# Analysis of the Chinook Music Store Database

The aim of this business analysis was to gain insights of the Chinook Dataset. To understand the nature of its sales & employees and to come up with business case scenarios for efficient decision making in order to drive business.

Introduction to Dataset –

The Chinook Dataset is a dataset for a Music Record Company, having 12 tables which store data about the employees, customers, invoices, artists, albums, music tracks and media types from the beginning of 2009 till the end of 2013. It has 12 tables, which are related to each other as follows -
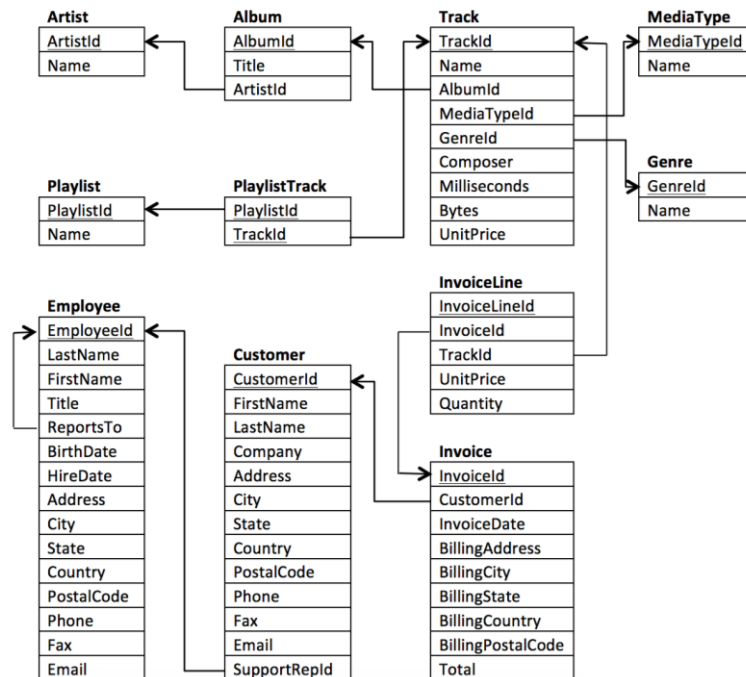
**The 12 tables can be broadly divided into 2 categories** –

1) INVENTORY – It includes information on *Albums produced by Artists.* These *Albums* have *Tracks*, which are further grouped by *Genre* and *Media Type. Playlists* is also used to group various *Tracks.*
2) BILLING – It includes details of *Employees* who sell *Tracks* to *Customers. Invoice* and *Invoice_Items* table shave been used to store all the Transactional data.

To understand the Company Situation and to build the Business Strategy, analysed the Dataset from 4 main perspectives –

Financial	Customer
Internal Process	Employees
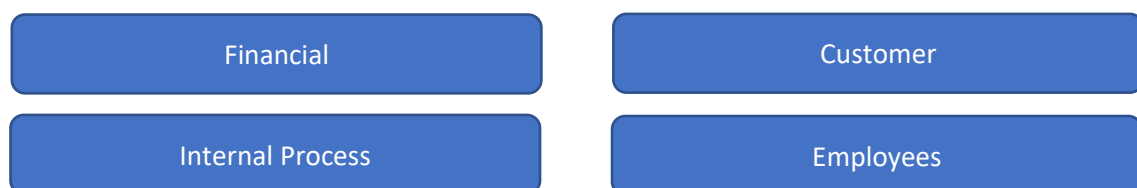
Used the interpretation from the above elements and came up with one key strategic recommendation for the following –

➢ *Purchasing Strategy for Top Market (Business Growth)*
➢ *Product Sales Strategy*
➢ *New Product Development*
➢ *Operational Efficiency (To Reduce Costs)*
➢ *Marketing Campaigns (To Improve Sales)*
➢ *Loyalty Rewards (To get Repeat Business from Customers)*
➢ *Product Marketing Strategy*
➢ *Employee Recognition Program*
➢ *Customer Service impact on Sales*
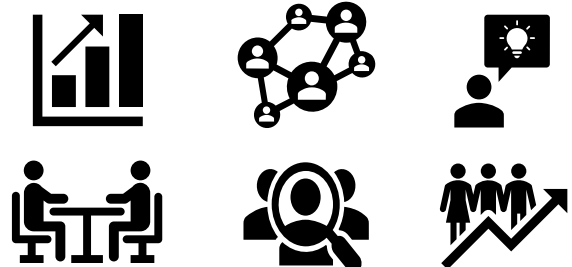
FINANCIAL

Yearly Trend of Invoices

Year	Nbr_of_Orders	Avg_Nbr_Tracks_per_Order	Avg_Revenue_per_Order
2009	83	5.46988	5.415181
2010	83	5.481928	5.800602
2011	83	5.325301	5.65759
2012	83	5.385542	5.753373
2013	80	5.525	5.63225

Overview of Invoices

Nbr_of_Orders	Average_QuantityPerOrder	Average_RevenuePerOrder
412	5.436893	5.651942

Overall Sales Overview

Nbr_of_Orders(Invoices)	Nbr_of_Customers	Nbr_TracksSold	Total_Quantity	Total_Revenue	Nbr_of_Countries	Total_Years
412	59	1984	2240	20848.62	24	4.971937

("Monthly Sales & Number of Invoices" and "Revenue and Quantity per Invoice" tables also present in SAS file)
(*Tables too big to be shown here)

From the above tables we could see that 2009 (the year of incorporation) saw least "Average Revenue per Order" and in 2010 it shot up to the highest level among the considered tenure. It followed the trend of low and high for succeeding years.

The first (2009 – $5.41) and the last (2013 - $5.63) were the only two years when the average revenue per order went below the overall average revenue for the 5 years ($5.65)

CUSTOMERS

Top 10 Customers by Tenure

CustomerId	Number_Of_Orders	Most_Recent_Order	First_Order	Tenure	Average_Sales
23	7	04DEC13	11JAN09	4.895277	5.374286
25	7	05DEC13	06MAR09	4.750171	6.088571
4	7	03OCT13	02JAN09	4.750171	5.66
21	7	04DEC13	05MAR09	4.750171	5.374286
8	7	04OCT13	03JAN09	4.750171	5.374286
46	7	04NOV13	03FEB09	4.750171	6.517143
42	7	03NOV13	02FEB09	4.750171	5.66
50	7	05NOV13	23JUN09	4.36961	5.374286
33	7	04SEP13	22APR09	4.36961	5.374286
12	7	05OCT13	23MAY09	4.36961	5.374286

Customer distribution Regionwise

Number_Of_Orders	Total	Region
11536	65200.8	Americas
11536	65200.8	Europe
1236	6985.8	Asia

Customer distribution Countrywise

Country	Number_Of_Customers	Total	Region
USA	5356	30271.8	Americas
Canada	3296	18628.8	Americas
France	2060	11643	Europe
Brazil	2060	11643	Americas
Germany	1648	9314.4	Europe
United Kingdom	1236	6985.8	Europe
India	824	4657.2	Asia
Czech Republic	824	4657.2	Europe
Portugal	824	4657.2	Europe
Austria	412	2328.6	Europe
Argentina	412	2328.6	Americas
Spain	412	2328.6	Europe
Belgium	412	2328.6	Europe
Sweden	412	2328.6	Europe
Poland	412	2328.6	Europe
Denmark	412	2328.6	Europe
Norway	412	2328.6	Europe
Netherlands	412	2328.6	Europe
Italy	412	2328.6	Europe
Chile	412	2328.6	Americas
Ireland	412	2328.6	Europe
Hungary	412	2328.6	Europe
Finland	412	2328.6	Europe
Australia	412	2328.6	Asia

From the Customer Tenure Table, we can observe that the top 10 customers as per tenure have placed their latest order in the year 2013. This implies that all old Customers are still purchasing, and the company is doing good in terms of customer retention.

Region wise, Americas and Europe are doing equally good in terms of total no. of orders while Asia orders are less, and the company may be can focus on the region to improve its sales there.

Country wise, USA is the top market for the company with accounting for almost 50% of the total no. of orders. CANADA and FRANCE followed by BRAZIL are the next three top contributing countries.

INTERNAL BUSINESS PROCESSING

Yearly purchase trend of High Price Tracks

Year	Nbr_Tracks	UnitPrice
2010	31	1.99
2011	32	1.99
2012	35	1.99
2013	13	1.99

Bytes Saved by Deleting Unsold Tracks

Number of Unsold Tracks	Total_Bytes_Saved in MB
1519	55304.41

*(*Table for List of Unsold songs present in SAS file, too big to be shown here)*

Top 5 Albums with MAX Unsold Songs

AlbumID	Nbr_UnsoldSongs
141	32
230	16
250	16
229	15
83	14

Top 5 Genres with MAX Unsold Songs

GenreID	Nbr_UnsoldSongs
1	552
7	239
3	143
4	129
2	62

Top 5 MediaTypes with MAX Unsold Songs

MediaTypeID	Nbr_UnsoldSongs
1	1289
3	111
2	108
5	8
4	3

From the first table we can see that the total no. of High Price Tracks sold have increased year by but 2013 saw a major dip when the sales of high price tracks got declined by more than 50%.

Another, important observation from the analysis of Unsold Tracks is that they have a significant quantity (1519) and removing them for the Product portfolio can significantly save storage bytes (~ 50k MB).

Further, the other three tables show the top Albums, Genres and Media Types which are contributing to the Unsold song quantities.

EMPLOYEES

Total number of Employees

8

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Employees about to Retire

EmployeeId	LastName	FirstName	Employee_Title
2	Edwards	Nancy	Sales Manager
4	Park	Margaret	Sales Support Agent

Page Break

Employee Tenure Data

EmployeeId	LastName	FirstName	Employee_Title	Tenure_of_Emp
1	Adams	Andrew	General Manager	42.61739
2	Edwards	Nancy	Sales Manager	42.32991
3	Peacock	Jane	Sales Support Agent	42.24778
4	Park	Margaret	Sales Support Agent	43.3347
5	Johnson	Steve	Sales Support Agent	43.79192
6	Mitchell	Michael	IT Manager	43.79192
7	King	Robert	IT Staff	44.00274
8	Callahan	Laura	IT Staff	44.17248

Summary of Employee Performance

First Name	Last Name	EmployeeId	Orders(Invoices made)	Customers served	Revenue Generated	Average revenue per order
Jane	Peacock	3	146	21	833.04	5.705753
Margaret	Park	4	140	20	775.4	5.538571
Steve	Johnson	5	126	18	720.16	5.715556

Employee Performance across Countries

First Name	Last Name	EmployeeId	Orders(Invoices made)	Nbr_CustomersServed	Revenue_Generated	Avg_Revenue per Order	Billing_Country
Jane	Peacock	3	7	1	41.62	5.945714	Finland
Jane	Peacock	3	7	1	45.62	6.517143	Ireland
Jane	Peacock	3	7	1	45.62	6.517143	Hungary
Jane	Peacock	3	13	2	75.26	5.789231	India
Jane	Peacock	3	14	2	75.24	5.374286	United Kingdom
Jane	Peacock	3	14	2	77.24	5.517143	Brazil
Jane	Peacock	3	14	2	80.24	5.731429	France
Jane	Peacock	3	14	2	81.24	5.802857	Germany
Jane	Peacock	3	21	3	119.86	5.707619	USA
Jane	Peacock	3	35	5	191.1	5.46	Canada
Margaret	Park	4	7	1	37.62	5.374286	Poland
Margaret	Park	4	7	1	37.62	5.374286	Argentina
Margaret	Park	4	7	1	37.62	5.374286	Australia
Margaret	Park	4	7	1	37.62	5.374286	Belgium
Margaret	Park	4	7	1	37.62	5.374286	Canada
Margaret	Park	4	7	1	37.62	5.374286	Denmark
Margaret	Park	4	7	1	39.62	5.66	Norway
Margaret	Park	4	7	1	40.62	5.802857	Czech Republic
Margaret	Park	4	14	2	75.24	5.374286	Brazil
Margaret	Park	4	14	2	77.24	5.517143	France
Margaret	Park	4	14	2	77.24	5.517143	Portugal
Margaret	Park	4	42	6	239.72	5.707619	USA
Steve	Johnson	5	7	1	37.62	5.374286	Brazil
Steve	Johnson	5	7	1	37.62	5.374286	France
Steve	Johnson	5	7	1	37.62	5.374286	Italy
Steve	Johnson	5	7	1	37.62	5.374286	United Kingdom
Steve	Johnson	5	7	1	37.62	5.374286	Spain
Steve	Johnson	5	7	1	38.62	5.517143	Sweden
Steve	Johnson	5	7	1	40.62	5.802857	Netherlands
Steve	Johnson	5	7	1	42.62	6.088571	Austria
Steve	Johnson	5	7	1	46.62	6.66	Chile
Steve	Johnson	5	7	1	49.62	7.088571	Czech Republic
Steve	Johnson	5	14	2	75.24	5.374286	Canada
Steve	Johnson	5	14	2	75.24	5.374286	Germany
Steve	Johnson	5	28	4	163.48	5.838571	USA

Above tables show the tenure and summary of employees in the company. Also, for all the three Salespersons - Jane, Margaret and Steve their performance across the countries have been determined from the above table.

We can observe that Jane has performed best for Canada and USA market. Margaret has performed extremely well in USA as compared to other markets. Steve on the other hand is doing best in the Czech Republic market. We can thus use this data to define territories of preference for all the three Salespersons to do sales and this can lead to improvement in overall employee efficiencies as well as sales figures for the company.

KEY STRATEGIC RECOMMENDATIONS –

Purchasing Strategy for Top Market (Business Growth) –

Analysing the past sales data, the company should have a purchase strategy in place so that wherever they need to make a choice to purchase albums they can easily decide which genres are to be given max preference.

Table for Purchase Strategy

Genre_name	Nbr_of_Orders	Country
Rock	389	USA
Latin	231	USA
Metal	160	USA
Alternative & Punk	130	USA
Jazz	51	USA
Blues	40	USA
Classical	39	USA
TV Shows	28	USA
R&B/Soul	27	USA
Comedy	16	USA
Reggae	16	USA
Bossa Nova	14	USA
Alternative	12	USA
Drama	12	USA
Hip Hop/Rap	12	USA
Pop	10	USA
Sci Fi & Fantasy	10	USA
Soundtrack	10	USA
Rock And Roll	9	USA
Heavy Metal	8	USA
Easy Listening	6	USA
Science Fiction	2	USA

(*For our analysis we have picked up the top performing country i.e USA)

The Company shall refer to the above table to choose for Genres before making purchases for the USA market. Rock being the best Genre to purchase followed by Latin, Metal and Alternative & Punk.

Product Sales Strategy –

In order to form a good Product sales strategy, the company needs to focus on creating more profitable. It would need to dig deeper to understand which product proposition brings in more business.

Table for Product Sales Strategy

Sales_Type	Count_of_Product_Purchased
Multiple Track Purchase	353
Single Track Purchase	59

From the above table we could see that almost 85% of customers purchase more than one tracks and only 15% of them purchase single tracks. The company could thus introduce a new Product Category as "Choose your own Album". This should allow customers to build a customized Album list of their own. The price of such Albums can be then little discounted from the sum of total tracks purchased. This can attract more customers and prove to be a profitable Product Sales Strategy for the Company.

New Product Development –

From Business expansion point of view the company would need to get tie ups with new record labels and would need to bring something new to the market. For this they would need the information on the Genre and Artists that are having maximum demand for any considered location.

This can be done by retrieving details of most popular Genres/Artists combinations, and then suggest their Albums/Tracks that are not present in those stores. To begin with we can do this analysis for the 2nd top country in terms of business i.e CANADA

Table for New Product Development

Genre_name	Artist_Name	Nbr_of_Orders
Metal	Metallica	38
Latin	Os Paralamas Do Sucesso	37
Rock	Led Zeppelin	29
Rock	Kiss	27
Alternative & Punk	Pearl Jam	22
Rock	Pearl Jam	22
Rock	U2	22
Latin	Chico Science & Nação Zumbi	18
Metal	Iron Maiden	18
Rock	Iron Maiden	18
Rock	Queen	18
Alternative & Punk	R.E.M.	18
Rock	Nirvana	16
Blues	Eric Clapton	15
Latin	Eric Clapton	15
Alternative & Punk	Titãs	15
Bossa Nova	Toquinho & Vinícius	14
Metal	Judas Priest	13
Rock	Alanis Morissette	12
Metal	Mötley Crüe	12

Above are the Top 20 Genre cum Artist combinations which the company could try and get onboard for their Product offerings to be highly in demand.

Operational Efficiency to Reduce Cost –

The company can decide to reduce their costs by focussing on the countries that they are most successful in. Thus, considering the preference as per the no. of orders a country is giving, the following 10 countries should be the focus of the Company to improve their efficiency.

Table for Operational Efficiency

Country	Number_Of_Customers	Total_Sales
USA	5356	30271.8
Canada	3296	18628.8
Brazil	2060	11643
France	2060	11643
Germany	1648	9314.4
United Kingdom	1236	6985.8
India	824	4657.2
Portugal	824	4657.2
Czech Republic	824	4657.2
Austria	412	2328.6

Marketing Campaigns to Improve Sales –

The company should analyse and target on the countries with the least customers and can run a targeted marketing campaign for those countries. We would need to find out the countries with least customers.

Table1 for Marketing Campaigns (Top 5 Countries with Least Customers)

Country	Number_Of_Customers
Austria	412
Finland	412
Spain	412
Chile	412
Norway	412

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Table2 for Marketing Campaigns (Customers for Target Campaigns)

FirstName	LastName	Country
Bjørn	Hansen	Norway
Astrid	Gruber	Austria
Terhi	Hämäläinen	Finland
Enrique	Muñoz	Spain
Luis	Rojas	Chile

From the above Table1 we can decide to run the campaigns for 5 of the worst performing countries - "Austria, Finland, Spain, Chile, Norway". Table2 shows the list of customers from these countries for which specific targeted campaigns can be run.

Rewarding Loyal Customers for Repeat Business –

In order to improve customer stickiness, the company should run Reward Programs for their most loyal customers (in terms of their tenure and business given to the company). Details of such top 5 customers are given in below table -

Table for Loyalty Rewards

CustomerId	First_Name	Last_Name	Loyalty_Period	Number_Of_Orders
23	John	Gordon	4.895277	7
4	Bjørn	Hansen	4.750171	7
8	Daan	Peeters	4.750171	7
46	Hugh	O'Reilly	4.750171	7
21	Kathy	Chase	4.750171	7

Product Marketing Strategy –

The company needs to understand how to market its product well by highlighting what's most popular amongst the customers.

Table for Product Marketing Strategy

Media_Type_Name	Nbr_of_Tracks_Sold
MPEG audio file	3034
Protected AAC audio file	237
Protected MPEG-4 video file	214
AAC audio file	11
Purchased AAC audio file	7

From the above table we can see that the most purchased media type is MPEG audio file (a non-protected media type), selling close to 1000% more than the second most purchased (protected AAC audio file).

While both protected and non-protected are present and contribute to the store revenue, MPEG audio files are leading sales by a huge difference, which means a non-protected media type is by far the most popular.

Employee Recognition Strategy –

In order to motivate top performing employees can suggest the HR to implement a new bonus program for such employees. From the below table we can suggest the same to be implemented for Employee 3.

Table for Employee Recognition

EmployeeID	Invoices_Made	TotalSales
3	146	833.04
4	140	775.4
5	126	720.16

Customer Service impact on Sales –

Every customer at Chinook gets assigned to a sales support agent after completing their first purchase. Below table gives the details of the Sales Support Representatives, in terms of their Title, Country, Age, Tenure in Company and Total Sales -

SupportRepID	Title	Country	FirstName	LastName	Age	Tenure_of_Agent	Total_Sales
3	Sales Support Agent	Canada	Jane	Peacock	47	42.24778	833.04
4	Sales Support Agent	Canada	Margaret	Park	73	43.3347	775.4
5	Sales Support Agent	Canada	Steve	Johnson	55	43.79192	720.16

Table for Customer Service

We can see that all Support Representatives are from Canada and share the same Title. Also, the agents have approximately the same level of experience in the store as they were hired within a few months from each other. Further, "Jane" the agent with the highest total sales is the youngest, which could potentially reflect an ability to connect to a younger customer market.