum_{i=1}^n t_i^2 - \left(\sum_{i=1}^n t_i \right)^2} = \frac{61,41 \cdot 60}{9 \cdot 60} = 6,823333333$$

$$b = \frac{n \sum_{i=1}^n \omega_i t_i - \sum_{i=1}^n t_i \sum_{i=1}^n \omega_i}{n \sum_{i=1}^n t_i^2 - \left(\sum_{i=1}^n t_i \right)^2} = \frac{9 \cdot 2,20}{9 \cdot 60} = 0,036666666$$

$$v_I = \left[\frac{\sum_{i=1}^n |\omega_i - \omega_{t_i}^I|}{n} : \frac{\sum_{i=1}^n \omega_i}{n} \right] \cdot 100 = \frac{\sum_{i=1}^n |\omega_i - \omega_{t_i}^I|}{\sum_{i=1}^n \omega_i} \cdot 100 = \frac{9,74}{61,41} \cdot 100 = 15,86\%$$

- if the proceeding's structure, which draws up the trend for ω variable, where ω = **the Sony's Imaging Product&Solutions worldwide revenues**, selects a quadratic exposure, $\omega_{t_i} = a + b \cdot t_i + ct_i^2$, a and b will be [2]:

Table 7. The „esplanade” regarding the Sony’s Imaging Product&Solutions worldwide revenues, if these make a quadratic „rally”

YEARS	SONY'S IMAGING PRODUCTS& SOLUTIONS WORLDWIDE REVENUES (billions \$) (ω_i)	PARABOLIC TENDENCY					
		t_i	t_i^2	t_i^4	$t_i^2 \omega_i$	$\omega_i = a + bt_i + ct_i^2$	$ \omega_i - \omega_i $
2011	7,16	-4	16	256	114,56	8,214848488	1,05
2012	7,77	-3	9	81	69,93	7,097878790	0,67
2013	7,20	-2	4	16	28,80	6,310519479	0,89
2014	6,00	-1	1	1	6,00	5,852770563	0,15
2015	6,29	0	0	0	0	5,724632035	0,57
2016	5,18	+1	1	1	5,18	5,926103895	0,75
2017	5,91	+2	4	16	23,64	6,457186143	0,55
2018	6,05	+3	9	81	54,45	7,317878779	1,27
2019	9,85	+4	16	256	157,60	8,508181803	1,34
TOTAL	61,41	0	60	708	460,16		7,24

$$a = \frac{\sum_{i=1}^n t_i^4 \sum_{i=1}^n \omega_i - \sum_{i=1}^n t_i^2 \sum_{i=1}^n t_i^2 \cdot \omega_i}{n \sum_{i=1}^n t_i^4 - \left(\sum_{i=1}^n t_i^2 \right)^2} = \frac{708 \cdot 61,41 - 60 \cdot 460,16}{9 \cdot 708 - 60^2} = 5,724632035$$

$$b = \frac{\sum_{i=1}^n \omega_i t_i}{\sum_{i=1}^n t_i^2} = \frac{2,20}{60} = 0,036666666$$

$$c = \frac{n \cdot \sum_{i=1}^n t_i^2 \cdot \omega_i - \sum_{i=1}^n t_i^2 \cdot \sum_{i=1}^n \omega_i}{n \sum_{i=1}^n t_i^4 - \left(\sum_{i=1}^n t_i^2 \right)^2} = \frac{9 \cdot 460,16 - 60 \cdot 61,41}{14 \cdot 9352 - 280^2} = 0,164805194$$

$$v_{II} = \left[\frac{\sum_{i=1}^n |\omega_i - \omega_i''|}{n} : \frac{\sum_{i=1}^n \omega_i}{n} \right] \cdot 100 = \frac{\sum_{i=1}^n |\omega_i - \omega_i''|}{\sum_{i=1}^n \omega_i} \cdot 100 = \frac{7,24}{61,41} \cdot 100 = 11,79\%$$

- if the proceeding's structure, which draws up the trend for ω variable, where ω = **the Sony’s Imaging Product&Solutions worldwide revenues**, selects an exponential exposure, $\omega_i = ab^{t_i}$, a and b will be [2]:

Table 8. The „esplanade” regarding the Sony’s Imaging Product&Solutions worldwide revenues, if these make an exponential „rally”

YEARS	SONY'S IMAGING PRODUCTS& SOLUTIONS WORLDWIDE REVENUES (billions \$) (ω_i)	EXPONENTIAL TENDENCY					
		t_i	$\lg \omega_i$	$t_i \lg \omega_i$	$\lg \omega_i = \lg a + t_i \lg b$	$\omega_i = ab^{t_i}$	$ \omega_i - \omega_i $
2011	7,16	-4	0,854913022	-3,419652089	0,827211883	6,717565086	0,44
2012	7,77	-3	0,890421018	-2,671263056	0,827091613	6,715705020	1,05
2013	7,20	-2	0,857332496	-1,714664993	0,826971344	6,713845516	0,49
2014	6,00	-1	0,778151250	-0,778151250	0,826851076	6,711986526	0,71
2015	6,29	0	0,798650645	0	0,826730808	6,710128051	0,42
2016	5,18	+1	0,714329759	+0,714329759	0,826610540	6,708270091	1,53
2017	5,91	+2	0,771587480	+1,543174962	0,826490272	6,706412645	0,80
2018	6,05	+3	0,781755374	+2,345266124	0,826370004	6,704555713	0,65
2019	9,85	+4	0,993436230	+3,973744922	0,826249736	6,702699296	3,15
TOTAL	61,41	0	7,440577275	-0,007216125			9,24

$$\lg a = \frac{\sum_{i=1}^n \lg \omega_i \sum_{i=1}^n t_i^2 - \sum_{i=1}^n t_i \lg \omega_i \sum_{i=1}^n t_i}{n \sum_{i=1}^n t_i^2 - \left(\sum_{i=1}^n t_i \right)^2} = \frac{7,440577275 \cdot 60}{9 \cdot 60} = 0,826730808$$

$$\lg b = \frac{n \cdot \sum_{i=1}^n t_i \lg \omega_i - \sum_{i=1}^n \lg \omega_i \sum_{i=1}^n t_i}{n \sum_{i=1}^n t_i^2 - \left(\sum_{i=1}^n t_i \right)^2} = \frac{9 \cdot (-0,007216125)}{9 \cdot 60} = -0,000120268$$

$$v_{\exp} = \left[\frac{\sum_{i=1}^n |\omega_i - \omega_{t_i}^{\exp}|}{n} : \frac{\sum_{i=1}^n \omega_i}{n} \right] \cdot 100 = \frac{\sum_{i=1}^n |\omega_i - \omega_{t_i}^{\exp}|}{\sum_{i=1}^n \omega_i} \cdot 100 = \frac{9,24}{61,41} \cdot 100 = 15,05\%$$

$$v_{II} = 11,79\% < v_{\exp} = 15,05\% < v_I = 15,86\%$$

The values concerning **the Sony's Imaging Product&Solutions worldwide revenues** cover a quadratic „rally” $\omega_{t_i} = a + b \cdot t_i + ct_i^2$

Graph 2. The quadratic „rally” for the values which show us the evolution regarding the Sony's Imaging Product&Solutions worldwide revenues

$$\omega_{2021}^{SONY'S_IMAGING_PRODUCTS\&SOLUTIONS_REVENUES} = 5,724632035 + 0,036666666 \cdot 6 + 0,164805194 \cdot 6^2 = \$11,88_billions$$

$$\omega_{2022}^{SONY'S_IMAGING_PRODUCTS\&SOLUTIONS_REVENUES} = 5,724632035 + 0,036666666 \cdot 7 + 0,164805194 \cdot 7^2 = \$14,06_billions$$

$$\omega_{2023}^{SONY'S_IMAGING_PRODUCTS\&SOLUTIONS_REVENUES} = 5,724632035 + 0,036666666 \cdot 8 + 0,164805194 \cdot 8^2 = \$16,57_billions$$

$$\omega_{2024}^{SONY'S_IMAGING_PRODUCTS\&SOLUTIONS_REVENUES} = 5,724632035 + 0,036666666 \cdot 9 + 0,164805194 \cdot 9^2 = \$19,40_billions$$

$$\omega_{2025}^{SONY'S_IMAGING_PRODUCTS\&SOLUTIONS_REVENUES} = 5,724632035 + 0,036666666 \cdot 10 + 0,164805194 \cdot 10^2 = \$22,57_billions$$

4. The survey concerning the worldwide revenues for Sony's Home Entertainment and Sound Products&Solutions, which has as target them estimation between 2021-2025

Table 9. The Sony's Home Entertainment and Sound Products&Solutions worldwide revenues, between 2011-2018

YEARS	SONY'S HOME ENTERTAINMENT AND SOUND PRODUCTS&SOLUTIONS WORLDWIDE REVENUES (billions\$) (λ_i)
2011	12,06
2012	10,58
2013	11,35
2014	10,06
2015	10,26
2016	9,28
2017	11,03
2018	10,42

Source: „Statista Portal the United States of America“

- if the proceeding's structure, which draws up the trend for λ variable, where λ = **the Sony's Home Entertainment and Sound Products&Solutions worldwide revenues**, selects a linear exposure, $\lambda_{t_i} = a + b \cdot t_i$, a and b will be [2]:

Table 10. The „esplanade“ concerning the Sony's Home Entertainment and Sound Products&Solutions worldwide revenues, if these make a linear „rally“

YEARS	SONY'S HOME ENTERTAINMENT AND SOUND PRODUCTS WORLDWIDE REVENUES (billions \$) (λ_i)	LINEAR TENDENCY				
		t_i	t_i^2	$t_i \lambda_i$	$\lambda_{t_i} = a + b t_i$	$ \lambda_i - \lambda_{t_i} $
2011	12,06	-4	16	-48,24	11,2400	0,82
2012	10,58	-3	9	-31,74	11,0875	0,51
2013	11,35	-2	4	-22,70	10,9350	0,41
2014	10,06	-1	1	-10,06	10,7825	0,72
2015	10,26	+1	1	+10,26	10,4775	0,22
2016	9,28	+2	4	+18,56	10,3250	1,05
2017	11,03	+3	9	+33,09	10,1725	0,86
2018	10,42	+4	16	+41,68	10,0200	0,40
TOTAL	85,04	0	60	-9,15	85,04	4,99

$$a = \frac{\sum_{i=1}^n \lambda_i \sum_{i=1}^n t_i^2 - \sum_{i=1}^n \lambda_i t_i \sum_{i=1}^n t_i}{n \sum_{i=1}^n t_i^2 - \left(\sum_{i=1}^n t_i \right)^2} = \frac{85,04 \cdot 60}{8 \cdot 60} = 10,63 \quad b = \frac{n \sum_{i=1}^n \lambda_i t_i - \sum_{i=1}^n t_i \sum_{i=1}^n \lambda_i}{n \sum_{i=1}^n t_i^2 - \left(\sum_{i=1}^n t_i \right)^2} = \frac{8 \cdot (-9,15)}{8 \cdot 60} = -0,1525$$

$$v_I = \left[\frac{\sum_{i=1}^n |\lambda_i - \lambda_{t_i}|}{n} : \frac{\sum_{i=1}^n \omega_i}{n} \right] \cdot 100 = \frac{\sum_{i=1}^n |\lambda_i - \lambda_{t_i}|}{\sum_{i=1}^n \lambda_i} \cdot 100 = \frac{4,99}{85,04} \cdot 100 = 5,87\%$$

- if the proceeding's structure, which draws up the trend for λ variable, where λ = **the Sony's Home Entertainment and Sound Products&Solutions worldwide revenues**, selects a quadratic exposure, $\lambda_{t_i} = a + b \cdot t_i + c t_i^2$, a and b will be [2]:

Table 11. The „esplanade” regarding the Sony’s Home Entertainment and Sound Products&Solutions worldwide revenues, if these make a quadratic „rally”

YEARS	SONY'S HOME ENTERTAINMENT AND SOUND PRODUCTS WORLDWIDE REVENUES (billions \$) (λ_i)	PARABOLIC TENDENCY					
		t_i	t_i^2	t_i^4	$t_i^2 \lambda_i$	$\lambda_i = a + bt_i + ct_i^2$	$ \lambda_i - \lambda_i $
2011	12,06	-4	16	256	192,96	11,87288759	0,19
2012	10,58	-3	9	81	95,22	11,19918605	0,62
2013	11,35	-2	4	16	45,40	10,67439923	0,68
2014	10,06	-1	1	1	10,06	10,29852713	0,24
2015	10,26	+1	1	1	10,26	9,993527134	0,27
2016	9,28	+2	4	16	37,12	10,06439923	0,78
2017	11,03	+3	9	81	99,27	10,28418605	0,75
2018	10,42	+4	16	256	166,72	10,65288759	0,23
TOTAL	85,04	0	60	708	657,01		3,76

$$a = \frac{\sum_{i=1}^n t_i^4 \sum_{i=1}^n \lambda_i - \sum_{i=1}^n t_i^2 \sum_{i=1}^n t_i^2 \cdot \lambda_i}{n \sum_{i=1}^n t_i^4 - \left(\sum_{i=1}^n t_i^2 \right)^2} = \frac{708 \cdot 85,04 - 60 \cdot 657,01}{8 \cdot 708 - 60^2} = 10,07156977 \quad b = \frac{\sum_{i=1}^n \lambda_i t_i}{\sum_{i=1}^n t_i^2} = -\frac{9,15}{60} = -0,1525$$

$$c = \frac{n \cdot \sum_{i=1}^n t_i^2 \cdot \lambda_i - \sum_{i=1}^n t_i^2 \cdot \sum_{i=1}^n \lambda_i}{n \sum_{i=1}^n t_i^4 - \left(\sum_{i=1}^n t_i^2 \right)^2} = \frac{8 \cdot 657,01 - 60 \cdot 85,04}{8 \cdot 708 - 60^2} = 0,074457364$$

$$v_{II} = \left[\frac{\sum_{i=1}^n |\lambda_i - \lambda_{i_i}''|}{n} : \frac{\sum_{i=1}^n \lambda_i}{n} \right] \cdot 100 = \frac{\sum_{i=1}^n |\lambda_i - \lambda_{i_i}''|}{\sum_{i=1}^n \lambda_i} \cdot 100 = \frac{3,764}{85,04} \cdot 100 = 4,42\%$$

- if the proceeding's structure, which draws up the trend for λ variable, where λ = **the Sony's Home Entertainment and Sound Products&Solutions worldwide revenues**, selects an exponential exposure, $\lambda_{i_i} = ab^{t_i}$, a and b will be [2]:

Table 12 The „esplanade” regarding the Sony’s Home Entertainment and Sound Products&Solutions worldwide revenues, if these make an exponential „rally”

YEARS	SONY'S HOME ENTERTAINMENT AND SOUND PRODUCTS WORLDWIDE REVENUES (billions \$) (λ_i)	EXPONENTIAL TENDENCY					
		t_i	$\lg \lambda_i$	$t_i \lg \lambda_i$	$\lg \lambda_{i_i} = \lg a + t_i \lg b$	$\lambda_{i_i} = ab^{t_i}$	$ \lambda_i - \lambda_{i_i} $
2011	12,06	-4	1,081347308	-4,325389231	1,049720353	11,21296207	0,85
2012	10,58	-3	1,024485668	-3,073457003	1,043620433	11,05657034	0,48
2013	11,35	-2	1,054995862	-2,109991723	1,037520513	10,90235986	0,45
2014	10,06	-1	1,002597981	-1,002597981	1,031420593	10,75030022	0,69
2015	10,26	+1	1,011147361	+1,011147361	1,019220753	10,45251388	0,19
2016	9,28	+2	0,967547976	+1,935095952	1,013120833	10,30672843	1,03
2017	11,03	+3	1,042575512	+3,127726537	1,007020913	10,16297630	0,87
2018	10,42	+4	1,017867719	+4,071470876	1,000920993	10,02122915	0,40
TOTAL	85,04	0	8,202565387	-0,365995212			4,96

$$\lg a = \frac{\sum_{i=1}^n \lg \lambda_i \sum_{i=1}^n t_i^2 - \sum_{i=1}^n t_i \lg \lambda_i \sum_{i=1}^n t_i}{n \sum_{i=1}^n t_i^2 - \left(\sum_{i=1}^n t_i \right)^2} = \frac{8,202565387 \cdot 60}{8 \cdot 60} = 1,025320673$$

$$\lg b = \frac{n \cdot \sum_{i=1}^n t_i \lg \lambda_i - \sum_{i=1}^n \lg \lambda_i \sum_{i=1}^n t_i}{n \sum_{i=1}^n t_i^2 - \left(\sum_{i=1}^n t_i \right)^2} = \frac{8 \cdot (-0,365995212)}{8 \cdot 60} = -0,00609992$$

$$v_{\exp} = \left[\frac{\sum_{i=1}^n |\lambda_i - \lambda_{t_i}^{\exp}|}{n} : \frac{\sum_{i=1}^n \lambda_i}{n} \right] \cdot 100 = \frac{\sum_{i=1}^n |\lambda_i - \lambda_{t_i}^{\exp}|}{\sum_{i=1}^n \lambda_i} \cdot 100 = \frac{4,96}{85,04} \cdot 100 = 5,83\%$$

$$v_H = 4,42\% < v_{\exp} = 5,83\% < v_I = 5,87\%$$

The values concerning **the Sony's Home Entertainment and Sound Products&Solutions worldwide revenues** cover a quadratic „rally” $\lambda_{t_i} = a + b \cdot t_i + ct_i^2$

Graph 3. The quadratic „rally” for the values which show us the evolution for the Sony's Home Entertainment and Sound Products worldwide revenues

$$\begin{aligned} \lambda_{2021}^{\text{SONY'S_HOME_ENTERTAINMENT\&SOUND_PRODUCTS\&SOLUTIONS_REVENUES}} &= 10,07156977 + (-0,1525) \cdot 7 + 0,074457364 \cdot 7^2 = \$12,65_billions \\ \lambda_{2022}^{\text{SONY'S_HOME_ENTERTAINMENT\&SOUND_PRODUCTS\&SOLUTIONS_REVENUES}} &= 10,07156977 + (-0,1525) \cdot 8 + 0,074457364 \cdot 8^2 = \$13,62_billions \\ \lambda_{2023}^{\text{SONY'S_HOME_ENTERTAINMENT\&SOUND_PRODUCTS\&SOLUTIONS_REVENUES}} &= 10,07156977 + (-0,1525) \cdot 9 + 0,074457364 \cdot 9^2 = \$14,73_billions \\ \lambda_{2024}^{\text{SONY'S_HOME_ENTERTAINMENT\&SOUND_PRODUCTS\&SOLUTIONS_REVENUES}} &= 10,07156977 + (-0,1525) \cdot 10 + 0,074457364 \cdot 10^2 = \$15,99_billions \\ \lambda_{2025}^{\text{SONY'S_HOME_ENTERTAINMENT\&SOUND_PRODUCTS\&SOLUTIONS_REVENUES}} &= 10,07156977 + (-0,1525) \cdot 11 + 0,074457364 \cdot 11^2 = \$17,40_billions \end{aligned}$$

5. The survey concerning the worldwide revenues for Sony Music Entertainment, which has as target them estimation between 2021-2025

Table 13. The Sony's Music Entertainment worldwide revenues, between 2011-2019

YEARS	SONY'S MUSIC ENTERTAINMENT WORLDWIDE REVENUES (billions \$) (γ_i)
2011	4,16
2012	4,70
2013	4,89
2014	4,54
2015	5,47
2016	5,78
2017	7,21
2018	7,28
2019	7,82

Source: „Statista Portal the United States of America”

- if the proceeding's structure, which draws up the trend for γ variable, where γ = **the Sony's Music Entertainment worldwide revenues**, selects a linear exposure, $\gamma_{t_i} = a + b \cdot t_i$, a and b will be [2]:

Table 14. The „esplanade” concerning the Sony’s Music Entertainment worldwide revenues, if these make a linear „rally”

YEARS	SONY’S MUSIC WORLDWIDE REVENUES (billions \$) (γ_i)	LINEAR TENDENCY				
		t_i	t_i^2	$t_i \gamma_i$	$\gamma_{t_i} = a + b t_i$	$ \gamma_i - \gamma_{t_i} $
2011	4,16	-4	16	-16,64	3,877111111	0,28
2012	4,70	-3	9	-14,10	4,348111111	0,35
2013	4,89	-2	4	-9,78	4,819111111	0,07
2014	4,54	-1	1	-4,54	5,290111111	0,75
2015	5,47	0	0	0	5,761111111	0,29
2016	5,78	+1	1	+5,78	6,232111111	0,45
2017	7,21	+2	4	+14,42	6,703111111	0,51
2018	7,28	+3	9	+21,84	7,174111111	0,11
2019	7,82	+4	16	+31,28	7,645111111	0,17
TOTAL	51,85	0	60	28,26		2,98

$$a = \frac{\sum_{i=1}^n \gamma_i \sum_{i=1}^n t_i^2 - \sum_{i=1}^n \gamma_i t_i \sum_{i=1}^n t_i}{n \sum_{i=1}^n t_i^2 - \left(\sum_{i=1}^n t_i \right)^2} = \frac{51,85 \cdot 60}{9 \cdot 60} = 5,761111111 \quad b = \frac{n \sum_{i=1}^n \gamma_i t_i - \sum_{i=1}^n t_i \sum_{i=1}^n \gamma_i}{n \sum_{i=1}^n t_i^2 - \left(\sum_{i=1}^n t_i \right)^2} = \frac{9 \cdot 28,26}{9 \cdot 60} = 0,471$$

$$v_I = \left[\frac{\sum_{i=1}^n |\gamma_i - \gamma_{t_i}^I|}{n} : \frac{\sum_{i=1}^n \gamma_i}{n} \right] \cdot 100 = \frac{\sum_{i=1}^n |\gamma_i - \gamma_{t_i}^I|}{\sum_{i=1}^n \gamma_i} \cdot 100 = \frac{2,98}{51,85} \cdot 100 = 5,75\%$$

- if the proceeding’s structure, which draws up the trend for γ variable, where γ = **the Sony’s Music Entertainment worldwide revenues**, selects a quadratic exposure, $\gamma_{t_i} = a + b \cdot t_i + c t_i^2$, a and b will be [2]:

Table 15. The „esplanade” regarding the Sony’s Music Entertainment worldwide revenues, if these make a quadratic „rally”

YEARS	SONY’S MUSIC WORLDWIDE REVENUES (billions \$) (γ_i)	PARABOLIC TENDENCY					
		t_i	t_i^2	t_i^4	$t_i^2 \gamma_i$	$\gamma_{t_i} = a + b t_i + c t_i^2$	$ \gamma_i - \gamma_{t_i} $
2011	4,16	-4	16	256	66,56	4,257515151	0,10
2012	4,70	-3	9	81	42,30	4,443212114	0,26
2013	4,89	-2	4	16	19,56	4,710424239	0,18
2014	4,54	-1	1	1	4,54	5,059151514	0,52
2015	5,47	0	0	0	0	5,489393939	0,02
2016	5,78	+1	1	1	5,78	6,001151514	0,22
2017	7,21	+2	4	16	28,84	6,594424239	0,62
2018	7,28	+3	9	81	65,52	7,269212114	0,01
2019	7,82	+4	16	256	125,12	8,025515139	0,21
TOTAL	51,85	0	60	708	358,22		2,14

$$a = \frac{\sum_{i=1}^n t_i^4 \sum_{i=1}^n \gamma_i - \sum_{i=1}^n t_i^2 \sum_{i=1}^n t_i^2 \cdot \gamma_i}{n \sum_{i=1}^n t_i^4 - \left(\sum_{i=1}^n t_i^2 \right)^2} = \frac{708 \cdot 51,85 - 60 \cdot 358,22}{9 \cdot 708 - 60^2} = 5,489393939 \quad b = \frac{\sum_{i=1}^n \gamma_i t_i}{\sum_{i=1}^n t_i^2} = \frac{28,26}{60} = 0,471$$

$$c = \frac{n \cdot \sum_{i=1}^n t_i^2 \cdot \gamma_i - \sum_{i=1}^n t_i^2 \cdot \sum_{i=1}^n \gamma_i}{n \sum_{i=1}^n t_i^4 - \left(\sum_{i=1}^n t_i^2 \right)^2} = \frac{9 \cdot 358,22 - 60 \cdot 51,85}{9 \cdot 708 - 60^2} = 0,040757575$$

$$v_{II} = \left[\frac{\sum_{i=1}^n |\gamma_i - \gamma_{t_i}^{II}|}{n} : \frac{\sum_{i=1}^n \gamma_i}{n} \right] \cdot 100 = \frac{\sum_{i=1}^n |\gamma_i - \gamma_{t_i}^{II}|}{\sum_{i=1}^n \gamma_i} \cdot 100 = \frac{2,14}{51,85} \cdot 100 = 4,13\%$$

- if the proceeding's structure, which draws up the trend for γ variable, where γ = **the Sony's Music Entertainment worldwide revenues**, selects an exponential exposure, $\gamma_{t_i} = ab^{t_i}$, a and b will be [2]:

Table 16. The „esplanade” regarding the Sony's Music Entertainment worldwide revenues, if these make an exponential „rally”

YEARS	SONY'S MUSIC WORLDWIDE REVENUES (billions \$) (γ_i)	EXPONENTIAL TENDENCY					
		t_i	$\lg \gamma_i$	$t_i \lg \gamma_i$	$\lg \gamma_{t_i} = \lg a + t_i \lg b$	$\gamma_{t_i} = ab^{t_i}$	$ \gamma_i - \gamma_{t_i} $
2011	4,16	-4	0,61909333	-2,476373323	0,609504117	4,069153912	0,09
2012	4,70	-3	0,672097857	-2,016293574	0,644648767	4,412134743	0,29
2013	4,89	-2	0,689308859	-1,378617718	0,679793417	4,784024741	0,11
2014	4,54	-1	0,657055852	-0,657055852	0,714938067	5,187260602	0,65
2015	5,47	0	0,737987326	0	0,750082717	5,624484406	0,15
2016	5,78	+1	0,761927838	+0,761927838	0,785227367	6,098560928	0,32
2017	7,21	+2	0,857935264	+1,715870529	0,820372017	6,612596410	0,60
2018	7,28	+3	0,862131379	+2,586394138	0,855516667	7,169958913	0,11
2019	7,82	+4	0,893206753	+3,572827012	0,890661317	7,774300385	0,05
TOTAL	51,85	0	6,750744458	2,10867905			2,37

$$\lg a = \frac{\sum_{i=1}^n \lg \gamma_i \sum_{i=1}^n t_i^2 - \sum_{i=1}^n t_i \lg \gamma_i \sum_{i=1}^n t_i}{n \sum_{i=1}^n t_i^2 - \left(\sum_{i=1}^n t_i \right)^2} = \frac{6,750744458 \cdot 60}{9 \cdot 60} = 0,750082717$$

$$\lg b = \frac{n \cdot \sum_{i=1}^n t_i \lg \gamma_i - \sum_{i=1}^n \lg \gamma_i \sum_{i=1}^n t_i}{n \sum_{i=1}^n t_i^2 - \left(\sum_{i=1}^n t_i \right)^2} = \frac{9 \cdot 2,10867905}{9 \cdot 60} = 0,03514465$$

$$v_{\exp} = \left[\frac{\sum_{i=1}^n |\gamma_i - \gamma_{t_i}^{\exp}|}{n} : \frac{\sum_{i=1}^n \gamma_i}{n} \right] \cdot 100 = \frac{\sum_{i=1}^n |\gamma_i - \gamma_{t_i}^{\exp}|}{\sum_{i=1}^n \gamma_i} \cdot 100 = \frac{2,37}{51,85} \cdot 100 = 4,57\%$$

$$v_H = 4,13\% < v_{\exp} = 4,57\% < v_I = 5,75\%$$

The values concerning **the Sony's Music Entertainment worldwide revenues** cover a quadratic „rally”
 $\gamma_{t_i} = a + b \cdot t_i + ct_i^2$

Graph 4. The quadratic „rally” for the values which show us the evolution concerning the Sony's Music Entertainment worldwide revenues

$$\gamma_{2021}^{\text{SONY'S_MUSIC_REVENUES}} = 5,489393939 + 0,471 \cdot 6 + 0,040757575 \cdot 6^2 = \$9,78_billions$$

$$\begin{aligned}\gamma_{2022}^{SONY'S_MUSIC_REVENUES} &= 5,489393939 + 0,471 \cdot 7 + 0,040757575 \cdot 7^2 = \$10,78_billions \\ \gamma_{2023}^{SONY'S_MUSIC_REVENUES} &= 5,489393939 + 0,471 \cdot 8 + 0,040757575 \cdot 8^2 = \$11,87_billions \\ \gamma_{2024}^{SONY'S_MUSIC_REVENUES} &= 5,489393939 + 0,471 \cdot 9 + 0,040757575 \cdot 9^2 = \$13,03_billions \\ \gamma_{2025}^{SONY'S_MUSIC_REVENUES} &= 5,489393939 + 0,471 \cdot 10 + 0,040757575 \cdot 10^2 = \$14,27_billions\end{aligned}$$

4. Conclusions

In Forbes, the Sony Corporation has the positioning on 47 place, in the list named „the 2020 world's most valuable brands”, with \$ 13,3 billions quotation for the brand value. We can remark between 2021-2025, that the Sony Corporation's worldwide revenues will be in a continuous augmentation, from \$80,58 billions, to \$ 93,87 billions. Also, the Sony's Imaging Product&Solutions worldwide revenues will manifest the same „symptom”, namely permanent increment in the period 2021-2025, from \$11,88 billions, to \$22,57 billions, concerning the digital imaging products and the medical goods. Concerning the Sony's Home Entertainment and Sound Products&Solutions worldwide revenues, there are rises in future, between 2021-2025, from \$12,65 billions, to \$17,40 billions. Alike, the Sony's Music worldwide revenues will be in a continuous development between 2021-2025, from \$ 9,78 billions, to \$14,27 billions.

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