Operational Data Insights for Enhanced Business Strategy

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ABSTRACT :

This research titled "Operational Data Insights for Enhanced Business Strategy," was conducted with a private company. The project aimed to evaluate the company's operational performance, uncover business insights, and identify areas for improvement. The scope of the work involved analyzing operational data to understand client discontinuation trends, uncover performance patterns, and suggest strategic recommendations to enhance business efficiency. The project was designed to achieve several objectives that include: (1) analyzing the operational performance, (2) identifying patterns, peculiarities, and functional insights, (3) examining client discontinuation trends and understanding the underlying reasons, and (4) providing actionable recommendations based on these findings.

Keywords: business operations, business performance, data analysis, descriptive analysis, data visualisation

1. Introduction :

Business operations refer to the day-to-day activities and processes that a company undertakes to produce goods or deliver services. Business operations analysis involves examining these activities to improve efficiency, reduce costs, and enhance overall performance [2]. Achieving maximum possible efficiency in operations is imperative owing to key business aspects such as optimal resource utilization, cost-effectiveness, quality management, customer satisfaction, process standardization, high productivity, and constantly improving benchmarks [5]

Data analysis is the process of examining the structure of the data to find patterns, trends, and relationships. This is performed in a way that allows the discovery of underlying characteristics that enhance understanding and provide empirical knowledge about events [1]

Descriptive data analysis of business operations looks at historical data to understand what has happened in the business. Descriptive analysis summarizes historical data for easy understanding. It helps create a baseline and benchmarks for comparison over different periods [7]. Descriptive analysis is useful in identifying trends and patterns in data, filtering out irrelevant events or objects, and understanding the influence of certain characteristics on the rest of the data [3]. Additionally, descriptive analysis can be presented in a simplified manner, providing clarity for a non-technical audience [4]. Another major facet of descriptive analysis is its ability to produce charts and visualizations that facilitate effective reporting for management and other stakeholders [3][8].

Diagnostic data analysis goes a step further by investigating why certain events occurred, identifying causes and underlying factors [5]. At its core, diagnostic analysis traces and identifies the root cause of a specific event. It enables comprehensive problem-solving for specific issues, yielding deeper insights from the data and aiding management in making informed decisions and strategizing effectively for improvement [2].

Data visualization is the graphical representation of information and data, allowing complex data sets to be presented in an easily graspable format. By transforming numbers and statistics into visuals like charts, graphs, and maps, data visualization helps identify patterns, trends, and insights that might otherwise be overlooked in numerical data alone [8]. It enhances understanding and communication, making data more accessible to a broader audience, including those without a technical background [4]. Effective data visualization empowers decision-makers to make informed choices based on clear visual narratives that convey the story behind the numbers [3].

This research focuses on a comprehensive analysis of a company's operational data, with the primary objective of uncovering key insights, patterns, strengths, and weaknesses within the business processes. The analysis was crucial in identifying operational shortfalls and providing actionable recommendations for improvement.

Given that this was the company's first attempt at such an in-depth business operations analysis, the approach was intentionally more exploratory in nature [7]. The researcher focused on thoroughly understanding the current state of operations rather than predicting future outcomes [6]. This allowed for a broad examination of the data, facilitating the identification of areas for enhancement and setting the foundation for more predictive and strategic

analyses in the future. This analysis also played a pivotal role in establishing a baseline for ongoing operational assessments, ensuring that the company can continuously evolve and optimize its processes [2].

2. Objectives

1. To study and analyse the operational performance of the business
2. To uncover patterns, find peculiarities, relevant and functional insights
3. To get insights on client discontinuation and identify reasons for the same
4. To suggest improvements based on findings

3. Methodology

The process begins with collecting data on business activities, client interactions, and staff engagement. After ensuring data accuracy through cleaning and pre-processing, analytical techniques are applied to identify key trends and insights. These insights are then visually represented and summarized, providing management with clear, actionable recommendations to enhance business performance.

1. Data Collection & Extraction

The process starts with gathering data related to the clients, daily business activity, service staff engagement data, expenditure records and client engagement with the company's services. This data can include enrollment records, course completion statistics, feedback from surveys, and responses to marketing campaigns. All necessary data was extracted from the company's existing data architecture.

2. Data Cleaning and Pre-processing

The first step to begin is cleaning the data, a crucial phase that ensures the data to be is accurate, fit for analysis and reliable. This involves:

Removing Duplicates: Removing duplicate entries, like having multiple records for the same event; this negatively influences the analysis by resulting into bias, skewing the data in a particular direction, incorrect statistics and stunted output.

Handling Missing Values: In this step, missing values are dealt with options such as imputing them with mathematical mean or mode, or most common value for the column, or by entirely dropping such records if that is feasible and if the missing value makes that record completely lose its substance.

Correcting Errors: Any errors, such as incorrect or inconsistent values (like inconsistent date formats, spelling errors, numeric or Roman number formats), must be corrected for the data to be consistent and accurate, making it fit for analysis.

Data standardization: This involves the process of normalizing data from different sources into a unified format to improve compatibility for analysis. This may involve converting all text to lowercase or standardizing date formats, for example.

Upon completion of this phase, the dataset is refined, uniform, and prepared for in-depth analysis, thereby reducing the likelihood of errors that could undermine the research results.

3. Data Exploration and Analysis

In this phase, the cleaned datasets will be utilized to derive valuable insights that will inform the company's strategies for enhancing operational performance, boosting cash flow, and increasing client engagement. This stage incorporates several key analytical techniques:

Descriptive Analysis: Descriptive analysis provides a snapshot of past events, summarizing data to reveal trends and patterns that help us understand what has happened. It's like telling the story of the data, making complex information accessible and easy to digest.

Diagnostic Analysis: Diagnostic analysis digs deeper to uncover the reasons behind the identified trends, focusing on understanding the "why" behind the data. It helps identify root causes of issues, guiding organizations to make informed decisions for improvement.

Data with respect to the company's operations was analysed which included the following –
a. Sales by service type, top services, period wise analysis of the same

b. Clients enrolled for the Meditation Courses, under which modules, phases and period analysis of the same, module performance comparison

c. Analysis of session conductors' data for the Meditation Courses

d. Identifying current valuable clients, having potential for a near immediate further sale

e. Deep study of course completions versus dropouts, discontinuation point(s) and retention threshold analysis

    f. Delivery assessment – value delivered as regards to session duration

    g. Customer lifespan assessment

4. Data Visualization

The process of data visualization starts with gathering and organizing the data from various sources. Once the data is cleaned and structured, the next step is choosing the right visual format whether it's charts, graphs, or maps that best represents the underlying patterns or insights. Finally, the data is visually presented in a way that simplifies complex information, making it easier for users to interpret and draw meaningful conclusions at a glance. This process turns numbers into clear, actionable stories.

5. Summary and Reporting

Summary and reporting involve rendering complex data into clear, concise insights that the management can easily understand. A good summary highlights key findings and trends, while reporting organizes this information in a structured format, often with visual aids like charts or tables. The goal is to provide a snapshot that informs strategy, without overwhelming the audience with unnecessary details. Relevant suggestions and recommendations are also made to the business to further improve upon the weak points and boost business performance.

## 4. Analysis and Presentation

Flow of appointments by period
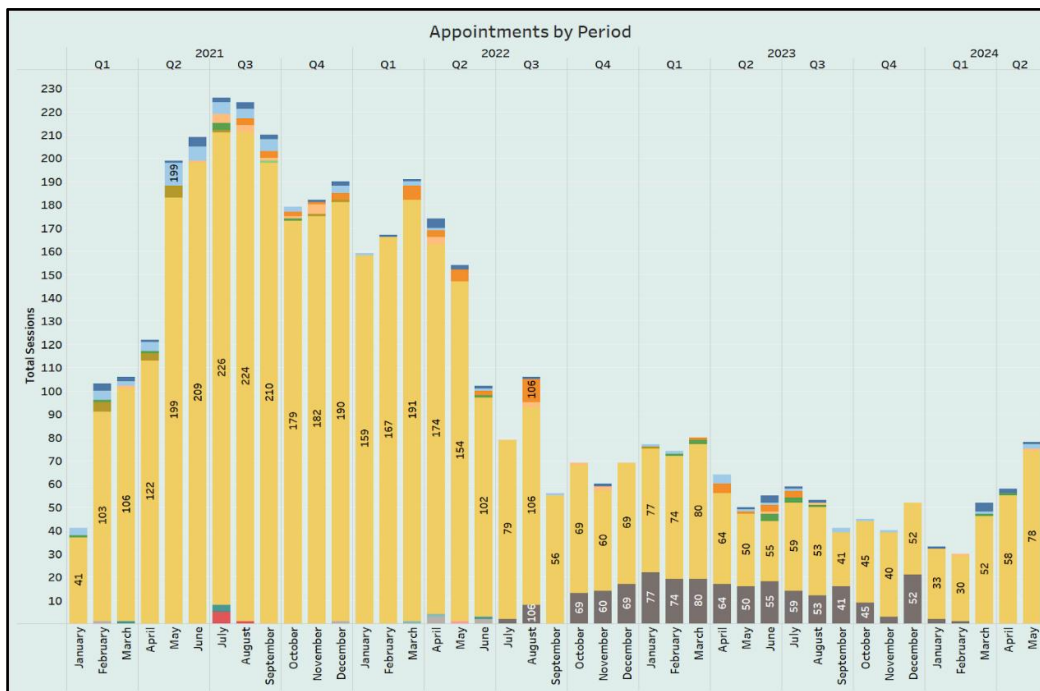
This visualisation shows the distribution of total appointments serviced by period. A peak of appointments is seen between May and September of 2021. This was the case due to a promotional activity in May of 2021.

One-on-One Meditation Sessions Analysis
Modules and Number of Clients Enrolled
The following table shows the number of clients enrolled for the respective modules.

Module Name	Number of Clients Enrolled
Module 4	51
Module 5	18
Module 3	18

Module 1	16
Module 2	6
Module 7	6
Module 4.1	4
Special Program	6
TOTAL CLIENTS SERVICED	**125**
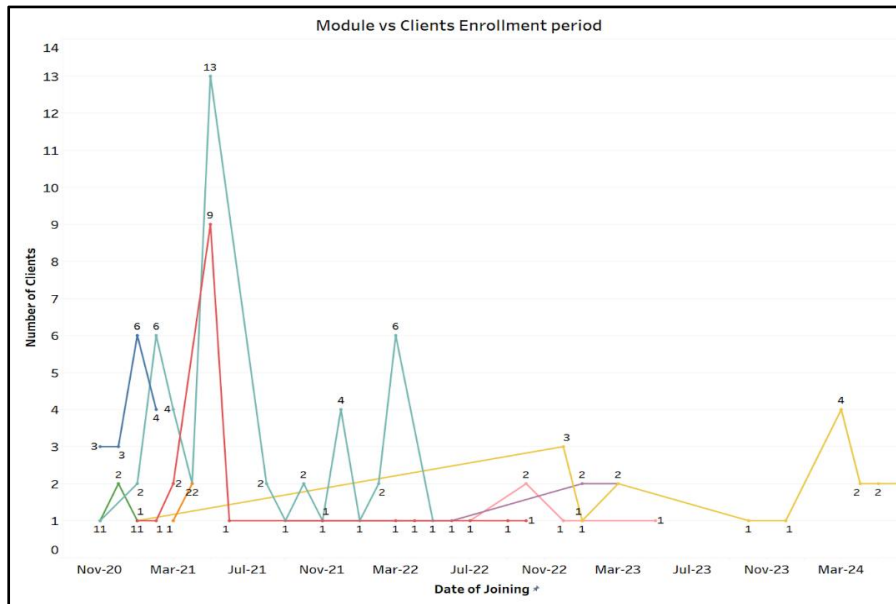
The above visualisation shows the enrollment periods and journey for different modules whilst also showing the lifespans of the modules, for instance when a particular module got discontinued and the rise of newer ones.
This chart is based on the final package group of the client and not the initial package enrolled for.

Conductors & Sessions Summary

Conductor Engagement
The below table represents the total sessions conducted by each of the conductors and also their engagement as to percentage of the number of sessions conducted by them compared to the grand total of sessions conducted.

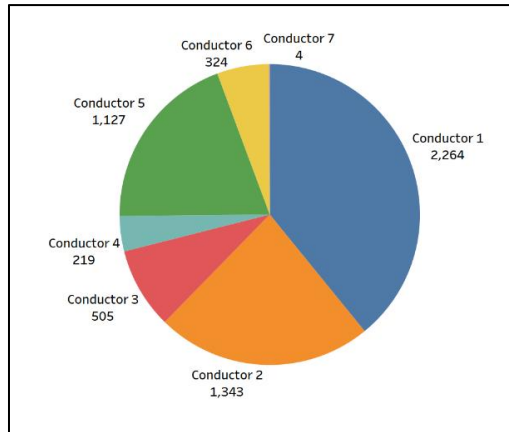| Session Incharge	Sessions Conducted	Percentage Of Total
Conductor 1	2264	39.13
Conductor 2	1343	23.21
Conductor 3	505	8.73
Conductor 4	219	3.78
Conductor 5	1127	19.48
Conductor 6	324	5.6
Conductor 7	4	0.07
TOTAL	**5786**	**100.0**

Number of Session Conducted by Condcutor

Fig. 3 – Number of Session Conducted by Conductor

The above visualisation is a pie chart representation of the number of sessions conducted by each of the conductors and a relative comparison of the same.

Sessions conducted - Module and Year wise
The below table shows the number of sessions conducted by each of the conductors for the respective modules in the respective periods.

Table 1.3

Module	Session Incharge	Conductor 1	Conductor 2	Conductor 3	Conductor 4	Conductor 5	Conductor 6	Conductor 7	TOTAL
Module 1	2020	19	-	-	-	-	-	-	19
	2021	231	48	-	21	-	-	-	300
	2022	5	1	-	-	39	-	-	45
	2023	21	-	-	-	-	-	-	21
Module 2	2021	31	24	5	7	-	-	-	67
	2022	12	6	1	-	-	-	-	19
Module 3	2021	228	152	27	70	-	-	-	477
	2022	181	156	48	-	155	-	-	540
	2023	47	61	38	-	20	33	-	199
	2024	6	3	-	-	-	-	-	9
Module 4 & 4.1	2020	18	-	-	-	-	-	-	18
	2021	587	280	29	119	-	-	-	1015
	2022	396	365	145		645	-	-	1551
	2023	63	26	28		168	291	4	580
	2024	35	15	14			-	-	64
Module 5	2021	32	9	-	2	-	-	-	43
	2022	15	-	-	-	45	-	-	60
	2023	73	95	50	-	-	-	-	218
	2024	80	40	38	-	-	-	-	158
Special Program	2021	2	4	-	-	-	-	-	6
	2022	12	2	-	-	55	-	-	69
	2023	13	14	7	-	-	-	-	34
Module 7	2022	41	13	-	-	-	-	-	54
	2023	113	29	75	-	-	-	-	217

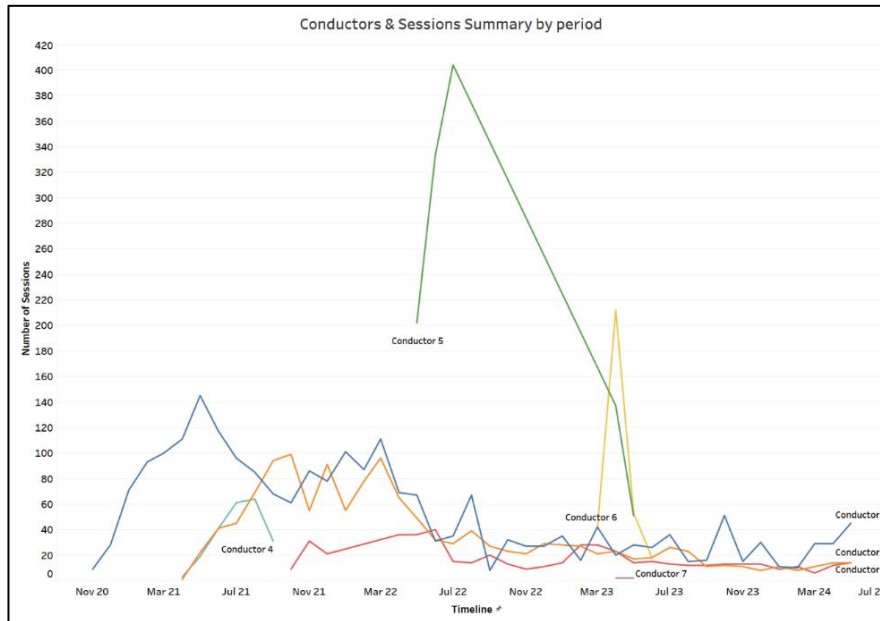| 2024	3	-	-	-	-	-	-	3
TOTAL	**2264**	**1343**	**505**	**219**	**1127**	**324**	**4**	**5786**

Sessions Summary

Fig. 4 – Conductors and sessions summary by period

The above visualisation shows the number of sessions conducted by the conductors across the period, the flow of sessions activity.

A total of 7 conductors were involved throughout the duration, each either individually or together assigned to conduct different types/sets of sessions. Certain conductors are designated only to conduct a segment of a client's total number of sessions.

It also depicts the joining and active period and engagement of the different conductors along with their utilisation with respect to number of sessions conducted.

For context, a session is of 30 minutes (which can be extended if the need be). And for lectures with longer content or special processes, every 30 minutes elapsed is counted as 1 session.

Current Valuable Clients, favourable and having potential for a near immediate further sale, based on Modules Enrolled and Total Sessions.

Client Number	Total Sessions	Enrolled for Advanced Course
13	104	TRUE
19	118	TRUE
60	118	TRUE
63	118	TRUE
78	118	TRUE
85	118	TRUE
89	118	TRUE
101	78	TRUE

Study of Course Completions vs Client Dropouts

Taking into account the clients who have either fully completed the course or have discontinued, the following table represents the course completion rate and client retention for the respective modules.

For example - Completion 92.3% means that of all the clients enrolled, whether fully completed the course or discontinued, the average course completion is 92.3%.

The Retention (%) signifies the number of clients enrolled vs number of clients discontinued.

For example - Retention 81.3% means that 81.3% of clients that enrolled have completed the course, the rest (18.7%) have discontinued.

Module	Completion (%)	Total Clients	Course Completed	Discontinued	Retention (%)
Module 7	100.0	3	3	0	100.0
Module 3	92.3	16	13	3	81.3
Module 1	91.4	14	11	3	78.6
Module 5	87.3	6	5	1	83.3
Module 2	84.0	2	1	1	50.0
Module 4.1	83.3	3	2	1	66.7
Module 4	70.6	35	20	15	57.1
AGGREGATE	**87**	-	-	-	**74**
Special Program	60.0	5	2	3	40.0

Thus, amongst the clients who have completed the course and who have discontinued, **the aggregate course completion rate is 87% and client retention is 74%.**

Since the Special Program is not a module itself, it can be excluded from this calculation and can be looked at as an independent component.

Course Discontinuation Analysis
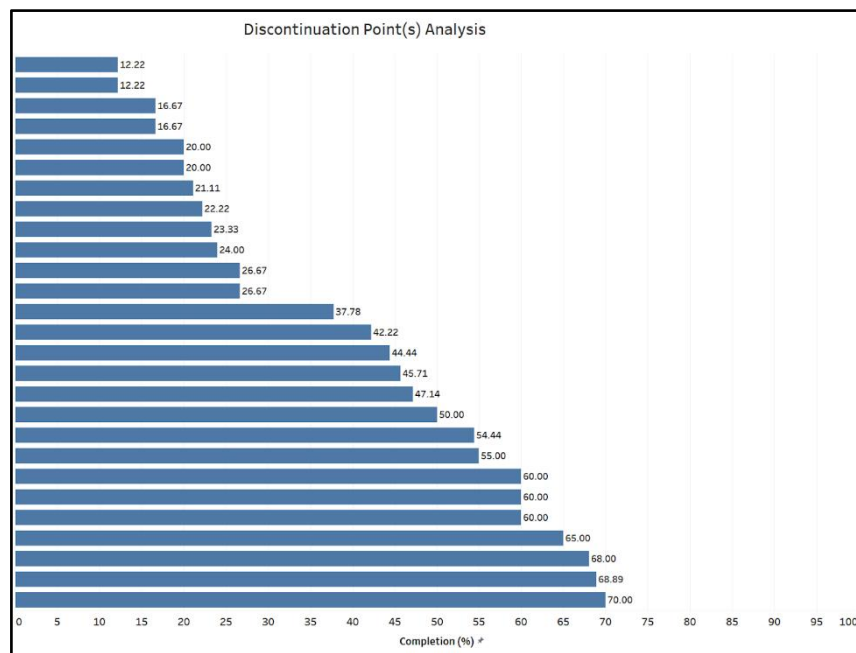
Bar Chart Representation

Fig. 5 – Clients' discontinuation points

The above visualisation is a representation of at what points (in terms of percentage of completion of the course) have clients discontinued.

The graph hints towards two prime zones of discontinuation, one at under the 30% mark and other at under the 67-70% mark.

Thus we can see 2 clear thresholds from the above chart, those being at about one-thirds and two-thirds completion of the course.

For understanding, once a client begins the course, they are very likely to complete upto 25-30% of the course. Further if they surpass that point, it is likely that they will continue upto 50% or 66% of the course.

A final retention threshold can clearly be identified through this graph, at nearly the 70% mark wherein when a client surpasses this threshold they are not at all likely to discontinue the course.

For context, the lower the threshold, the better it is. Hence attempting to lower this threshold must be targetted.

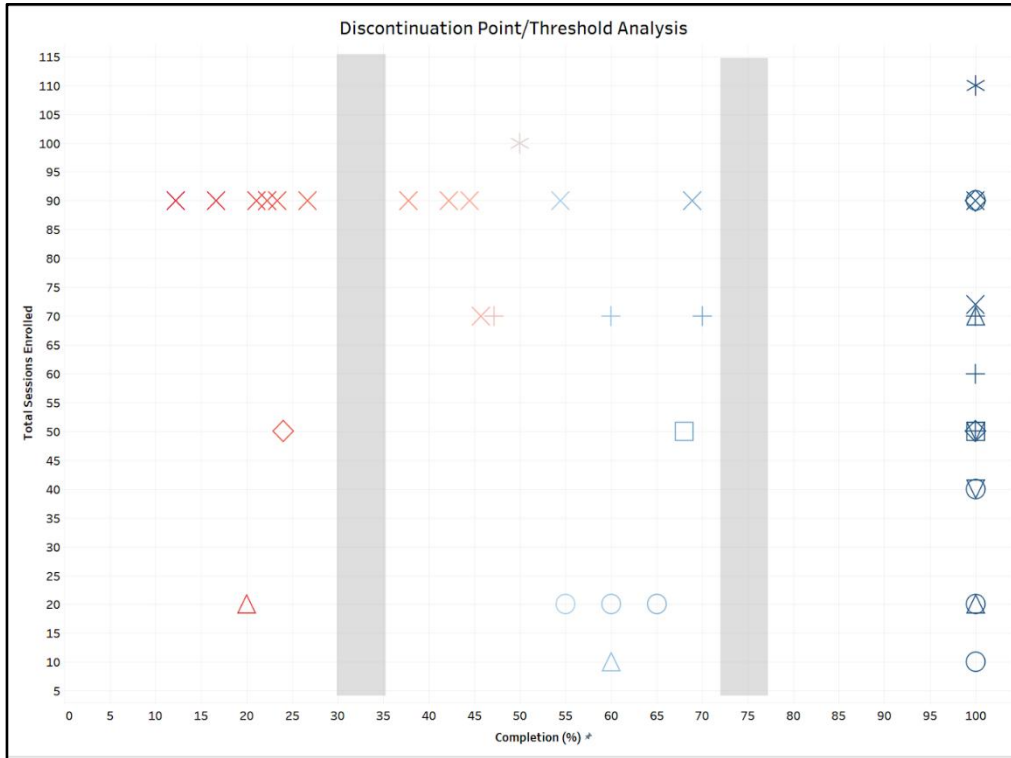Discontinuation Point/Threshold Analysis

Fig. 6 – Discontinuation point / threshold analysis

The above visualisation is a scatter plot chart showing course discontinuations (of the same bar graph earlier) at the corresponding completion percentage along with the total number of sessions enrolled by the client.

The different shapes of the plots represent the different modules as per the legend.

Study of discontinuation points -

Having identified the discontinuation point(s), those being at about one-thirds and two-thirds completion of the course and the retention thresholds, this must relate to another factor that is the root of the same.

Upon analysing other factors and arrangements of and in the business, it can be attributed to the credit policy offered to the clients along with clients' post-enrollment engagement strategies.
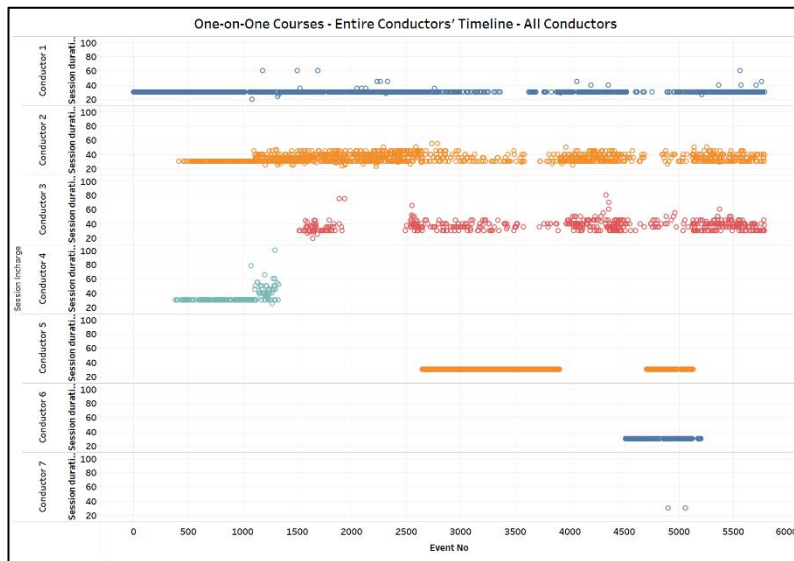
Recommendations have been made for the same.

Fig. 7 – One-on-One courses – entire conductors' timeline – all conductors

The above is a very powerful single snap visualization of the entire timeline of the One-on-One Meditation Courses Service showing the conductors, their joining phase, breaks taken, phases of the course, session durations and other tendencies.

The above visualisation shows the flow of sessions activity.

A total of 7 conductors were involved throughout the duration, each either individually or together assigned to conduct different types/sets of sessions. Certain conductors are designated only to conduct a segment of a client's total number of sessions. It also depicts the joining and active period and engagement of the different conductors along with their utilisation with respect to number of sessions conducted. For context, a session is of 30 minutes (which can be extended if the need be), so this visualisation also incorporates the session durations and tendencies.

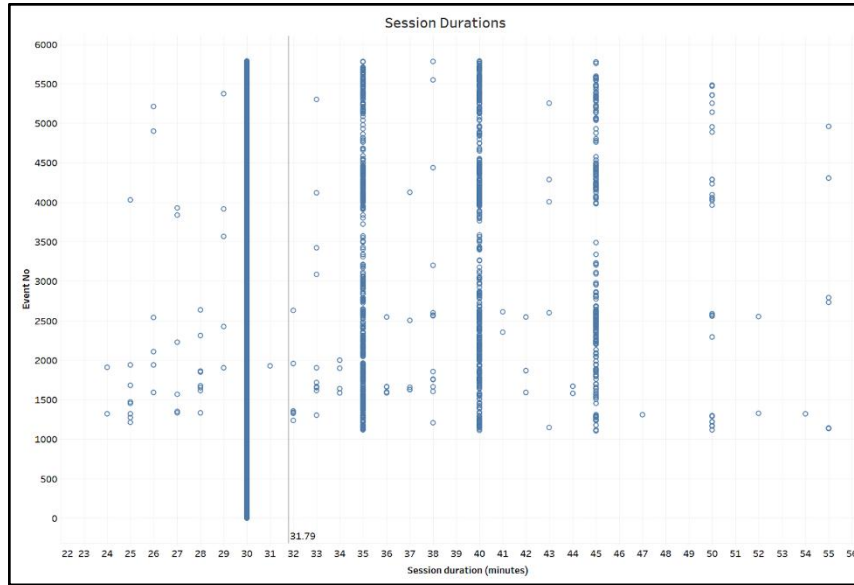**Session Durations Analysis**

Average Session Duration – Course Segment 1

Fig. 8 – Distribution of session durations

About this graph and further ones -

The x axis represents the session duration (in minutes) and the y axis represents a timeline in hindsight by being the Event No (session number in chronological order of the entire set of sessions conducted by all conductors).

So in a way this graph also shows the consistency or deviations through the entire period and at what point in time and which Event No.

As per the company's proposition, the prescribed duration of one session is 30 minutes. This guideline is non-rigid and if required, the session duration can be extended ad-hoc, live- during the session to whatever time duration might get consumed. This carries no consequence, neither to the conductor nor the client. This is a well-supported practice within the company so as to maximise client satisfaction and increase value delivery.

The above graph shows the most common session durations for all conductors combined, which are 30, 35, 40 and 45 minutes.
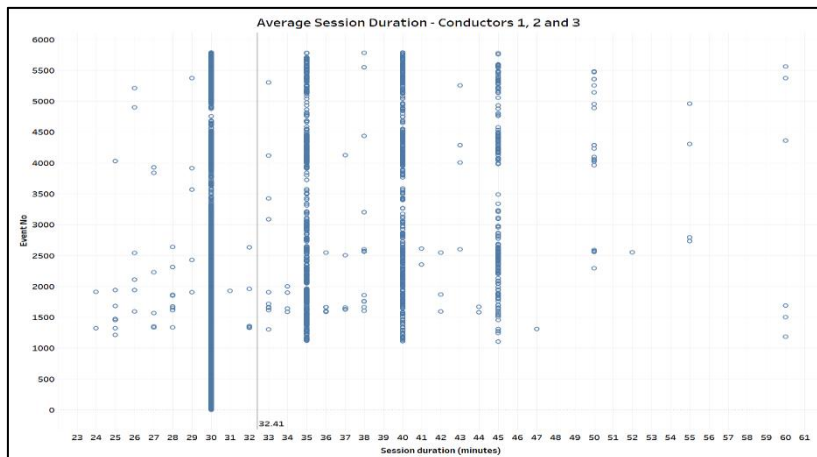

Fig. 9 – Average session duration – Conductors 1,2 and 3

The above chart shows session durations for Course Segment 1 only.

Average session time - 32 minutes.

For Conductors - Conductor 1, Conductor 2, Conductor 3 (combined)

The above is a combined average, which could be biased/skewed so let's dive deeper into more individual selections for understanding.
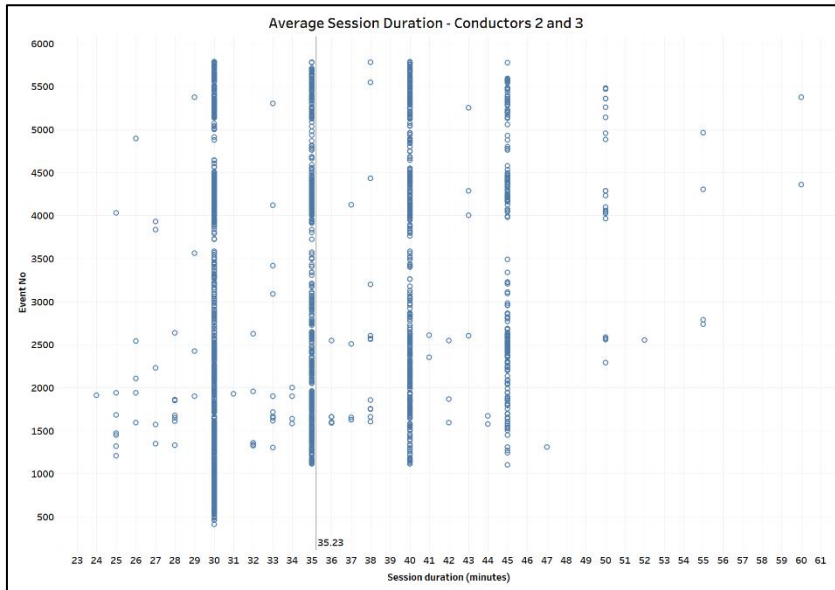
Fig. 10 – Average session duration – Conductors 2 and 3

The above chart shows session durations for Course Segment 1 only.

Average session time - 35 minutes.

For Conductors - Conductor 2, Conductor 3 (combined)

Upon individually studying session durations of Conductor 2 and 3 -

Conductor 2

It was observed that for an initial period the conductor conducted sessions for about 30 minutes as prescribed. But later on it was observed that the conductor became more comfortable and vested resulting in the conductor going the extra mile for the clients extending the session duration as required. This is a good step in the direction of client engagement. It will be beneficial to keep this around 35-37 minutes (over delivering by 15-20%).

While a majority of sessions have lasted 30 minutes, there are ample number of sessions extending to 35, 40 and 45 minutes.

The overall average session time for Conductor 2 is 34.5 minutes (115%).

Conductor 3

It was observed that the conductor was immediately more vested and engaged resulting in the conductor going the extra mile for the clients extending the session duration as required as soon as they started conducting sessions.

This is a good step in the direction of client engagement.

Durations like 35, 40, 45 minutes also hold strong along with 30 minutes.

The overall average session time for Conductor 3 is 37 minutes (123%). This is a strong edge for the company.
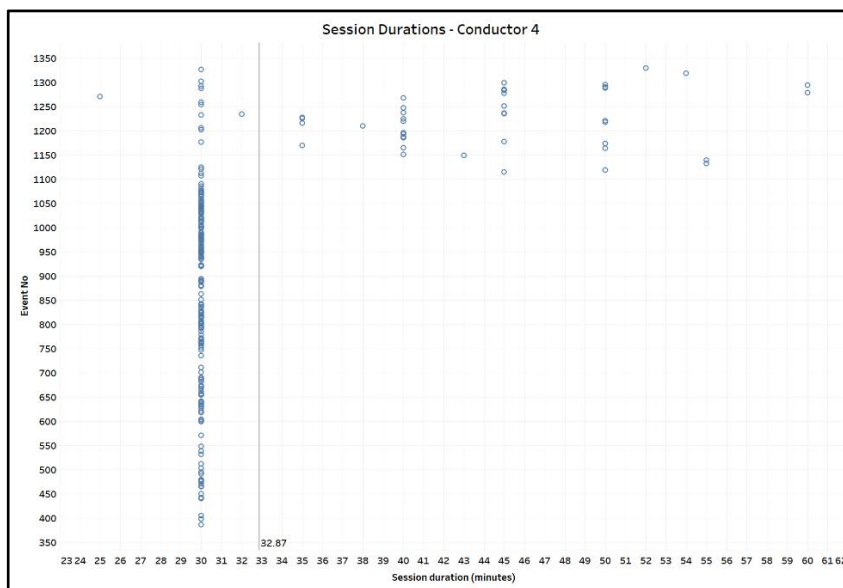
Conductor 4

Fig. 11 – Session durations – Conductor 4

While for a very long initial period the session duration lasted for only 30 minutes, an inorganic spike in the same can be observed in the later stages.
The overall average stays at about 33 minutes but that is skewed due to the heavy initial bias towards 30 minutes.
No internal policy changes or instructions were laid out during the time to have caused such an outcome.
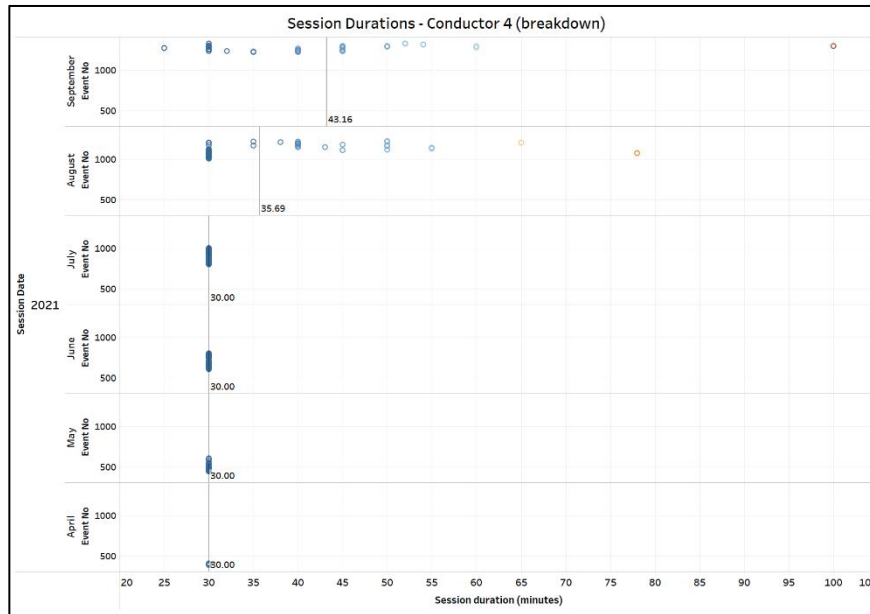This needs to be further drilled down to understand or uncover deviations.

Fig. 12 – Session durations – Conductor 4 (breakdown)

The above visualisation provides a detailed breakdown of the previous chart, dividing the data points by month. It also utilizes raw, uncleaned data for discovery purposes. It can now be observed that the session durations started extending in a trice in August 2021 immediately bringing the average to 35.7 minutes with peak session duration being 65 and 80 minutes which is unusual. Going into September 2021, it further pushes the average time to 43 minutes which is also unusual and peaks being 60 and 100 minutes.

Period	Average session duration (minutes)	Change (%)	Absolute Change (%)
April to July 21	30	-	-
August 2021	35.7	19	19
September 2021	43.16	12	44

This hints towards a potential compromise of the course's integrity, content and the conduction protocol.

The below table is a breakdown of the number of sessions conducted in each of the said months by Conductor 4.

		Conductor 4 Sessions Breakdown		
Session Incharge	Year of Session Date	Month of Session Date	Number of Sessions	Average Session duration (minutes)
		April	3	30
		May	19	30
Conductor 4	2021	June	41	30
		July	61	30
		August	64	35

	September	31	43

Weightage of session lengths (Course Segment 1)
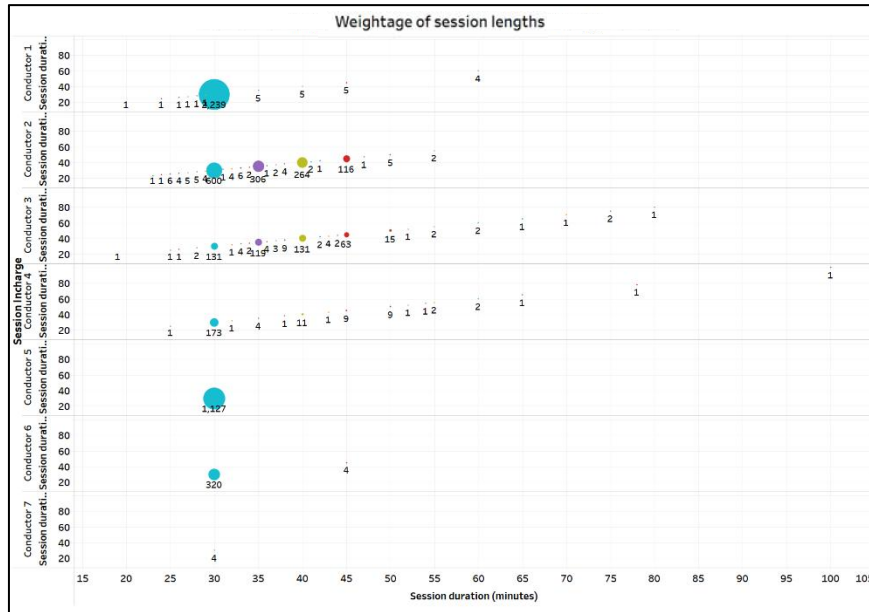
(Raw data)   **Fig. 13 – Weightage of session lengths**

This is a weightage distribution of the various session durations for each of the conductors. The larger the dot, higher is the concentration of that value of session duration amongst all others.

It can be observed that majority of the sessions lasted for 30 minutes for Conductor 2 followed by 35, 40 and 45 minutes, for Conductor 3 almost an equal number of sessions have lasted for the said durations which is a good indicator.

Conductors with session duration greater than 30 minutes

Session Incharge	Number sessions with duration more than 30 minutes	Average time for sessions when they exceed 30 minutes	Difference (%)
Conductor 2	717	38.64	29
Conductor 3	369	40.14	34
Conductor 4	45	47.27	57

Course Segment 2, having various other kinds of session content and also is conducted by a different set of conductors, have a fixed session time, not by control but by nature. Hence all Course Segment 2 sessions have lasted only for the prescribed time of 30 minutes and hence do not require such detailed analysis as for Course Segment 1.

Customer Lifespan Calculation

Client Lifespan is calculated by the number of days the client was active from the first session to the completion of the course. This includes delays caused by cancellations from client, unavailability of the client and in very few cases if the company had to reschedule a session owing to any reason.

This further allows to drill-down into delay-analysis. Clients with poor commitment, clients with high absenteeism and situations where sessions were rescheduled by the company can be identified to find voids, lapses and loopholes which can be worked upon to further improve the processes and operational efficiency.

Client Lifespan Calculation for all modules and combined

Module	Average period (days)	Overall (years)	Justification
Module 1	186	0.5	
Module 2	532	1.45	
Module 3	532	1.45	
Module 4	608	1.66	This means, on average a client for the respective module takes x number of days OR y number of years to complete the course.
Module 4.1	898	2.46	
Module 5	448	1.23	
Special Program	109	0.3	
Module 7	403	1.1	
AVERAGE	**464.6**	**1.27**	

Client Turnover Rate is directly related to revenue.

A higher client turnover rate indicates towards a higher income rate as well.

For example, having 20 clients complete the course within 3 years versus 30 clients in 3 years implies earning 33% more revenue in the same period.

The business should focus on increasing the client turnover rate.

Shorter the Client Lifespan, more the number of clients will be completing the course within a period of time.

5. Limitations

1. As a niche and non-conventional business, the company may experience variations or inconsistencies in areas such as customer acquisition, pricing of products and services, updates to offerings, service delivery, and personalization. These factors can impact the uniformity and predictability of business operations.

2. Given the firm's small size, relative newness in the market, and limited data availability, this analysis has focused on descriptive insights. Consequently, the development of predictive models and advanced analytics is not yet feasible.

3. The absence of recorded employee data has limited the ability to conduct a comprehensive workforce analysis, restricting the scope of insights related to employee performance and organizational efficiency.

4. The researcher is not permitted to publish all data and findings, including but not limited to certain tables, visualisations, dashboards, proprietary data and information and certain terminologies. The researcher has to follow the company's internal policies and guidelines served with regards to publishing of company information and data and has to follow certain restrictions.

6. Recommendations and Scope for Future Work

1. A rework in the credit policy is suggested
   Considering the company's current credit policy, the business must therefore attempt to reduce the number of installments offered to clients and also shortened credit period. With reference to the suggestions that were made, multiple options can be utilised with a combination of different but shorter credit periods as well. Shortened credit period and increased rate of cash flow will help increase cash inflow and total sales.

2. Client Engagement and Post-Enrollment Promotional Strategies could be developed and work on
   E-content like posters, small write ups, a post-program handbook, important course practices graphic(s) and audio-visual content should be served to clients.
   Informing the client beforehand about specific intense or discussion sessions and letting them know about the further opportunities will encourage and motivate the clients and incentivise them to stay vested in the course.
   This will help in client retention resulting in higher course completion rates and total sales. The company should continually make improvements to make the courses feel more investible and relevant from the clients' point-of-views, which will eventually drive growth and success.

3.   Increase in client turnover rate

The client turnover rate is closely linked to revenue generation. A higher turnover rate typically correlates with increased income. For instance, serving 30 clients over three years compared to 20 clients in the same period results in a 33% higher revenue.

To capitalize on this, the business should prioritize increasing the client turnover rate. Reducing the client lifespan allows more clients to complete the course within a given time frame, thereby boosting overall revenue.

4.   Partial Course Restructure

Reorganising the existing sessions order in way that will boost client engagement and as suggested will result in improved value delivered. Introducing additional course content along with the existing, whether quantitatively or qualitatively will highly benefit.

This will lead to increased value delivery, help in client retention resulting in higher course completion rates and total sales. High value delivery is also good for publicity.

Scope for future work

1.   **Yearly Comparative Analysis**: Continuing to analyse business performance over the coming years and compare it with past data. This will help identify trends and patterns, leading to more informed strategic decisions.
2.   **KPI Development**: Establishing and determining the business-specific KPIs to measure and track so as to enable concurrent performance measurement and interpretation.
3.   **Process Standardisation**: Formalising or introducing more consistent procedures and ensuring consistency across the different operations will improve both internal evaluations and benchmarking against other businesses.
4.   **Workforce Data Tracking**: Implement consistent workforce policies and framework to track employee metrics effectively will aid in resource management and productivity analysis.
5.   **ERP Implementation**: Gradually integrating a comprehensive ERP system to streamline operations and facilitate better long-term performance monitoring.

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