The report on customer analysis based on cohort analysis

TABLE OF CONTENT

METHODOLOGY

01 - DATA

The data used for analysis in this report is transaction data obtained from a very large chain of pizza stores, specifically sourced from the Pizzahut system in Vietnam. Each piece of data represents a record of individual transactions with customers, including: BillID, Channel, OrderFrom, TransactionDate, SalesAmount, CustomerID, CustomerGender, VoucherStatus, Province.

02 - TIME

"The data collection period in this report spans over 1 year, from October 1st, 2021, to January 9th, 2023.

03 - ANALYSIS METHOD

The report only utilizes the cohort analysis method to analyze three key metrics regarding customers and business indices. Specifically: Customer retention, Net dollar retention, Customer lifetime value.

DATA MAPPING

Column name	Meaning	Data type	Example
BillID	The ID of the transaction. This ID is unique in the dataset	Text	1
Channel	The method for delivering food to customers.	Text	Delivery Take away Dine in
OrderFrom	Where do customers place orders from	Text	App Call center Store Website
TransactionDate	When does the transaction take place	Date	2021-10-01

DATA MAPPING

Column name	Meaning	Data type	Example
SalesAmount	The amount of money received from the transaction	Number	296891
CustomerID	ID of the customer	Text	1753863
CustomerGender	The gender of the customers	Text	Male Female Unknown
VoucherStatus	Did the customer use a voucher for their transaction?	Text	Yes No
Province	Province of each customer	Text	Ho Chi Minh City Hanoi

OVERVIEW OF ENTERPRISE

Pizza Hut is a globally renowned restaurant chain specializing in pizza and other Italian-American cuisine. Pizza Hut is celebrated for its diverse menu, which includes various styles of pizzas, pasta, wings, salads, and desserts.

What sets Pizza Hut apart is its commitment to innovation and quality. Beyond its delicious food, Pizza Hut is known for its distinctive dining experience, offering dine-in, takeout, and delivery options to customers. The company prides itself on its friendly service and inviting atmosphere, making it a popular choice for family gatherings, casual outings, and celebrations alike.

OVERVIEW OF ENTERPRISE

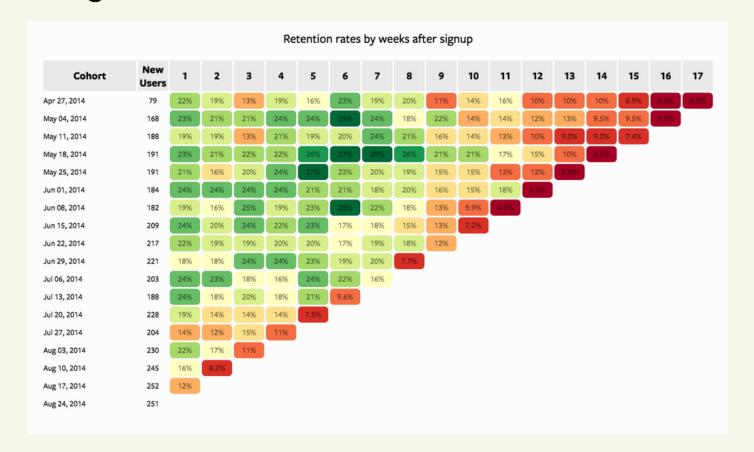The data is collected from all Pizza Hut store chains in Vietnam over a period of more than 1 year, from October 1st, 2021, to January 9th, 2023. Through this data, the report will clarify the issues that businesses need to pay attention to regarding customer retention, net dollar retention, and customer lifetime value, thereby making recommendations to improve the current issues of the business.

OVERVIEW OF COHORT ANALYSIS

Cohort analysis is a valuable method used in statistics and data analytics to study the behavior of specific groups over time. In business and marketing, it is particularly useful for understanding customer behavior and trends.

Cohorts are groups of individuals who share a common characteristic or experience within a specific time frame.

Cohort analysis involves tracking various metrics or key performance indicators (KPIs) over time within each cohort. Common metrics include customer retention rate, revenue per customer, customer lifetime value, and others relevant to the business goals.

Retention rates by weeks after signup

Cohort	New Users	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Apr 27, 2014	79	22%	19%	13%	19%	16%	23%	19%	20%	11%	14%	16%	10%	10%	10%	8.9%	6.3%	4.3%
May 04, 2014	168	23%	21%	21%	24%	24%	29%	24%	18%	22%	14%	14%	12%	13%	9.5%	9.5%	5.5%	
May 11, 2014	188	19%	19%	13%	21%	19%	20%	24%	21%	16%	14%	13%	10%	9.0%	9.0%	7.4%		
May 18, 2014	191	23%	21%	22%	22%	26%	27%	29%	26%	21%	21%	17%	15%	10%	6.8%			
May 25, 2014	191	21%	16%	20%	24%	27%	23%	20%	19%	15%	15%	12%	12%	5.8%				
Jun 01, 2014	184	24%	24%	24%	24%	21%	21%	18%	20%	16%	15%	18%	6.3%					
Jun 08, 2014	182	19%	16%	25%	19%	23%	28%	22%	18%	13%	9.9%	4.9%						
Jun 15, 2014	209	24%	20%	24%	22%	23%	17%	18%	15%	13%	7.2%							
Jun 22, 2014	217	22%	19%	19%	20%	20%	17%	19%	18%	12%								
Jun 29, 2014	221	18%	18%	24%	24%	23%	19%	20%	7.7%									
Jul 06, 2014	203	24%	23%	18%	16%	24%	22%	16%										
Jul 13, 2014	188	24%	18%	20%	18%	21%	9.6%											
Jul 20, 2014	228	19%	14%	14%	14%	7.5%												
Jul 27, 2014	204	14%	12%	15%	11%													
Aug 03, 2014	230	22%	17%	11%														
Aug 10, 2014	245	16%	8.2%															
Aug 17, 2014	252	12%																
Aug 24, 2014	251																	

OVERVIEW OF COHORT ANALYSIS

Cohorts are typically analyzed over regular intervals, such as weeks, months, or years, allowing for comparisons and trend identification. This helps in understanding how behaviors change over time within and across cohorts.

By analyzing cohort data, businesses can gain insights into customer behavior patterns, identify trends, and make data-driven decisions. These insights often lead to actionable recommendations aimed at improving customer satisfaction, retention, and overall business performance.

Subscription		Months since account creation											
		0	1	2	3	4	5	6	7	8	9	10	11
April 2019	24	92%	88%	79%	79%	79%	71%	71%	63%	63%	67%	63%	58%
May 2019	27	93%	85%	81%	81%	81%	81%	81%	81%	78%	78%	70%	
June 2019	40	98%	90%	83%	80%	78%	75%	73%	73%	68%	68%		
July 2019	30	97%	83%	77%	77%	73%	70%	67%	50%	47%			
August 2019	34	94%	82%	82%	79%	74%	71%	65%	59%				
September 2019	23	100%	91%	91%	83%	87%	87%	78%					
October 2019	34	97%	94%	91%	85%	76%	71%						
November 2019	26	100%	85%	81%	69%	69%							
December 2019	18	100%	100%	94%	89%								
January 2020	24	100%	88%	88%									
February 2020	31	100%	87%										
March 2020	29	100%											

DATA ANALYSIS (CUSTOMER RENTENTION RATE)

The table on the right shows the number of customers using the service according to cohort analysis. Each customer will be recorded in the first month they make a transaction, and this analysis will track the number of customers still using the service since the first month they used it at the customer's end.
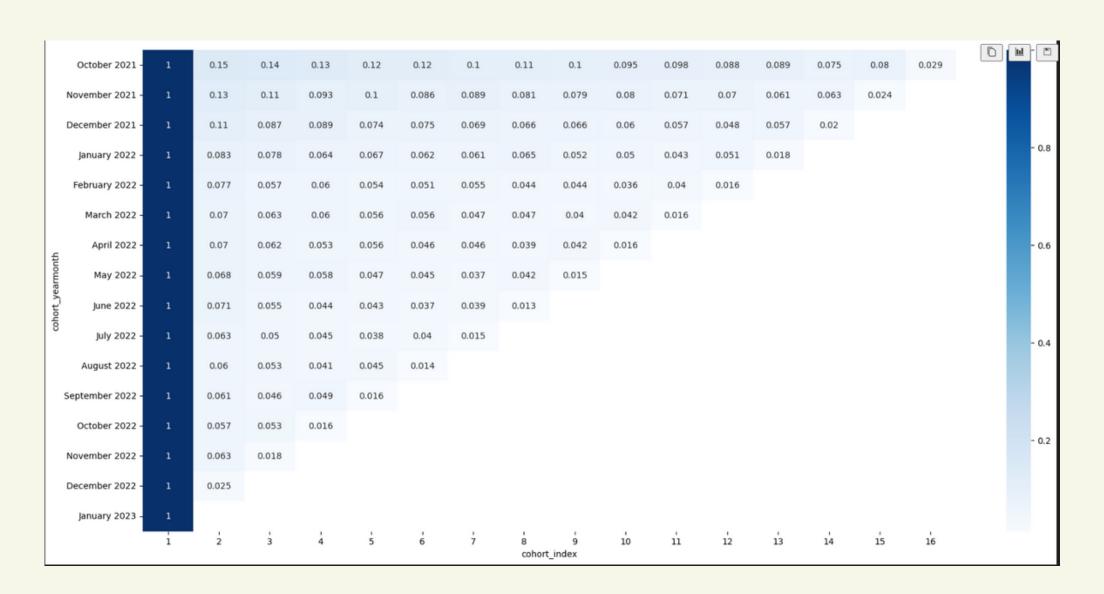
Of course, relying solely on the number of customers makes tracking difficult. That's why we need to convert these numbers into percentages, and these percentage figures are called customer retention rates.

cohort_index / cohort_yearmonth	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
October 2021	64247.0	9324.0	9196.0	8666.0	7601.0	7718.0	6624.0	6942.0	6401.0	6119.0	6294.0	5638.0	5688.0	4804.0	5132.0	1850.0
November 2021	51021.0	6384.0	5722.0	4757.0	5129.0	4399.0	4521.0	4147.0	4007.0	4073.0	3618.0	3595.0	3113.0	3193.0	1206.0	NaN
December 2021	52547.0	5642.0	4579.0	4668.0	3883.0	3922.0	3650.0	3477.0	3490.0	3167.0	2974.0	2541.0	2992.0	1032.0	NaN	NaN
January 2022	48625.0	4036.0	3816.0	3122.0	3241.0	3006.0	2984.0	3160.0	2544.0	2438.0	2078.0	2465.0	879.0	NaN	NaN	NaN
February 2022	44710.0	3450.0	2568.0	2676.0	2406.0	2281.0	2448.0	1948.0	1959.0	1628.0	1801.0	733.0	NaN	NaN	NaN	NaN
March 2022	41968.0	2934.0	2662.0	2538.0	2331.0	2356.0	1979.0	1989.0	1680.0	1782.0	655.0	NaN	NaN	NaN	NaN	NaN
April 2022	35517.0	2472.0	2212.0	1897.0	1981.0	1630.0	1629.0	1370.0	1499.0	553.0	NaN	NaN	NaN	NaN	NaN	NaN
May 2022	37181.0	2539.0	2207.0	2145.0	1733.0	1678.0	1361.0	1553.0	547.0	NaN	NaN	NaN	NaN	NaN	NaN	NaN
June 2022	37132.0	2640.0	2051.0	1648.0	1583.0	1373.0	1442.0	501.0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
July 2022	34102.0	2142.0	1692.0	1528.0	1312.0	1379.0	528.0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
August 2022	30223.0	1803.0	1602.0	1249.0	1371.0	425.0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
September 2022	26183.0	1605.0	1214.0	1272.0	412.0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
October 2022	26151.0	1490.0	1386.0	419.0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
November 2022	21952.0	1379.0	385.0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
December 2022	24177.0	613.0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
January 2023	7906.0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN

DATA ANALYSIS (CUSTOMER RENTENTION RATE)

The table on the right shows the customer retention rate of the Pizzahut chain, compiled from October 2021 to January 2023. Looking at the results, it can be observed that most customers do not tend to reuse the store's services after their initial usage. This is evidenced by the significant decrease in the percentage of customers reusing the product from the second month onwards.

Mostly, only around or less than 10% of customers return to use the service again after their initial visit. This is an extremely alarming situation for the Pizzahut chain because the customer retention rate here is too low.

DATA ANALYSIS (NET DOLLAR RETENTION)

The table on the right shows the revenue generated by the store from customers based on cohort analysis. The revenue from each customer is classified and recorded in the first month they use the product at the store, and subsequent revenue from each customer is recorded based on whether they continue to use the product or not.
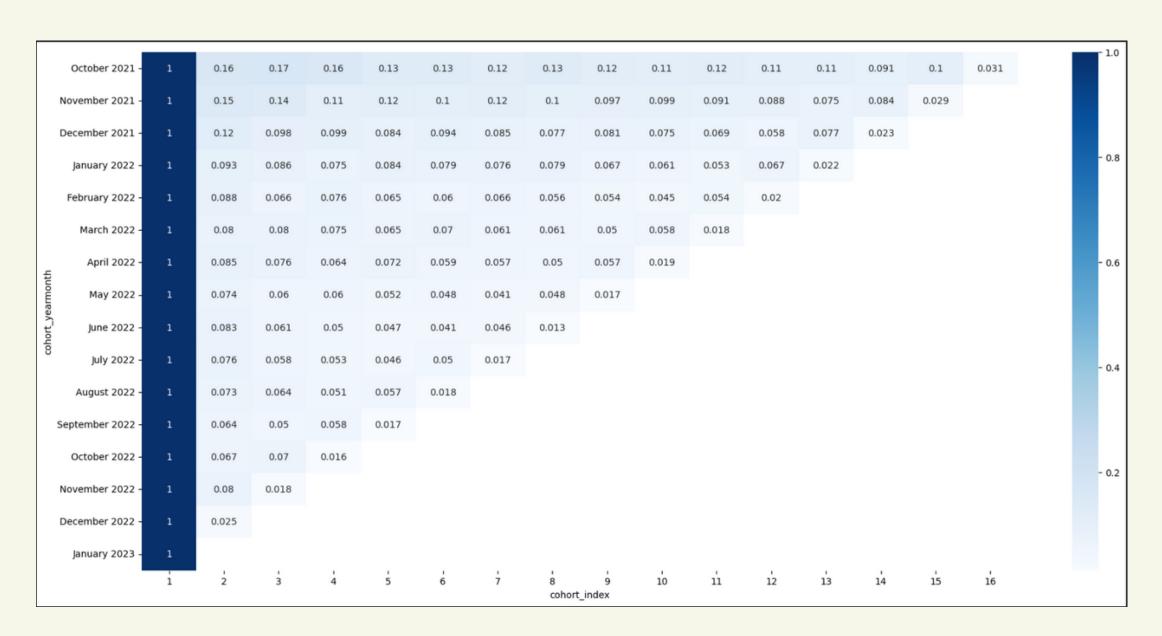
However, just like the number of customers, if we only rely on the amount of money, it would be challenging to analyze. Therefore, we will convert this data into percentages, and that is called Net Dollar Retention.

cohort_index	1	2	3	4	5	6	7	8	9	10	11	12
cohort_yearmonth												
October 2021	21418928390.00	3531187519.00	3640272429.00	3343488352.00	2861244785.00	2885912460.00	2576231881.00	2876471238.00	2568266671.00	2420038750.00	2526383105.00	2328329267.00
November 2021	15895180881.00	2395974318.00	2177968327.00	1711368516.00	1830908749.00	1649089108.00	1840504627.00	1619537876.00	1535829624.00	1581542406.00	1441134073.00	1406339097.00
December 2021	16648339214.00	2072109123.00	1634682183.00	1648436737.00	1394271726.00	1558741501.00	1411830776.00	1285059706.00	1345670749.00	1254782177.00	1148466691.00	962893363.00
January 2022	14846210861.00	1384792949.00	1275348291.00	1108219004.00	1246377722.00	1170753926.00	1124664209.00	1171191612.00	989043082.00	906222052.00	783699564.00	988956557.00
February 2022	13474724132.00	1183764512.00	884858298.00	1022170778.00	881938715.00	806823270.00	886095699.00	757776769.00	724665937.00	600706185.00	721717971.00	266308430.00
March 2022	12627619431.00	1014650023.00	1005205327.00	946203938.00	822433950.00	884693359.00	769144925.00	774306834.00	629625059.00	731282335.00	227225180.00	NaN
April 2022	10967777898.00	936738524.00	837689559.00	705068980.00	792400472.00	644965134.00	628726262.00	544591369.00	628517957.00	205617465.00	NaN	NaN
May 2022	13277807691.00	976990958.00	795146789.00	794259615.00	694717541.00	643776655.00	544234594.00	636111269.00	223621070.00	NaN	NaN	NaN
June 2022	12658464375.00	1047179330.00	771648693.00	631666794.00	597530261.00	524317593.00	582805166.00	170095146.00	NaN	NaN	NaN	NaN
July 2022	10707237535.00	811786995.00	621835946.00	567655411.00	497542048.00	536285981.00	177712562.00	NaN	NaN	NaN	NaN	NaN
August 2022	9375900916.00	683160420.00	599875574.00	475437601.00	538229795.00	165659800.00	NaN	NaN	NaN	NaN	NaN	NaN
September 2022	9049772314.00	575434309.00	456088290.00	521893932.00	149918924.00	NaN	NaN	NaN	NaN	NaN	NaN	NaN
October 2022	8604613642.00	576040583.00	599327909.00	138239196.00	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
November 2022	6949949637.00	554464734.00	123035791.00	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
December 2022	8267019161.00	206935404.00	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
January 2023	2524186375.00	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN

DATA ANALYSIS (NET DOLLAR RETENTION)

The table on the right has shown the Net Dollar Retention rate of Pizzahut. It can be observed that similar to the customer retention rate, the net dollar retention rate of the business is also very low, with most businesses being able to retain only an average of 10% of total revenue compared to the first month when customers first used the service. This is an extremely low figure.

Moreover, in the subsequent 6 months to 1 year, the amount of revenue retained compared to the revenue from the first usage is even less than 10%. These results clearly reflect the alarming situation of the business in retaining store revenue.

cohort_yearmonth	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
October 2021	1	0.16	0.17	0.16	0.13	0.13	0.12	0.13	0.12	0.11	0.12	0.11	0.11	0.091	0.1	0.031
November 2021	1	0.15	0.14	0.11	0.12	0.1	0.12	0.1	0.097	0.099	0.091	0.088	0.075	0.084	0.029	
December 2021	1	0.12	0.098	0.099	0.084	0.094	0.085	0.077	0.081	0.075	0.069	0.058	0.077	0.023		
January 2022	1	0.093	0.086	0.075	0.084	0.079	0.076	0.079	0.067	0.061	0.053	0.067	0.022			
February 2022	1	0.088	0.066	0.076	0.065	0.06	0.066	0.056	0.054	0.045	0.054	0.02				
March 2022	1	0.08	0.08	0.075	0.065	0.07	0.061	0.061	0.05	0.058	0.018					
April 2022	1	0.085	0.076	0.064	0.072	0.059	0.057	0.05	0.057	0.019						
May 2022	1	0.074	0.06	0.06	0.052	0.048	0.041	0.048	0.017							
June 2022	1	0.083	0.061	0.05	0.047	0.041	0.046	0.013								
July 2022	1	0.076	0.058	0.053	0.046	0.05	0.017									
August 2022	1	0.073	0.064	0.051	0.057	0.018										
September 2022	1	0.064	0.05	0.058	0.017											
October 2022	1	0.067	0.07	0.016												
November 2022	1	0.08	0.018													
December 2022	1	0.025														
January 2023	1															

cohort_index

DATA ANALYSIS (CUSTOMER LIFETIME REVENUE)

The table next to it represents the customer lifetime revenue. This table is calculated by using cumulative revenue from customers based on cohort analysis. From here, we can determine the average revenue obtained from each customer since their first usage of our service until a certain point in time. However, the customer lifetime revenue index alone does not provide much insight for analysis; it needs to be transformed into customer lifetime value.

cohort_index	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
cohort_yearmonth																
October 2021	333384.10	388346.79	445007.37	497048.53	541583.60	586502.62	626601.49	671373.56	711348.45	749016.18	788339.15	824579.43	860393.69	890829.58	925080.28	935375.93
November 2021	311541.93	358502.48	401190.17	434732.60	470618.00	502939.77	539013.24	570755.81	600857.73	631855.60	660101.50	687665.42	711173.12	737304.29	746278.93	NaN
December 2021	316827.59	356261.03	387369.98	418740.69	445274.50	474938.25	501806.22	526261.65	551866.74	575745.98	597601.97	615926.39	640380.05	647639.83	NaN	NaN
January 2022	305320.53	333799.56	360027.81	382818.94	408451.39	432528.59	455657.93	479744.14	500084.35	518721.31	534838.52	555176.96	561793.73	NaN	NaN	NaN
February 2022	301380.54	327857.05	347648.11	370510.35	390236.11	408281.81	428100.55	445049.25	461257.39	474693.01	490835.21	496791.56	NaN	NaN	NaN	NaN
March 2022	300886.85	325063.61	349015.32	371561.16	391157.85	412238.04	430564.98	449014.91	464017.41	481442.17	486856.42	NaN	NaN	NaN	NaN	NaN
April 2022	308803.61	335177.98	358763.58	378615.17	400925.63	419084.96	436787.08	452120.34	469816.60	475605.87	NaN	NaN	NaN	NaN	NaN	NaN
May 2022	357112.71	383389.33	404775.17	426137.14	444821.89	462136.55	476773.99	493882.50	499896.89	NaN	NaN	NaN	NaN	NaN	NaN	NaN
June 2022	340904.46	369105.99	389887.22	406898.61	422990.67	437111.04	452806.53	457387.36	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
July 2022	313976.82	337781.49	356016.08	372661.89	387251.71	402977.65	408188.86	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
August 2022	310224.03	332828.02	352676.34	368407.32	386215.94	391697.19	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
September 2022	345635.42	367612.83	385032.08	404964.63	410690.44	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
October 2022	329035.74	351063.22	373981.19	379267.38	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
November 2022	316597.56	341855.61	347460.38	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
December 2022	341937.34	350496.53	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
January 2023	319274.78	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN

DATA ANALYSIS (CUSTOMER LIFETIME REVENUE)

The table on the right illustrates the customer lifetime value. Assuming the gross profit from each customer is 65%, and the cost to acquire a customer is 300,000 VND. Customer lifetime value is a crucial metric to determine the value of a customer to the business over a certain period. This metric is essential as it helps the business measure the effectiveness of a campaign based on the profit generated from customers and the costs incurred. Thus, they can make appropriate adjustments according to the actual situation.

In this case, it can be observed that with a cost of 300,000 VND per customer, the business's campaign seems to be performing very well. By the end of the 7th month, the store chain has already recouped its investment and started to generate profits from the 7th month onwards. Therefore, from this perspective, it is still a strategy that brings favorable results."

cohort_index	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
cohort_yearmonth																
October 2021	216699.67	252425.41	289254.79	323081.54	352029.34	381226.70	407290.97	436392.81	462376.49	486860.52	512420.45	535976.63	559255.90	579039.23	601302.18	607994.36
November 2021	202502.26	233026.61	260773.61	282576.19	305901.70	326910.85	350358.61	370991.28	390557.52	410706.14	429065.97	446982.53	462262.53	479247.79	485081.31	NaN
December 2021	205937.93	231569.67	251790.49	272181.45	289428.42	308709.87	326174.04	342070.07	358713.38	374234.89	388441.28	400352.15	416247.03	420965.89	NaN	NaN
January 2022	198458.35	216969.72	234018.07	248832.31	265493.40	281143.58	296177.66	311833.69	325054.83	337168.85	347645.04	360865.03	365165.93	NaN	NaN	NaN
February 2022	195897.35	213107.08	225971.27	240831.73	253653.47	265383.18	278265.35	289282.02	299817.31	308550.45	319042.89	322914.51	NaN	NaN	NaN	NaN
March 2022	195576.45	211291.34	226859.96	241514.75	254252.60	267954.73	279867.24	291859.69	301611.32	312937.41	316456.67	NaN	NaN	NaN	NaN	NaN
April 2022	200722.35	217865.69	233196.33	246099.86	260601.66	272405.22	283911.60	293878.22	305380.79	309143.81	NaN	NaN	NaN	NaN	NaN	NaN
May 2022	232123.26	249203.06	263103.86	276989.14	289134.23	300388.76	309903.10	321023.62	324932.98	NaN	NaN	NaN	NaN	NaN	NaN	NaN
June 2022	221587.90	239918.89	253426.70	264484.10	274943.93	284122.17	294324.25	297301.78	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
July 2022	204084.93	219557.97	231410.45	242230.23	251713.61	261935.47	265322.76	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
August 2022	201645.62	216338.21	229239.62	239464.76	251040.36	254603.17	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
September 2022	224663.03	238948.34	250270.85	263227.01	266948.79	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
October 2022	213873.23	228191.09	243087.77	246523.80	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
November 2022	205788.41	222206.15	225849.24	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
December 2022	222259.27	227822.74	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
January 2023	207528.60	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN

SUMMARY

Although this is a successful campaign for Pizzahut as it can be seen that, on average, the customer lifetime value exceeds the customer acquisition cost (CAC) and brings profits to the company, there are still some areas of concern that the business needs to address.

1. Customer retention rate is very low, which is a glaring issue for the company. It's well known that the cost to acquire a new customer is much higher than retaining an existing one. However, we can observe that only 10% of customers reuse the product in the second month after their initial usage in the first month. This is an extremely small percentage and has consumed a lot of the company's resources.
2. Net dollar retention is also very low and the severity parallels the customer retention rate. It can be seen that the business can only retain an average of 10% of profit compared to the profit from the first month when customers first used the service, and by the end of the survey period, the company only retains less than 3% of the revenue from the first month.

OPINION OF THE REPORT AUTHOR

With the existing issues, particularly the weakness in retaining customers within the business, the Pizzahut chain needs to review and classify customers into specific customer segments. This will enable us to develop tailored strategies for each customer segment to satisfy them and retain valuable customers with the business for as long as possible.