

# Music Streaming Patterns

## A Research on the Music Streaming Patterns in Different Age Groups

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**Abstract:- This brief paper reports on the research carried out on the music streaming patterns across 995 people between the ages of 7-40.**

### I. INTRODUCTION

Adoption of streaming is by far the most significant shift in the industry in the last ten years — and that's a shift that is still ongoing. Even today, streaming services are looking for ways to expand their user-base, develop their product, grow the revenues, and find a sustainable long-term business model balancing paid subscribers with ad supported options for other users. The music industry is caught in the middle of that. Streaming has already changed the way the recording industry operates and the way in which we consume, share and experience music — and that might be just the beginning. That's why we've decided to take a close look at the mechanics behind the music streaming and answer the questions: how many people stream music? How many actually pay for it? And does streaming music depend on age? The following analysis is based on the primary data collected via an online survey.

### II. DATA COLLECTION

#### A. Primary Data

Primary Data was collected via an online survey. Data of approximately 1000 persons was collected and analyzed.

#### B. Survey Contents

Consisted of: Age of the Individual (Birth Year)  
Whether he/she streams music (True/False)  
Whether he/she pays for the same (True/False)

### III. ANALYSIS

Firstly, the true and false values were converted into quantitative variables using lookup function in excel. (True corresponds to the value 2, and False corresponds to the value 1) Pivot Table was used next. A pivot table is a statistics tool that summarizes and reorganizes selected columns and rows of data in a spreadsheet or database table to obtain a desired report. The data collected was reorganized and the average of the number of people who stream music and the number of people who pay for the same was calculated for each age group as seen below:

Row Labels	Average of people who stream music	Average of those who pay
1981	2.00	2.00
1982	1.33	1.00
1983	1.31	1.23
1984	1.55	1.36
1985	1.17	1.17
1986	1.30	1.05
1987	1.15	1.12
1988	1.36	1.31
1989	1.43	1.30
1990	1.18	1.11
1991	1.51	1.20
1992	1.53	1.35
1993	1.40	1.20
1994	1.39	1.28
1995	1.45	1.27
1996	1.55	1.26
1997	1.59	1.34
1998	1.64	1.32
1999	1.58	1.23
2000	1.56	1.24

2001	1.64	1.22
2002	1.66	1.21
2003	1.77	1.16
2004	1.84	1.32
2005	1.67	1.22
2006	1.83	1.06
2007	1.67	1.00
2008	1.50	1.00
2009	1.83	1.00
2010	1.50	1.00
2011	1.67	1.00
2012	2.00	1.00
2013	2.00	1.00
<b>Grand Total</b>	<b>1.52</b>	<b>1.24</b>

Table 1

Note: The age or birth year is regarded as the independent variable, and the average of people who stream music and average of those who pay are taken as the dependent variables in our analysis.

*A. Moving Averages*

In statistics, a moving average is a calculation to analyze data points by creating a series of averages of different subsets of the full data set. It is also called a

moving mean or rolling mean and is a type of finite impulse response filter.

Here, the 5 yearly moving averages is observed for each of the two dependent variables.

The following is the 5 yearly moving average for the average number of people who stream music according to their age group:

Row Labels	Average of people who stream music	5 Yearly Moving Averages
1981	2.00	#N/A
1982	1.33	#N/A
1983	1.31	#N/A
1984	1.55	#N/A
1985	1.17	1.47
1986	1.30	1.33
1987	1.15	1.29
1988	1.36	1.31
1989	1.43	1.28
1990	1.18	1.29
1991	1.51	1.33
1992	1.53	1.40
1993	1.40	1.41
1994	1.39	1.40
1995	1.45	1.46
1996	1.55	1.46
1997	1.59	1.47
1998	1.64	1.52
1999	1.58	1.56
2000	1.56	1.58
2001	1.64	1.60
2002	1.66	1.61

2003	1.77	1.64
2004	1.84	1.69
2005	1.67	1.72
2006	1.83	1.75
2007	1.67	1.76
2008	1.50	1.70
2009	1.83	1.70
2010	1.50	1.67
2011	1.67	1.63
2012	2.00	1.70
2013	2.00	1.80

Table 2

➤ Graphical Representation:

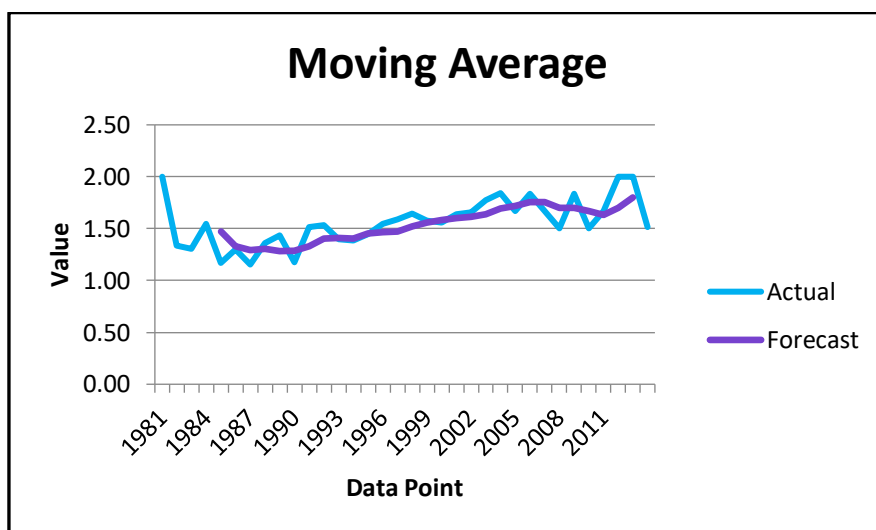


Fig 1

➤ Interpretation:

As we can see from the table and the graphical representation, which is according to the 5 yearly moving averages, the teenagers and young adults prefer to stream music much more than the older adults, although there are exceptions. This is because the averages ranges more towards true (value 2) for the younger generation and more towards false (value 1) for the older generation.

The following is the 5 yearly moving averages for the average of those who pay for streaming music:

Row Labels	Average of those who pay	5 yearly Moving Averages
1981	2.00	#N/A
1982	1.00	#N/A
1983	1.23	#N/A
1984	1.36	#N/A
1985	1.17	1.35
1986	1.05	1.16
1987	1.12	1.19
1988	1.31	1.20
1989	1.30	1.19
1990	1.11	1.18
1991	1.20	1.20

1992	1.35	1.25
1993	1.20	1.23
1994	1.28	1.23
1995	1.27	1.26
1996	1.26	1.27
1997	1.34	1.27
1998	1.32	1.30
1999	1.23	1.28
2000	1.24	1.28
2001	1.22	1.27
2002	1.21	1.24
2003	1.16	1.21
2004	1.32	1.23
2005	1.22	1.23
2006	1.06	1.19
2007	1.00	1.15
2008	1.00	1.12
2009	1.00	1.06
2010	1.00	1.01
2011	1.00	1.00
2012	1.00	1.00
2013	1.00	1.00

Table 3

➤ Graphical Representation:

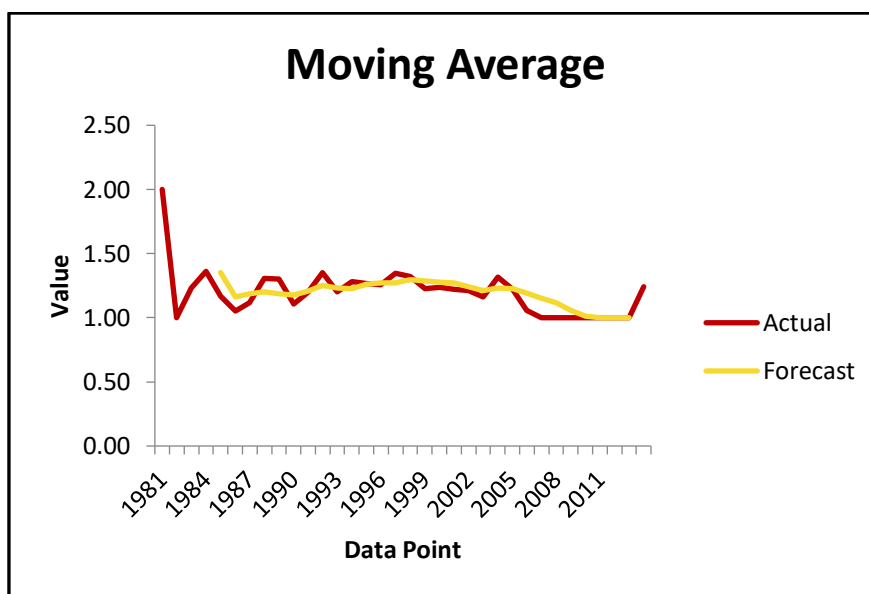


Fig 2

➤ Interpretation:

As we can see from the table and the graphical representation that is according to the 5 yearly moving averages it can be interpreted that since the teenagers and younger adults don't have enough money, they don't prefer paying for streaming music and rather use free platforms. Their averages therefore ranges more towards false (value 1). The older adults who like to stream music are willing to pay for the same. Their averages ranges more towards true (value 2). The reason for the uptake in moving average

towards the end can be explained by them using their parent's family plan where they don't have to pay for the service themselves.

B. Regression ( Using Least Square Method)

In statistical modeling, regression analysis is a set of statistical processes for estimating the relationships between a dependent variable (often called the 'outcome variable') and one or more independent variables (often called 'predictors', 'covariates', or 'features'). The most

common form of regression analysis is linear regression, in which a researcher finds the line (or a more complex linear combination) that most closely fits the data according to a specific mathematical criterion. The method of least squares is a standard approach in regression analysis to approximate the solution of overdetermined systems by minimizing the sum of the squares of the residuals made in the results of every single equation.

Here,  $X$  is the independent and  $Y$  estimate is the estimated values of the dependent variables.

The following is the estimated values for the number of people who stream music:

Row Labels	Average of people who stream music (y)	X= Year - Middle Year	Y-estimated
1981	2.00	-16	1.32
1982	1.33	-15	1.34
1983	1.31	-14	1.35
1984	1.55	-13	1.37
1985	1.17	-12	1.38
1986	1.30	-11	1.40
1987	1.15	-10	1.41
1988	1.36	-9	1.43
1989	1.43	-8	1.44
1990	1.18	-7	1.46
1991	1.51	-6	1.47
1992	1.53	-5	1.49
1993	1.40	-4	1.50
1994	1.39	-3	1.52
1995	1.45	-2	1.53
1996	1.55	-1	1.55
1997	1.59	0	1.56
1998	1.64	1	1.58
1999	1.58	2	1.59
2000	1.56	3	1.61
2001	1.64	4	1.62
2002	1.66	5	1.64
2003	1.77	6	1.65
2004	1.84	7	1.67
2005	1.67	8	1.68
2006	1.83	9	1.70
2007	1.67	10	1.71
2008	1.50	11	1.73
2009	1.83	12	1.74
2010	1.50	13	1.76
2011	1.67	14	1.77
2012	2.00	15	1.79
2013	2.00	16	1.80
2020		23	1.90

Table 4

➤ Graphical Representation:

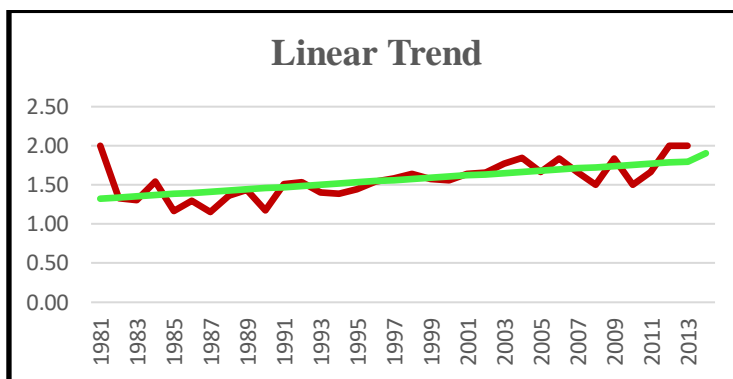


Fig 3

➤ Interpretation:

The Regression Coefficient used to understand which among the independent variables are related to the dependent variable. Here, the regression coefficient is 0.01488. As we can see from the table and the graph, the Y estimate for 2020 is estimated to be 1.90. Therefore, even in the near future, the younger adults and teenagers will prefer streaming music more than the older adults.

The following is the estimated values for the number of people who pay to stream music:

Row Labels	Average of those who pay	X= Year – Middle Year	Y estimate
1981	2.0	-16	1.36
1982	1.0	-15	1.35
1983	1.2	-14	1.34
1984	1.4	-13	1.33
1985	1.2	-12	1.32
1986	1.1	-11	1.31
1987	1.1	-10	1.30
1988	1.3	-9	1.29
1989	1.3	-8	1.28
1990	1.1	-7	1.27
1991	1.2	-6	1.26
1992	1.4	-5	1.25
1993	1.2	-4	1.24
1994	1.3	-3	1.23
1995	1.3	-2	1.22
1996	1.3	-1	1.21
1997	1.3	0	1.20
1998	1.3	1	1.19
1999	1.2	2	1.18
2000	1.2	3	1.17
2001	1.2	4	1.16
2002	1.2	5	1.15
2003	1.2	6	1.14
2004	1.3	7	1.13
2005	1.2	8	1.12
2006	1.1	9	1.11
2007	1.0	10	1.10
2008	1.0	11	1.09
2009	1.0	12	1.08
2010	1.0	13	1.07
2011	1.0	14	1.06
2012	1.0	15	1.05
2013	1.0	16	1.04
2020		23	0.97

Table 5

➤ *Graphical Representation:*

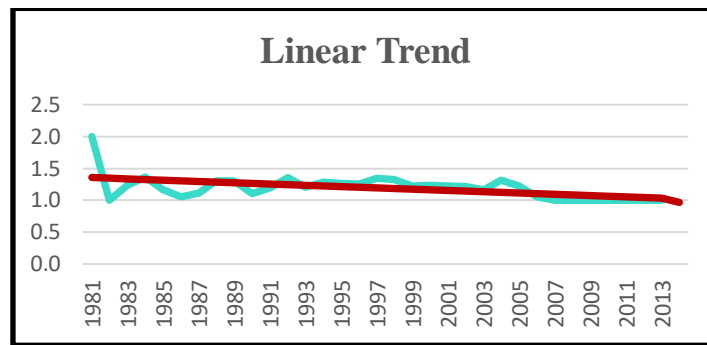


Fig 4

➤ *Interpretation:*

The Regression Coefficient used to understand which among the independent variables are related to the dependent variable. Here, the regression coefficient is - 0.01. As we can see from the table and graph, the Y estimate for 2020 is estimated to be 0.97. Therefore, people are more likely to pay as they get older.

random variables or bivariate data. In the broadest sense correlation is any statistical association, though it commonly refers to the degree to which a pair of variables are linearly related.

The following is the multiple correlation between the indepent and dependent variables:

C. *Correlation*

In statistics, correlation or dependence is any statistical relationship, whether causal or not, between two

	<i>Row Labels</i>	<i>Average of people who stream music</i>	<i>Average of those who pay</i>
<i>Row Labels</i>	1		
<i>Average of people who Stream Music</i>	0.625382451	1	
<i>Average of those who pay</i>	-0.509846122	0.14521284	1

Table 6

Interpretation: A correlation between variables indicates that as one variable changes in value, the other variable tends to change in a specific direction. Here, there is a moderate positive correalation between the independent variable and the dependent variables. This suggests that the average number of people who stream music as well as the average number of people who pay for it depends a lot on the age group, although there might be exceptions.

**IV. CONCLUSION**

We can here by conclude from the above analysis that the younger generation (children, teenagers, young adults) prefer streaming music more than the older adults, but do not prefer paying for the same. Hence, ad supported mediums and more brand collaborations can drive revenue growth for such services.

**REFERENCES**

[1]. [www.wikipedia.com](http://www.wikipedia.com)  
 [2]. <https://soundcharts.com/blog/how-music-streaming-works-trends>