# Predicting Sales for the Next Generation of Consoles in 2020

Amy Chung
University of Leicester
18th April 2020

## Abstract

This paper will predict sales for the next generation of consoles by using the data of its predecessors. The estimated sales will be used to approximate the probability of a console selling within a range of possible units, the probability of one console outselling the other, and whether it will sell more than its predecessors. The two game consoles that will be researched in this paper are PlayStation and Xbox. Mathematical calculations and arguments will be included to support the findings of the results. Methods and programs such as Simple Linear Regression, Poisson Distribution and MATLAB are used for calculations.

## 1. Introduction

PlayStation and Xbox are leaders in the gaming industry [1] with combined total sales exceeding 600 million units over four generations of hardware. The two consoles are produced by Sony Interactive Entertainment and Microsoft respectively. The companies are releasing new models, PlayStation 5 and Xbox Series X, at the end of 2020 [2-3].

PlayStation has many iterations of the same models, however only the first version of each console is considered in this paper, so mid-generation releases such as the PlayStation 4 Pro will not be considered. Therefore, the consoles that will be used are PlayStation 1, PlayStation 2, PlayStation 3 and PlayStation 4. PlayStation 2 is the best-selling home game console to date, having sold over 155 million units up until 2012 when it was discontinued [4].

Likewise, Xbox has many versions of the same console though only the following models will be considered: Xbox, Xbox 360 and Xbox One. The best-selling console for Xbox is the Xbox 360, having sold over 84 million units by the end of 2016 when it was discontinued [5].

To predict sales for the two gaming consoles, only data from launch to the fifth year of availability will be used. As there are regions which have different release dates, only the first date of launch will be considered when finding data for models. Furthermore, the sales that are mentioned in this paper are all cumulative sales.

 

## 2. Initial Data

### 2.1. Data for PlayStation

| | Cumulative Sales (in millions) | | | |
|---|---|---|---|---|
| **Year after launch** | **PS1** | **PS2** | **PS3** | **PS4** |
| **1** | 3.40 | 10.04 | 3.61 | 19.90 |
| **2** | 10.00 | 28.68 | 12.85 | 37.70 |
| **3** | 28.20 | 51.20 | 22.91 | 57.10 |
| **4** | 50.00 | 71.30 | 35.91 | 76.50 |
| **5** | 70.04 | 87.47 | 50.21 | 94.20 |

*Table 1 - A table showing cumulative sales after 5 years from launch for PlayStation* [6-9]

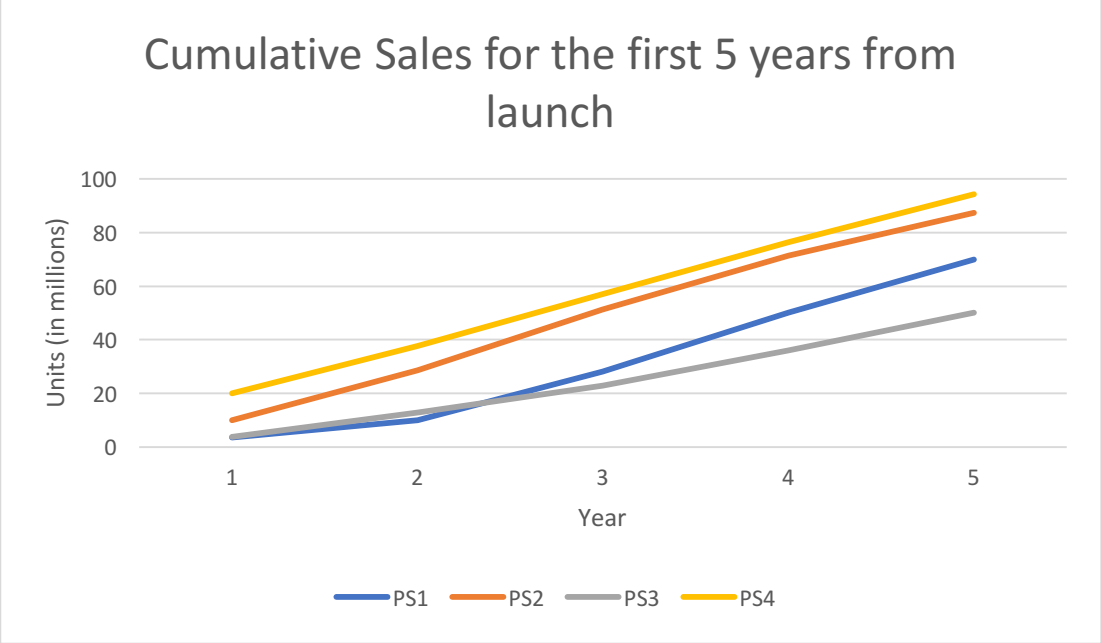


*Figure 1 - A graph showing cumulative sales for the first 5 years from launch for PlayStation*

Figure 1 shows that PlayStation 4 is the best-selling model in the first five years from launch, followed by PlayStation 2. In the first five years of availability, PlayStation 2, 3 and 4 all have a linear growth, while PlayStation 1 experiences a faster selling rate after the second year from launch. Moreover, Table 1 shows that PlayStation 1 sold the least number of units after the first year of launch, followed by PlayStation 3. PlayStation 2 and 4 have proven to outsell the original PlayStation 1 after the first five years of availability from launch by 24.16 and 6.73 million units respectively.

Although PlayStation 4 sold more units compared to PlayStation 2 in the first five years of release, PlayStation 2 holds the title: 'best-selling video game console of all time' to this day from its sales over 13 years of availability, having sold over 155 million units worldwide, compared to PlayStation 4 who has sold over 108.9 million units worldwide and still ongoing.

 

## 2.2. Data for Xbox

| | Cumulative Sales (in millions) | | |
|---|---|---|---|
| **Year after launch** | **Xbox** | **Xbox 360** | **Xbox One** |
| **1** | 8.00 | 7.60 | 10.99 |
| **2** | 13.70 | 10.90 | 19.62 |
| **3** | 19.90 | 14.80 | 27.99 |
| **4** | 24.00 | 32.70 | 36.20 |
| **5** | | 40.22 | 52.92 |

*Table 2 - A table showing cumulative sales after 5 years from launch for Xbox* [10-15]

Note: the entry for Xbox – year 5 is empty due to the manufacturer discontinuing the console in the fifth year after launch.

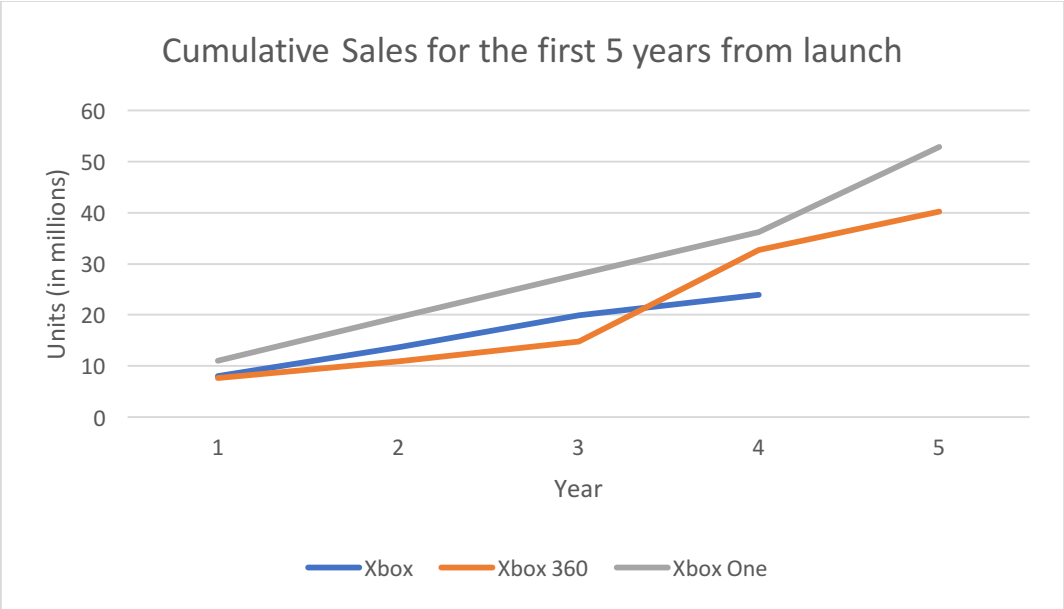


*Figure 2 - A graph showing cumulative sales for the first 5 years from launch for Xbox*

Figure 2 shows that Xbox One is the best-selling model in the first five years of launch, followed by Xbox 360. The original Xbox was discontinued by the manufacturer after five years of sale and sold a total of 24 million units across the years of sale. Xbox One had successfully outsold Xbox 360's cumulative five-year sales by 12.70 million units, however Xbox 360 has sold more units overall up until the present day.

 

## 3. Simple Linear Regression

A simple linear regression is used to model a relationship between two sets of variables; an independent and a dependent variable. In this case, the independent variable is the models for PlayStation/Xbox and the dependent variable is the cumulative sales over the first 5 years from launch. The simple linear regression model is represented by the equation:

$$y = mx + c$$

where $m$ is the gradient and $c$ is the $y$-intercept of the regression line. To work out the value of $m$ and $c$, the following formulas are used [16]:

$$m = \frac{n(\sum xy) - (\sum x)(\sum y)}{n(\sum x^2) - (\sum x)^2} \qquad (*)$$

$$c = \frac{(\sum y)(\sum x^2) - (\sum x)(\sum xy)}{n(\sum x^2) - (\sum x)^2} \qquad (**)$$

The linear regression line for PlayStation:

| Models | Total units sold (in millions) |
|---|---|
| **PS1** | 70.04 |
| **PS2** | 87.47 |
| **PS3** | 50.21 |
| **PS4** | 94.20 |

*Table 3 - A table showing total sales over the first 5 years from launch for PlayStation*

Let $x = models$ and $y = total\ sales$, then the following can be worked out with simple calculations:

$$n = 4,\ \sum x = 10,\ \sum y = 301.92,\ \sum x^2 = 30,\ \sum xy = 772.41.$$

By substituting these values into $(*)$ and $(**)$, the values obtained for $m$ and $c$ are $3.522$ and $66.675$ respectively. From this, the following equation is formed:

$$y = 3.522x + 66.675$$

Using this equation, a value for the predicted sales after five years of availability from launch for PlayStation 5 can be obtained by substituting $x = 5$ into the equation. This gives a value of $84.285$. This means that the predicted cumulative sales for PlayStation 5 after five years from launch will be $84.285$ million units.

 

The linear regression line for Xbox:

| Models | Total units sold (in millions) |
|---|---|
| Xbox | 24 |
| Xbox 360 | 40.22 |
| Xbox One | 52.92 |

*Table 4 - A table showing total sales over the first 5 years from launch for Xbox*

Let $x = models$ and $y = total\ sales$, then the following can be worked out with simple calculations:

$$n = 3, \sum x = 6, \ \sum y = 117.14, \ \sum x^2 = 14, \ \sum xy = 263.2.$$

By substituting these values into $(*)$ and $(**)$, the values obtained for $m$ and $c$ are $14.46$ and $10.127$ respectively. From this, the following equation is formed:

$$y = 14.46x + 10.127$$

Using this equation, a value for the predicted sales after five years of availability from launch for Xbox Series X can be obtained by substituting $x = 4$ into the equation. This gives a value of $67.967$. This means that the predicted cumulative sales for Xbox Series X after five years from launch will be $67.967$ million units.

Note that $x$ cannot equal 0 as $x$ represents the models, for example, $x = 1$ represents PlayStation 1 and $x = 2$ represents PlayStation 2. Therefore, it is impossible to have a console at 0. Additionally, these predicted sales will be used later on in the paper for further calculations.

## 4. Poisson Distribution

A Poisson distribution is used for modelling the number of times an event occurs in an interval of time or space [17].

A discrete random variable X has a Poisson distribution with $\lambda > 0$, if for $k = 0,1,2,3 \ldots$ the probability mass function of X is defined by:

$$f(k;\lambda) = \frac{\lambda^k e^{-\lambda}}{k!} = P(X = k)$$

where

$\lambda$ is the mean number of occurrence in a given interval,
k is the actual number of occurrence in a given interval,
$e$ is the Euler's constant $\approx 2.71828$.

 

The Poisson distribution is able to model the number of consoles being sold as the average rate at which a console is sold does not affect the probability that a second console will be sold. That is, events occur independently.

## 5. Data Analysis

### 5.1. MATLAB Code 1

Using MATLAB, a code was written to obtain Poisson distribution graphs for PlayStation 5 and Xbox Series X. A Poisson distribution graph shows the probability of a number of events occurring in an interval. In this case, it shows the probability of a number of sales occurring in the interval from launch to the fifth year of availability. Lambda, $\lambda$, is the expected number of sales in the interval. As the rate of parameter, $\lambda$, changes, the probability of seeing different number of sales in one interval also changes. By running the following code in MATLAB, a Poisson distribution graph for PlayStation 5 is obtained.

MATLAB Code 1:

```
function [A] = myPoisson()

x = 0:130; % units sold in millions

lambda = 84.285; % expected number of sales

y = poisspdf(x,lambda);

plot(x,y,'-ro')

r=0;

A = sum(poisspdf(r:r+130,lambda));

disp(A);

title('Poisson Distribution for PlayStation 5')

xlabel('Units (in millions)')

ylabel('P(X=k)')

end
```

Note: Lambda is the expected number of sales in the interval from launch to the fifth year of availability. Hence, lambda is 84.285 for PlayStation 5 and lambda is 67.967 for Xbox Series X.

Here, the value of $r$ is set to 0 so a Poisson distribution can be created to model the probabilities of 0 to 130 million units being sold.

 

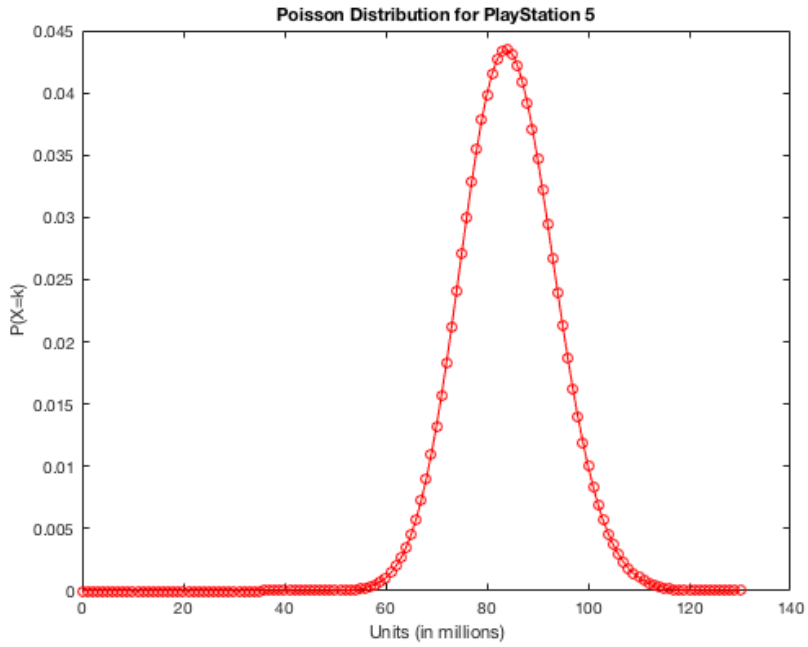


*Figure 3 - A graph showing the Probability Mass Function of the Poisson distribution for PlayStation 5 from launch to the fifth year of availability*

Figure 3 is the probability mass function of the Poisson distribution for PlayStation 5 showing the probability of the number of sales occurring in an interval with $\lambda = 84.285$. The graph shows that the chance of selling the expected 84.285 million units in the time period from launch to the fifth year of availability is approximately 4.31%.

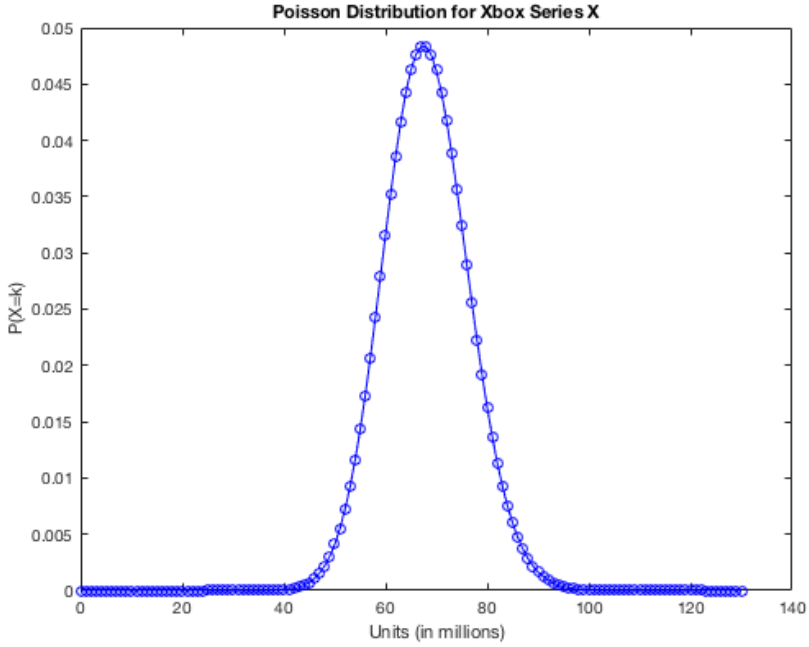


*Figure 4 - A graph showing the Probability Mass Function of the Poisson distribution for Xbox Series X from launch to the fifth year of availability*

 

Figure 4 is the probability mass function of the Poisson distribution for Xbox Series X showing the probability of the number of sales occurring in an interval with $\lambda = 67.967$. The graph shows that the chance of selling the expected 67.967 million units in the time period from launch to the fifth year of availability is approximately 4.83%.

Further probabilities for selling within a range of units can be calculated using Code 1, however the value of $r$ is changed.

**Example 1:**

Work out the probability that Sony will sell within the range $70 \leq x < 80$ million units of PlayStation 5.

```
lambda = 84.285; % expected number of sales

y = poisspdf(x,lambda);

plot(x,y,'-ro')

r=70;

A = sum(poisspdf(r:r+9,lambda));
```

Note: lambda is 84.285 as this is the expected number of sales for PlayStation 5.

The value of $r$ is changed to 70 to model the probabilities of $r$ to $r + 9$ which is the likelihood of selling within the range $70 \leq x < 80$ million units. In order to avoid overlapping inequalities in tables i.e. $70 \leq x \leq 80$ and $80 \leq x \leq 90$, $r + 9$ is chosen rather than $r + 10$. This would give $70 \leq x < 80$ and $80 \leq x < 90$. By running this code in MATLAB, it gives a probability of 25.55% that Sony will sell within $70 \leq x < 80$ million units of PlayStation 5 after five years of availability from launch.

Using the same code but changing the value of $r$, probabilities of selling within a range of possible units can be calculated. These are all listed below in Table 5.

| PlayStation 5 | |
|---|---|
| **Units (in millions)** | **Probability (to 2.d.p)** |
| 40 ≤ x < 50 | 0.00% |
| 50 ≤ x < 60 | 0.23% |
| 60 ≤ x < 70 | 4.79% |
| 70 ≤ x < 80 | 25.55% |
| 80 ≤ x < 90 | 41.34% |
| 90 ≤ x < 100 | 22.91% |
| 100 ≤ x < 110 | 4.76% |
| 110 ≤ x < 120 | 0.40% |
| 120 ≤ x < 130 | 0.01% |
| **Total** | **100.00%** |

*Table 5 - A table showing the probabilities of selling within a range of possible units (PlayStation 5)*

 

The probability for wider ranges such as a 20 million units range can also be worked out from Table 5:

The probability that PlayStation 5 will sell between

$$\mathbf{70 \leq x < 90 \text{ million units is } 25.55\% + 41.34\% = 66.89\%}$$

$$\mathbf{80 \leq x < 100 \text{ million units is } 41.34\% + 22.91\% = 64.25\%.}$$

$$\mathbf{90 \leq x < 110 \text{ million units is } 22.91\% + 4.76\% = 27.67\%}$$

Table 5 shows PlayStation 5 is most likely to sell within $80 \leq x < 90$ million units as it has the highest probability of 41.34% in the table. Though, when looking at a range of 20 million units, PlayStation 5 is most likely to sell within $70 \leq x < 90$ million units.

However, through trying out different values of $r$ in MATLAB, the range of units that are most likely to sell is in fact between $\mathbf{79 \leq x < 89}$ million which has the highest probability of **41.41%** in the 10 million units range and $\mathbf{74 \leq x < 94}$ million which has the highest probability of **72.39%** in the 20 million units range. As a result, PlayStation 5 is predicted to sell within these ranges.

**Example 2:**

Work out the probability that Microsoft will sell within the range $50 \leq x < 60$ million units of Xbox Series X.

```
lambda = 67.967; % expected number of sales

y = poisspdf(x,lambda);

plot(x,y,'-bo')

r=50;

A = sum(poisspdf(r:r+9,lambda));
```

Note: lambda is 67.967 as this is the expected number of sales for Xbox Series X.

The value of $r$ is changed to 50 to model the probabilities of $r$ to $r + 9$ which is the likelihood of selling within $50 \leq x < 60$ million units. This gives a probability of 14.20% that Microsoft will sell within 50 to 60 million units of Xbox Series X after five years of availability from launch.

Similar to PlayStation 5, probabilities of selling within a range of possible units can be calculated using the same code but changing the value of $r$. These are listed below in Table 6.

 

| Xbox Series X | |
|---|---|
| **Units (in millions)** | **Probability (to 2.d.p)** |
| 40 ≤ x < 50 | 0.97% |
| 50 ≤ x < 60 | 14.20% |
| 60 ≤ x < 70 | 42.96% |
| 70 ≤ x < 80 | 33.51% |
| 80 ≤ x < 90 | 7.75% |
| 90 ≤ x < 100 | 0.59% |
| 100 ≤ x < 110 | 0.02% |
| **Total** | **100.00%** |

*Table 6 - A table showing the probabilities of selling within a range of possible units (Xbox Series X)*

Note that any units before $40 \leq x < 50$ are not included as the probability of selling between those units are less than 0.01%.

Table 6 shows Microsoft is most likely to sell between $60 \leq x < 70$ million units of Xbox Series X in the first five years of availability as it has a probability of 42.96%, the highest probability out of all possible ranges in the table.

Instead of looking at a range of 10 million units, by looking at a range of 20 million units, the following probabilities can be worked out from Table 6:

The probability that Xbox Series X will sell between

$$\mathbf{50 \leq x < 70 \text{ million units is } 14.20\% + 42.96\% = 57.16\%}$$

$$\mathbf{60 \leq x < 80 \text{ million units is } 42.96\% + 33.51\% = 76.47\%}$$

$$\mathbf{70 \leq x < 90 \text{ million units is } 33.51\% + 7.75\% = 41.26\%}$$

Consequently, by looking at a range of 10 million units, Xbox Series X is most likely to sell between $60 \leq x < 70$ million units, though by looking at a range of 20 million units, Microsoft is most likely to sell between $60 \leq x < 80$ million units of Xbox Series X from launch to the fifth year of availability.

However, through trying out different values of $r$ in MATLAB, the range of units that are most likely to sell is in fact between $\mathbf{63 \leq x < 73}$ million with the highest probability of **45.63%** in the 10 million units range and $\mathbf{58 \leq x < 88}$ million with the highest probability of **77.54%** in the 20 million units range. As a result, Xbox Series X is predicted to sell within these ranges.

 

## 5.2. MATLAB Code 2

A second code was written to plot the two different Poisson distributions on the same graph to make it easier to analyse and compare.

MATLAB Code 2:

```
function [A,B] = myPoisson2()

x = 0:130; % units sold in millions for PlayStation 5

m = 0:130; % units sold in millions for Xbox Series X

lambda = 84.285; % expected number of sales for PlayStation 5

lambda_2 = 67.967; % expected number of sales for Xbox Series X

y = poisspdf(x,lambda);

z = poisspdf(m,lambda_2);

plot(x,y,'-ro')

hold on

plot(m,z,'-bo')

hold off

legend('PlayStation 5','Xbox Series X')

r=0;

s=0;

A = sum(poisspdf(r:r+130,lambda));

B = sum(poisspdf(s:s+130,lambda_2));

fprintf('A=%f,B=%f\n',A,B);

title('Poisson Distribution for PlayStation 5 and Xbox Series X')

xlabel('Units (in millions)')

ylabel('P(X=k)')


end
```

 

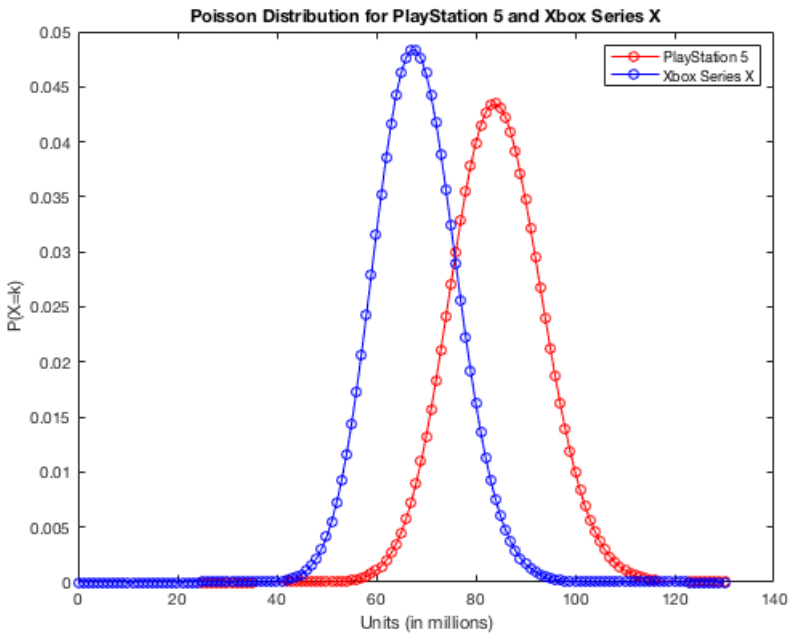


*Figure 5 - A graph showing the Poisson distribution for PlayStation 5 and Xbox Series X*

Figure 5 shows that PlayStation 5 is expected to make higher sales than Xbox Series X. However, the probability of PlayStation 5 making the calculated predicted sales, 84.285 million units, is lower than the probability of Xbox Series X making the calculated predicted sales, 67.967 million units.

From the graph, the probability of one console outselling the other can be calculated by working out areas under the curve. The probability of Xbox Series X outselling PlayStation 5 is 37.90% whereas the probability of PlayStation 5 outselling Xbox Series X is 62.10%, which shows that PlayStation 5 is likely to sell more consoles than Xbox Series X.

PlayStation and Xbox have always been big competitors, releasing new products around similar time periods. PlayStation have dominated this competition with the sales of PlayStation consoles exceeding the sales of Xbox consoles and the data suggests that this is likely to continue.

## 5.3. How does price affect sales?

**PlayStation**

| Models | Launch Price ($) | Sales (in millions) |
|---|---|---|
| PS1 | 299 | 70.04 |
| PS2 | 299 | 87.47 |
| PS3 | 599 | 50.21 |
| PS4 | 399 | 94.2 |

*Table 7 - A table showing how sales are affected by the price for PlayStation*

Table 7 shows that the launch price varies for all models. The launch price for PlayStation 2 remains the same as the launch price for PlayStation 1, however Sony decided to increase the

 

price by $300 for PlayStation 3. Though it is obvious that this was not a good price point as PlayStation 3 made fewer sales compared to the first two consoles. Hence, Sony decided to lower the launch price for PlayStation 4 to $399, a more reasonable price. Since the launch prices for the PlayStation consoles vary, an average was taken to obtain an average price in order to estimate the number of sales it could possibly make with this particular launch price. An average was taken by adding up all of the launch prices and dividing it by 4 as there are 4 models involved, giving an average price of $399. Using $(*)$ and $(**)$, the following linear equation can be formed:

$$y = -0.0952x + 113.44$$

Here, $x$ is the price and $y$ is the number of sales.

By substituting the price $399 into the equation, a value of $y$ can be obtained.

$$y = 75.455$$

This means that with a launch price of $399, the estimated number of sales for PlayStation 5 is in fact 75.455 million units. Compared to the predicted number of sales that was worked out previously using only the data from its predecessors and not taking into consideration of the launch price, there is only 8.830 million units difference.

After taking into account the launch price, the estimated number of sales for PlayStation 5 actually falls within the predicted category that it would sell between $74 \leq x < 94$ million units, as worked out previously. Since the difference between the predicted number of sales, 84.285 and 75.455 million units, are small, it shows that the Poisson distribution is a good model and there is a high chance that Sony will sell the forecasted number of sales or within the forecasted range of sales.

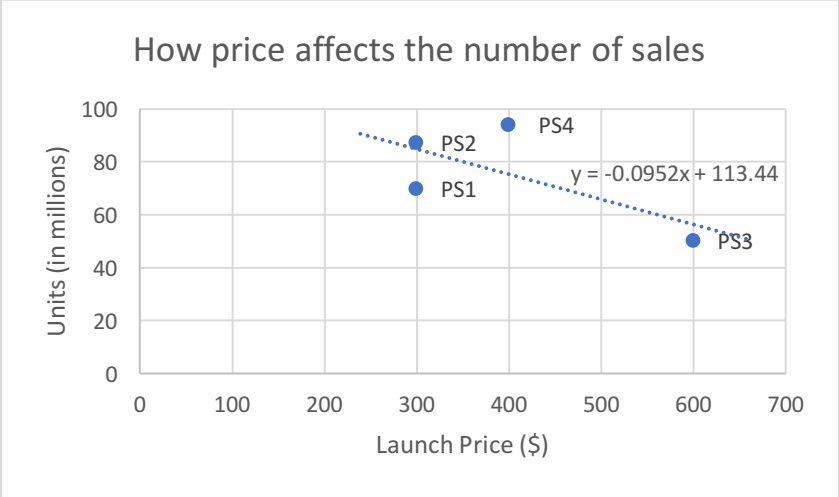


*Figure 6 - A graph showing how price affects the number of sales for PlayStation*

There are many factors that may affect the price of PlayStation 5, one in which includes supply issues of hardware components which would result in the consoles getting expensive to make [18]. This would in turn have an effect on the price that Sony will set for PlayStation 5. Therefore, it is very difficult to predict the price solely based on previous sales figures when there are a multitude of factors that affect price.

 

**Xbox**

| Models | Launch Price ($) | Sales (in millions) |
|---|---|---|
| Xbox | 299 | 24 |
| Xbox 360 | 399 | 40.22 |
| Xbox One | 499 | 52.92 |

*Table 8 - A table showing how sales are affected by the price of Xbox*

Table 8 shows that the launch price has increased by $100 for each model starting from the original Xbox. Assuming that the Xbox Series X follows the trend of increasing by $100, the price would be $599 at launch. Using $(*)$ and $(**)$, the following linear equation can be formed:

$$y = 0.1446x - 18.649$$

Here, $x$ is the price and $y$ is the number of sales.

By substituting the price $599 into the equation, a value of $y$ can be obtained.

$$y = 67.967$$

This means that with a launch price of $599, the estimated sales for Xbox Series X is 67.967 million units, which is the same as the previous predicted number of sales that was calculated when the launch price was not considered. The estimated number of sales fall into the two predicted categories that were worked out previously, $63 \leq x < 73$ million units (10 million units range) and $58 \leq x < 88$ million units (20 million units range), with a probability of 45.63% and 77.54% respectively. Hence, this shows that the Poisson distribution is a good model and there is a high chance that Xbox Series X will sell within the forecasted number of sales or slightly more/less (within the 10 or 20 million units range).

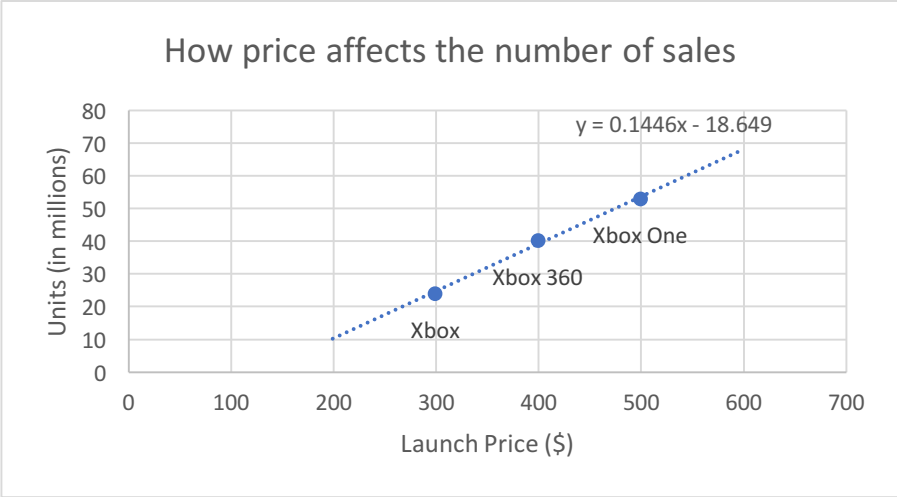


*Figure 7 - A graph showing how price affects the number of sales for Xbox*

Similar to PlayStation 5, there are many factors that would affect the price of Xbox Series X. Microsoft is targeting 4K resolution and 60 FPS (Frames Per Second) for all games [19]. The

 

components needed for this will not be cheap which would have an impact on the price of mass-producing the console and as a result, it would have an effect on the retail price. Thus, it would be very difficult to predict the price based on previous sales figures when there are numerous factors that may affect the price.

## 6. Conclusion

Sony and Microsoft, being the leaders of the game console market, are expected to sell a huge number of consoles in the new generation. Since the new consoles, PlayStation 5 and Xbox Series X, are both scheduled to launch at the end of 2020, there will be great competition between the two companies.

From the calculations in this paper, there is a 4.31% chance that PlayStation 5 will sell 84.285 million units, surpassing two of its predecessors, PlayStation 1 and 3, in the first five years of sales. This is the most likely amount of sales the console will make. Although this probability does not seem high, the probability of selling between $74 \leq x < 94$ million units, where the 84.285 million units lies is 72.39%, suggesting that there is a high chance that PlayStation 5 will in fact sell within this range. PlayStation 5 would have to exceed expectations in order to outsell PlayStation 2 and 4.

The sales for PlayStation consoles generally increase, excluding PlayStation 3 where the sales decreased by 37.36%, primarily due to the price being raised too high from PlayStation 2. From this experience, Sony lowered the price for PlayStation 4 which made a massive difference as it outsold its predecessors throughout the years from launch to the fifth year of availability, and has now become the second best-selling PlayStation model after PlayStation 2.

Furthermore, the findings in this paper show that there is a 4.83% chance Xbox Series X will sell 67.967 million units from launch to the fifth year of availability, outselling all of its predecessors. The probability of selling an amount within the calculated predicted range, $58 \leq x < 88$ million units, is 77.54%, where 67.967 million units also lies within this category. Thus, there is a high chance that Xbox Series X will sell within this predicted range. Although Xbox One outsold its predecessors in the first five years of availability, this does not necessarily mean that the console was successful. The price of Xbox One was initially $499 at launch, however six months later Microsoft slashed the price to $399 as the sales for Xbox One were not reaching expectations compared to PlayStation 4 [20]. To this day, Xbox One has sold over 46.9 million units which is just over half of what Xbox 360 had sold across its total years of availability (over 84 million units). This means that Microsoft would have to set an appealing price point for its new generation in order for Xbox Series X to outsell its predecessors and reach or exceed these predicted sales. In addition, PlayStation consoles are still outselling Xbox consoles every time, implying that Microsoft still has areas for improvement in order to exceed PlayStation sales. From further calculations, PlayStation 5 has a 62.10% chance of outselling Xbox Series X which is convincing as PlayStation consoles have always outsold Xbox consoles.

There are a few limitations that would have an effect on these predicted sales, one of which includes using data solely from predecessors to predict the sales for the new generation. The new consoles may become very successful where sales will increase by an unprecedented amount, or sales may be disastrous and decrease by a sizeable amount, therefore just by looking at previous data of predecessors is not enough as it is less reliable in comparison to considering more factors. The price of both consoles is still yet to be released and this is important because

 

a bad price point may lead to a decrease in sales, as seen with PlayStation 3. In 2015, Microsoft stated that it will stop releasing official figures for Xbox One, so the figures from the third to the fifth year of availability were estimated sales compiled by Market Research Companies [21]. If the official sales for Xbox One were to be higher/lower than the estimations compiled by the Market Research Companies, then this would affect the estimation for the predicted Xbox Series X sales since the sales were based on figures from its predecessors. As a result, this would change the predicted sales calculated in this paper.

Additionally, the full specification for both PlayStation 5 and Xbox Series X have not yet been released which would affect the prediction of sales as a high proportion of customers buy consoles based on what system is better. Another limitation is not taking into account brand loyalty where customers are loyal to the brand and continue to purchase new consoles rather than purchasing a different brand.

Overall, the Poisson distribution used in this paper can be used to find predictions of other products as long as the relevant data is provided. More factors such as the price of a product can be included when calculating the expected value of sales which will give a more reliable and accurate result.

 

# References


[1] StatCounter. *Console Operating System Market Share Worldwide* [Internet]. Available from: https://gs.statcounter.com/os-market-share/console/worldwide. [Accessed 14th April 2020].

[2] Sony Interactive Entertainment. *PlayStation 5 is coming* [Internet]. Available from: https://www.playstation.com/en-gb/explore/ps5/. [Accessed 14th April 2020].

[3] Microsoft. *The New Xbox Series X* [Internet]. Available from: https://www.xbox.com/en-GB/consoles/xbox-series-x. [Accessed 14th April 2020].

[4] Wikipedia: The Free Encyclopedia. *PlayStation 2* [Internet]. Available from: https://en.wikipedia.org/wiki/PlayStation_2#Sales. [Accessed 28th January 2020].

[5] Wikipedia: The Free Encyclopedia. *Xbox 360* [Internet]. Available from: https://en.wikipedia.org/wiki/Xbox_360. [Accessed 28th January 2020].

[6] Sony Computer Entertainment Inc. *Corporate Information* [Internet]. Available from: https://web.archive.org/web/20110524023857/http://www.scei.co.jp/corporate/data/bizdataps_e.html. [Accessed 28th January 2020].

[7] Sony Computer Entertainment Inc. *Corporate Information* [Internet]. Available from: https://web.archive.org/web/20110524050046/http://www.scei.co.jp/corporate/data/bizdataps2_e.html.[Accessed 28th January 2020].

[8] Fandom, Inc. *Video Games Sales Wiki* [Internet]. Available from: https://vgsales.fandom.com/wiki/PlayStation_3. [Accessed 28th January 2020].

[9] Wikipedia: The Free Encyclopedia. *PlayStation 4* [Internet]. Available from: https://en.wikipedia.org/wiki/PlayStation_4#Sales. [Accessed 28th January 2020].

[10] Fandom, Inc. *Video Games Sales Wiki* [Internet]. Available from: https://vgsales.fandom.com/wiki/Xbox. [Accessed 4th February 2020].

[11] Fandom, Inc. *Video Games Sales Wiki* [Internet]. Available from: https://vgsales.fandom.com/wiki/Xbox_360. [Accessed 4th February 2020].

[12] Lowensohn J. CNET (13th January 2011). *Games Sales Shrunk, but Xbox set records in 2010* [Internet]. Available from: https://www.cnet.com/news/game-sales-shrunk-but-xbox-set-records-in-2010/. [Accessed 4th February 2020].

[13] TechCrunch (4th November 2009). *Console Wars: The Effect of Price Cuts on the Xbox 360, Wii, and PS3* [ Internet]. Available from: https://techcrunch.com/2009/11/04/console-wars-the-effect-of-price-cuts-on-the-xbox-360-wii-and-ps3/. [Accessed 4th February 2020].


 

[14] GameSpot. *Sales per year for PlayStation 4, Switch and Xbox One* [Internet]. Available from: https://www.gamespot.com/forums/system-wars-314159282/sales-per-year-for-ps4-switch-and-xbox-one-33423602/. [Accessed 4th February 2020].

[15] Hruska J. ExtremeTech (2nd August 2018). *Report: Xbox One Sales Apparently Doubled Since 2017* [Internet]. Available from: https://www.extremetech.com/gaming/274746-xbox-one-sales-apparently-doubled-since-2017. [Accessed 4th February 2020].

[16] Statistics How To. *Linear Regression: Simple Steps, Video. Find Equation, Coefficient, Slope* [Internet]. Available from: https://www.statisticshowto.datasciencecentral.com/probability-and-statistics/regression-analysis/find-a-linear-regression-equation/. [Accessed 7th February 2020].

[17] Wikipedia: The Free Encyclopedia. *Poisson Distribution* [Internet]. Available from: https://en.wikipedia.org/wiki/Poisson_distribution#Probability_mass_function. [Accessed 7th February 2020].

[18] Evans A. GTPlanet (14th February 2020). *Hardware Supply Issues May Mean Sony Has to Sell the PlayStation 5 At a Loss* [Internet]. Available from: https://www.gtplanet.net/hardware-supply-issues-may-mean-sony-has-to-sell-the-playstation-5-at-a-loss/. [Accessed 6th March 2020].

[19] Davis H. ScreenRant (21st February 2020). *How much The Xbox Series X Could Cost* [Internet]. Available from: https://screenrant.com/xbox-series-x-price-cost/. [Accessed 7th March 2020].

[20] Crook J. TechCrunch (25th July 2016*). Microsoft slashes Xbox One price to $250 ahead of Slim launch* [Internet]. Available from: https://techcrunch.com/2016/07/25/microsoft-slashes-xbox-one-price-to-250-ahead-of-slim-launch/. [Accessed 6th March 2020].

[21] Crecente B. Variety (3rd May 2018). *Microsoft Explains Why It Isn't Releasing Xbox One Sales Numbers Anymore* [Internet]. Available from: https://variety.com/2018/gaming/news/xbox-one-sales-1202796674/. [Accessed 7th February 2020].

 