Analysis & Recommendations

🚀 **TL;DR**

Key Takeaway

- Digibank's user engagement shows **significant growth and an increase in healthy engagement**, with **a declining trend in Daily MAU Ratio and an increasing number of users with no engagement at all**.

Definitions

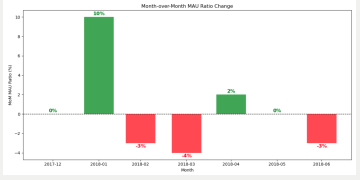
- **Active User Definition:** An active user is defined as someone who either opens the Digibank app or performs financial transactions (sending or receiving funds). This is for activity to reflect both digital product engagement and core banking services engagement.
- **Churn Definition:** A user is considered at risk of churning if they have not been active for 16 days, based on a detailed statistical analysis to provide a balanced threshold *(90th percentile of the average number of days between two active days per user)*.

Selected Metrics for Engagement & Retention

- **L0 Metric: MoM Change of MAU Ratio**
  - Identifies trends and changes while normalising against hyper-growing user base.
- **L1 Metric: Daily MAU Ratio**
  - Captures engagement while normalising against hyper-growing user base.
- **L2 Metric: Lness 2+/30 Ratio**
  - Captures healthy engagement ratio at-a-glance.

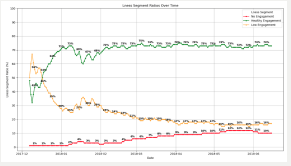
Tracking Metrics via Automated Dashboards & Reports

L0: MoM Change of MAU Ratio



L1: Daily MAU Ratio

L2: Lness 2+/30 Ratio



User Engagement Over Time:

- Available data shows significant user base growth from 1,000 to 70,000+ users. Metrics indicate mixed trends with **positive signs of increased healthy engagement** but concerns over **declining Daily MAU Ratio and rising no engagement segment**.

Segments

- 🚀 **Users active in their first week,**
- 📸 **Users who upload a profile photo,**
- 👫 **Users with friends on Digibank enabled,** and
- 📱 **Users who activate Android Pay** are likelier to be retained longer.
- 👴👵 **Younger users are likelier to be retained longer** compared to older users.
- 💳 **Offering overdrafts shows minimal practical significance**, suggesting limited impact.

Next Steps

- **Refine Activity and Churn Definitions:** Develop more nuanced definitions for activity and churn, and improve Lness cut-off points using survival analysis.
- **Experimentation and Analysis:** Conduct A/B testing for onboarding improvements, perform OLS regression to analyze combined feature effects, and develop predictive models to forecast user behavior and identify at-risk users.

Engagement & Retention Metric Proposal

Defining Active User

Active User Definition: An active user is defined as someone who either opens the Digibank app or performs financial transactions (sending or receiving funds).

Reasoning:

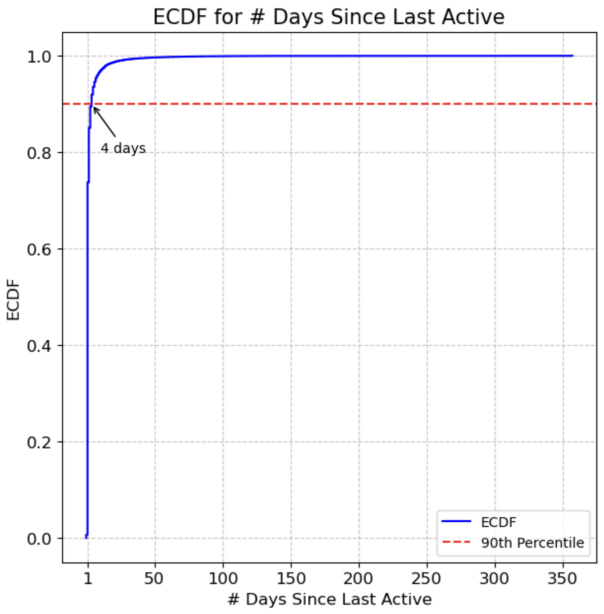
- **App Opens:** When a user opens the Digibank app, it shows that they are interacting with the digital product. This could mean they are checking their balance, reviewing transactions, or exploring the app's features. Regular app opens suggest that the user relies on Digibank for their banking needs and is engaged with the digital experience.
- **Transactions:** Financial transactions are at the heart of banking services. Whether a user is sending money to someone or receiving funds, it demonstrates that they are actively engaged in Digibank's banking services. Active transactions indicate trust in Digibank for their financial activities, suggests user is engaged with the services, and suggest a higher likelihood of continued use.

Defining Churn

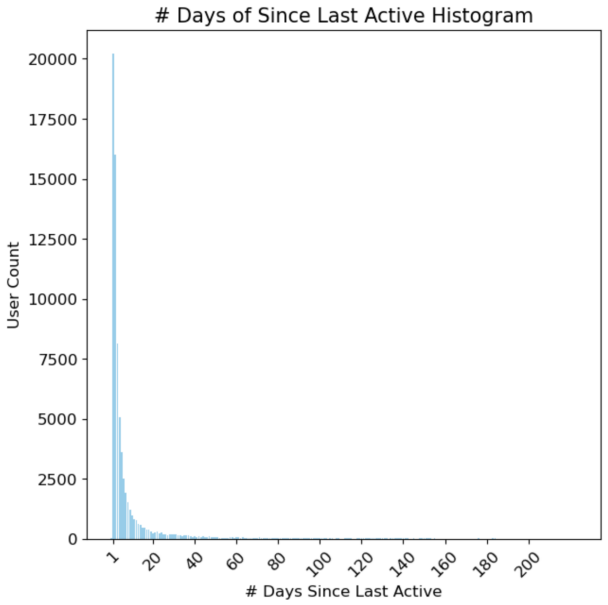
> **Churn Definition:** A user is considered at risk of churning if they have not been active for 16 consecutive days.

Rationale:

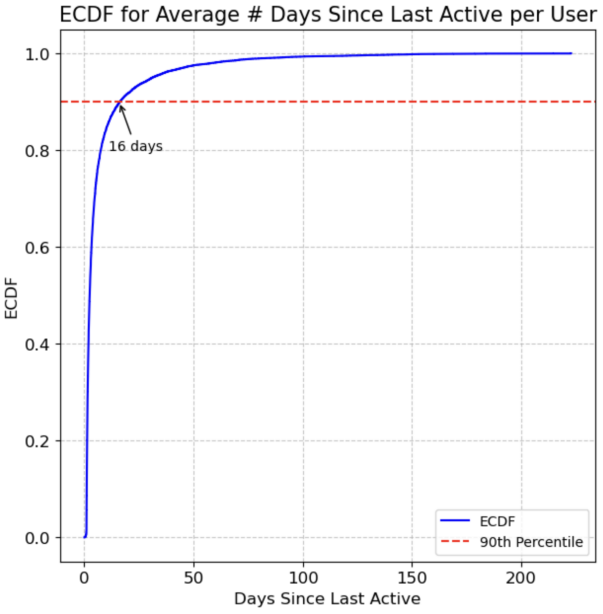
1. I first analysed the number of days between two active days following each other for each user. The ECDF *(Empirical Cumulative Distribution Function)* on the right shows the cumulative proportion of users against the number of days between two active days. It helps us understand the distribution of user activity. The ECDF reveals that 90% of all number of days between two active days are 4 days or less. However, this means that if we use the top 90th percentile as our cut-off, we would set a very small threshold of 4 days, which is too strict to accurately identify churn risk.



2. 4-days cut-off might be caused by the frequent use of the app by a large number of users. To investigate this, I checked the distribution of user activity with a histogram. The histogram on the right shows that a significant portion of users are highly active, which biases the cut-off point downwards. This heavy use by many users leads to an underestimation of the appropriate churn threshold.



3. To address this, the number of days since last active day for each active day of each user is averaged, and the 90th percentile re-evaluated and plotted here in the ECDF for average number of days since last active per user. This gave a more balanced cut off point of 16 days.



- The 16-day cut-off provides a balanced and accurate threshold for identifying users at risk of churning, based on the 90th percentile of the average number of days since the previous active day.
    - **Pros:** Mitigates bias from highly active users and offers a more accurate measure of engagement and retention risk.
    - **Cons:** May miss some users on the verge of churning but not yet at the 16-day mark.
- **Recommendation for Improved Churn Definition:**

- Experiment with other cut-off points to validate its effectiveness, and
- Consider current business goals and risk appetite to make adjustments as needed. *For example*, if the business does not have an objective for reducing user churn and focusing more on cutting down communication frequency with the users, 95th percentile can be used which is at 31 days.

Candidate Metrics for Engagement & Retention

POTENTIAL METRIC	DEFINITION	REASONING	PROS	CONS
DAU, WAU or MAU	Number of active users in a day, week or month	Basic measure of active users	✅ Simple to calculate ✅ Widely understood	❌ Does not distinguish between levels of engagement
Ratio of MAU to All Users	Ratio of monthly active users to total users	Direct measure of engagement	✅ Simple to understand ✅ Normalised against hyper growth phase and growing user base as it's a ratio ✅ Captures all product related activity, instead of focusing on a specific feature ✅ Detailed enough for mid-level management/leadership	❌ Does not account for retention ❌ New users may inflate numbers
Ratio of DAU to MAU	Ratio of daily active users to monthly active users	Measures stickiness, indicating how often users return	✅ Good indicator of stickiness but not repeat use	❌ May not capture depth of engagement ❌ Can fluctuate due to usage
Onboarding Engagement (D0D7 or D0D30)	Ratio of users active in the first week/month after signup	Measures success of onboarding experience	✅ Early indicator of potential long-term retention	❌ May not reflect long-term engagement or retention

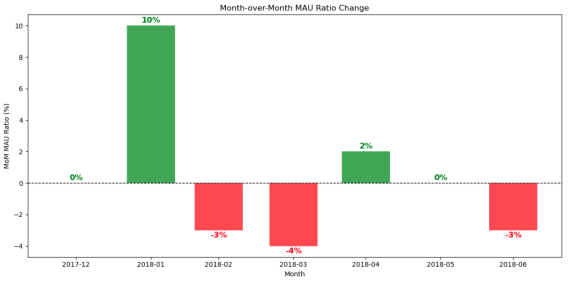
POTENTIAL METRIC	DEFINITION	REASONING	PROS	CONS
Lness n/30	Ratio of users that use the product at least twice in a 30-day period	Measures stickiness and retention of already engaged users	✅ Combines aspects of engagement and retention ✅ Great detailed view of engagement product manager level to take up quick actions and strategise ✅ Normalised against hyper growth phase and growing user base as it's a ratio	❌ May not capture depth of engagement ❌ Averages all users so power users and borderline healthy-engaged users will be bucketed.
DoD, MoM, YoY Change in Active Users	Change in the number of active users day-on-day, month-on-month, year-on-year	Tracks growth and retention over time	✅ Helps identify trends and seasonal effects ✅ Direct detection of any change ✅ At-a-glance metric, great for senior leadership	❌ Does not capture individual user engagement
DoD, MoM, YoY Change in Daily MAU Ratio	Change in the ratio of active users day-on-day, month-on-month, year-on-year	Tracks engagement growth over time	✅ Helps identify trends and seasonal effects ✅ Direct detection of any change ✅ At-a-glance metric, great for senior leadership ✅ Normalised against hyper growth phase and growing user base as it's a ratio	❌ Does not capture individual user engagement ❌ Does not capture individual user engagement
Transaction Frequency	Average number of transactions per user in a given period	Indicates active use of banking services	✅ Direct measure of core functionality usage	❌ May not capture other forms of engagement

POTENTIAL METRIC	DEFINITION	REASONING	PROS	CONS
				❌ More of a business / finance related metric instead of measuring product itself.

Selected Metrics

Following the evaluation of candidate metrics, three key metrics tailored to different levels within the organisation are selected. These selected metrics are designed to provide actionable insights and facilitate strategic decision-making, ensuring that each level of management has the appropriate tools to monitor and enhance user engagement effectively. Below, are the chosen metrics along with their definitions, rationale, pros, cons, and tracking methods, supported by visual representations to illustrate their practical application.

- **L0 Metric: MoM Change of MAU Ratio**
  - **Purpose:** This metric provides senior leadership with a high-level overview of user engagement trends, identifying significant month-over-month changes in the ratio of Monthly Active Users (MAU) to total users.
  - **Definition:** Measures the Month-over-Month change in the ratio of Monthly Active Users (MAU) to total users.
  - **Owner:** Senior leadership
  - **Pros:** Identifies trends and seasonal effects, directly detects changes, and is normalised against hyper-growing user base growth as it's a ratio.
  - **Cons:** Does not capture segment or individual user engagement.



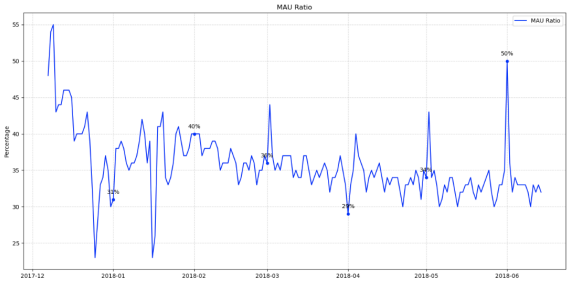
Usage

- **Trend Identification and Strategic Decisions:** By monitoring the MoM Change of MAU Ratio, senior leadership can quickly identify changes in engagement. For example, a significant drop in the MoM Change of MAU Ratio might prompt an investigation into potential issues such as a recent feature release causing user dissatisfaction. Conversely, a positive spike could indicate a successful marketing campaign or product launch, prompting further investment in those areas. This metric serves as an

- **Tracking:** Automated dashboards and monthly reports for senior leadership.

early warning system, enabling senior leadership to make strategic decisions and allocate resources effectively.

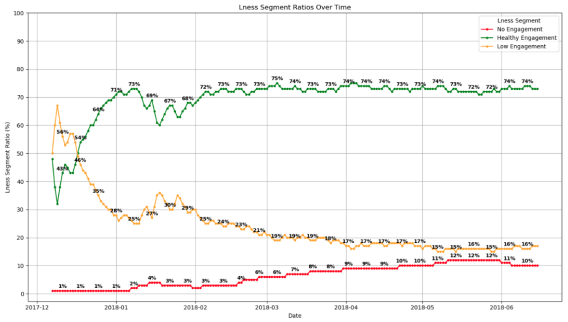
- **L1 Metric: MAU Ratio by Day**
  - **Purpose:** This metric offers insights for general managers and senior management to monitor daily engagement patterns, providing a more granular view of user activity.
  - **Definition:** The ratio of Monthly Active Users (MAU) to total users, calculated daily.
  - **Owner:** General managers, senior management
  - **Pros:** Simple to understand, normalised against hyper-growing user base growth, captures engagement activity, detailed enough for mid-level management.
  - **Cons:** Does not account for retention; campaigns, offerings and similar may inflate numbers.
  - **Tracking:** Automated dashboards and daily/weekly reports for general managers and senior management.



Usage

- **Daily Monitoring and Quick Response:** By tracking the Daily MAU Ratio, managers can observe day-to-day fluctuations in user engagement and quickly identify any anomalies or trends. For instance, if there is a sudden drop in daily MAU, it might indicate an issue with app performance or user dissatisfaction with a recent update. Managers can then respond rapidly by investigating and resolving the issue. This metric also helps assess the effectiveness of marketing campaigns or product launches. For example, a spike in daily MAU following a new feature release can signal its success, while a lack of change might prompt a reevaluation of the feature's appeal.

- **L2 Metric: Lness 2+/30 Ratio by Day**
  - **Purpose:** This metric provides a granular view of user engagement for product managers and squads enabling to take quick actions, segmenting users into three groups based on their activity levels over the last 30 days.
  - **Definition:** A ratio over time of users segmented into three groups:
    - No Engagement (*0 active days*),
    - Low Engagement *(1 or 2 active days)*, or
    - Healthy Engagement *(more than 2 active days*), in the last 30 days.
  - **Rationale:** The cut-off point of 2 active days was determined based on the 25th percentile of active days per active user. Additionally, using the churn definition, it is found that 15% of users with 1 or 2 active days have churned, while only 0.08% of users with more than 2 active days have churned.
  - **Owner:** Product managers, cross-functional teams, squads
  - **Pros:** Combines engagement and retention aspects, normalised against user base growth, detailed for product managers.
  - **Cons:** May not capture depth of engagement, averages all users, potentially misclassifying power



Usage

- **Segment Analysis and Targeted Interventions:** By analysing the Lness segment ratios, product managers can identify which user segments are growing or shrinking over time. For example, if the Low Engagement segment is increasing, it might indicate a rising churn risk, prompting re-engagement campaigns such as personalised emails or in-app notifications. Conversely, an increase in the segment with more than 2 active days might highlight the success of recent product enhancements, encouraging further development in those areas. This metric helps ensure the overall health of the user base by enabling product teams to implement targeted interventions and make data-driven product improvements.

users and borderline healthy-engaged users.

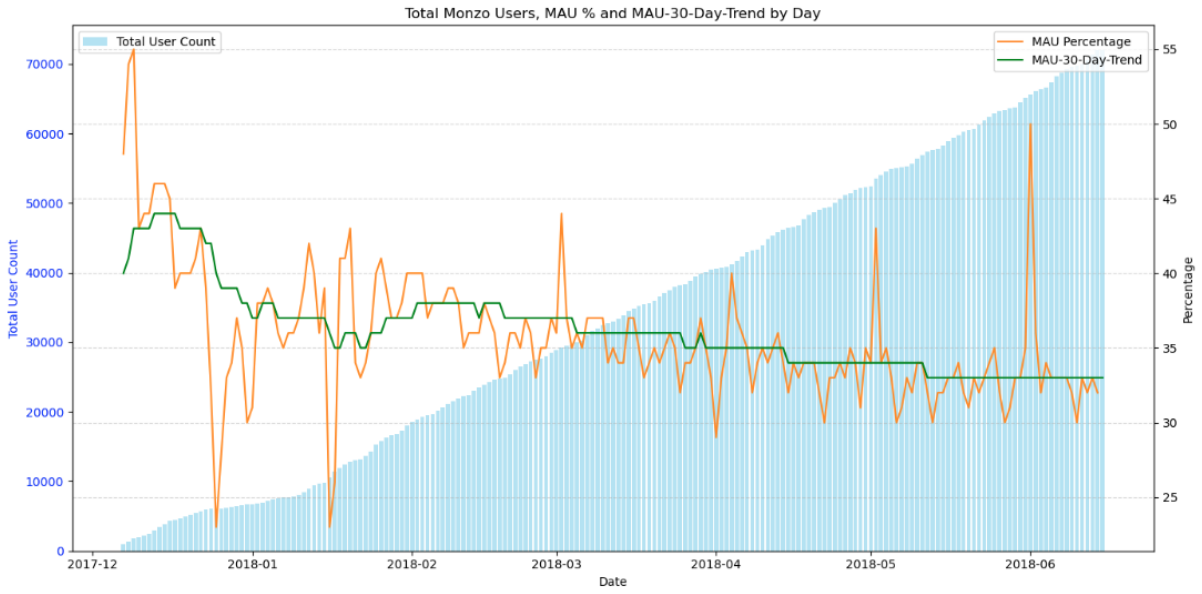
- **Tracking:** Automated dashboards and daily reports for product managers and squads.

User Engagement Over Time

To analyse user engagement over time, only the last 6 months of available data is taken into consideration, as prior to this period, the user base only has 1000 users, consisting of "Innovators" according to the Diffusion of Innovation Theory. They are very enthusiastic, potentially employees included and leading to highly fluctuating and unrepresentative engagement patterns. By examining last 6 months, a more stable and representative period is captured, during which the user base grew signigicantly from 1,000 to 70,000+ users.

Overview

- To provide a comprehensive overview, below chart includes total Digibank users, MAU percentage and rolling 30-day MAU percentage *(highlighting seasonality),* all by day for the last six months This chart showcases the overall user base growth alongside the decreasing MAU percentage.

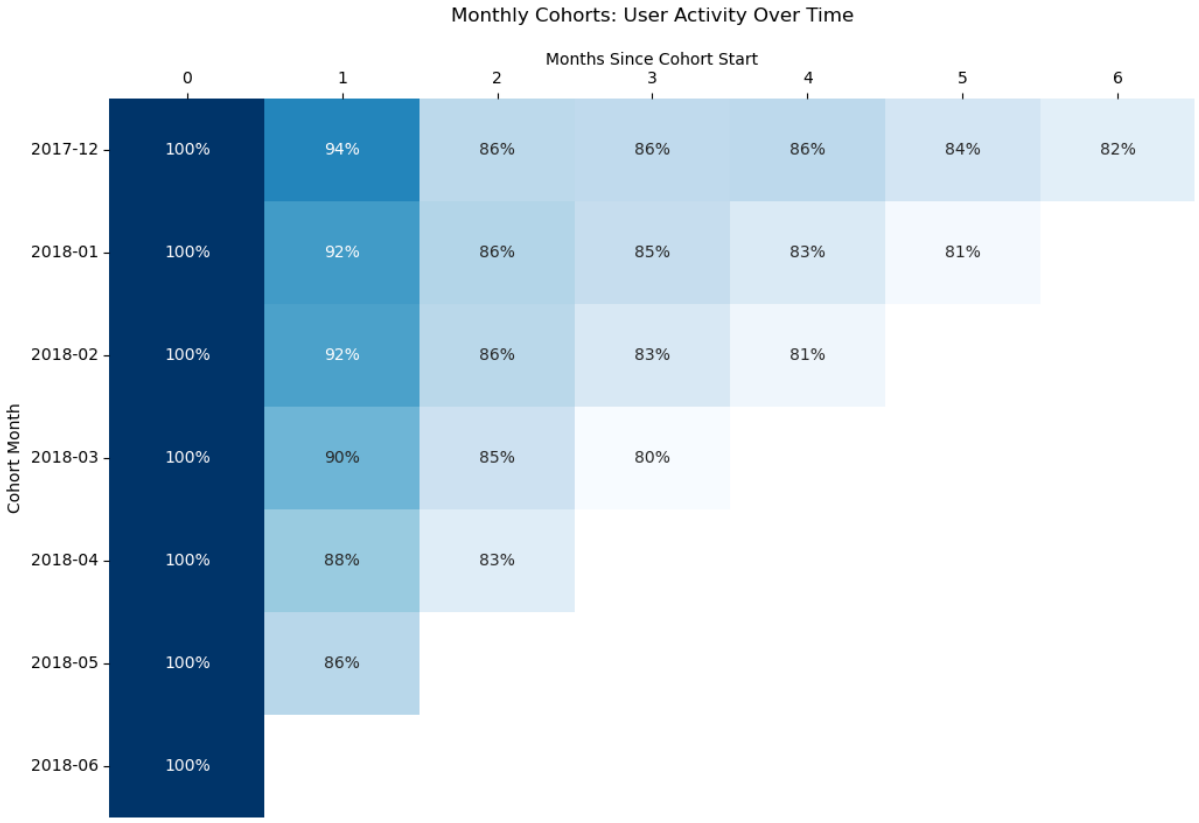


Cohorts

Below cohort charts shows the activity rates and survival (retention) rates for users who signed up each month from December 2017 to June 2018, tracking their activity and churn over the subsequent months.

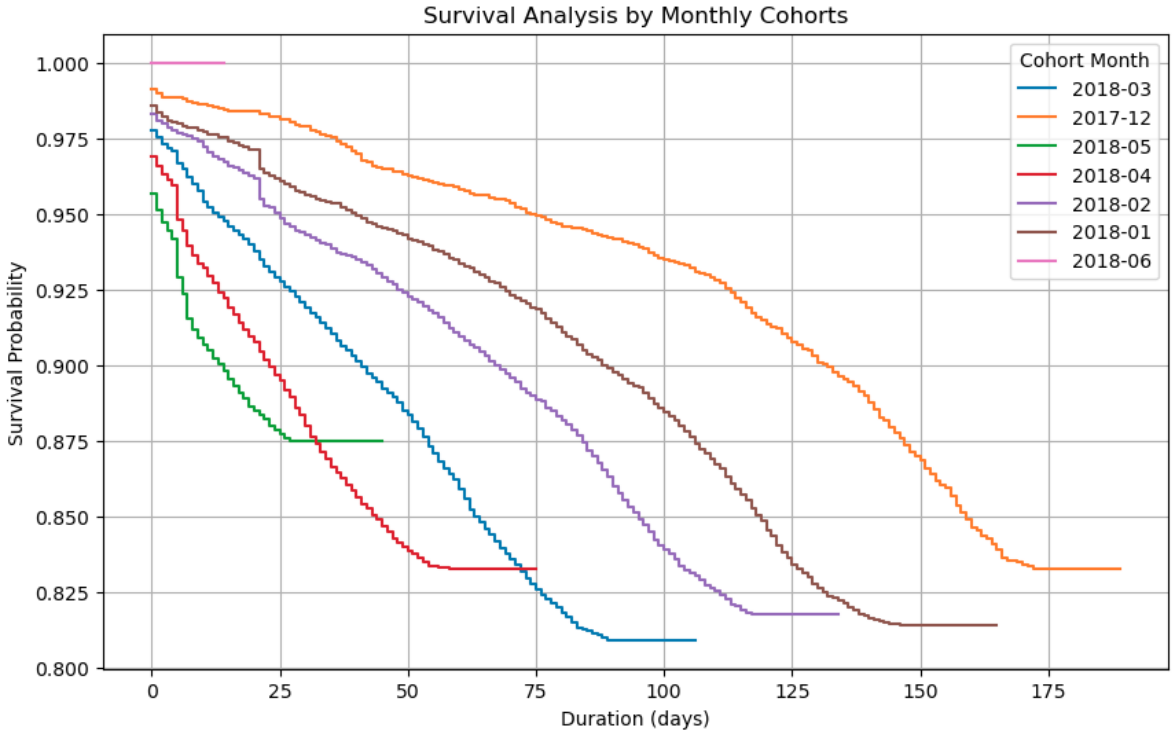
Monthly Cohorts Activity

- **First Month Retention:** The retention rate in the first month has been dropping, from 94% for the December 2017 cohort to 86% for the May 2018 cohort. This trend indicates that as the user base grows, **Digibank's user base starts including users who are less active or do not come back** after activating. The same downward trend applies to the 2nd, 3rd, 4th, and 5th months, though the specific retention rates vary. This further emphasizes the need to focus on improving early user engagement and retention.



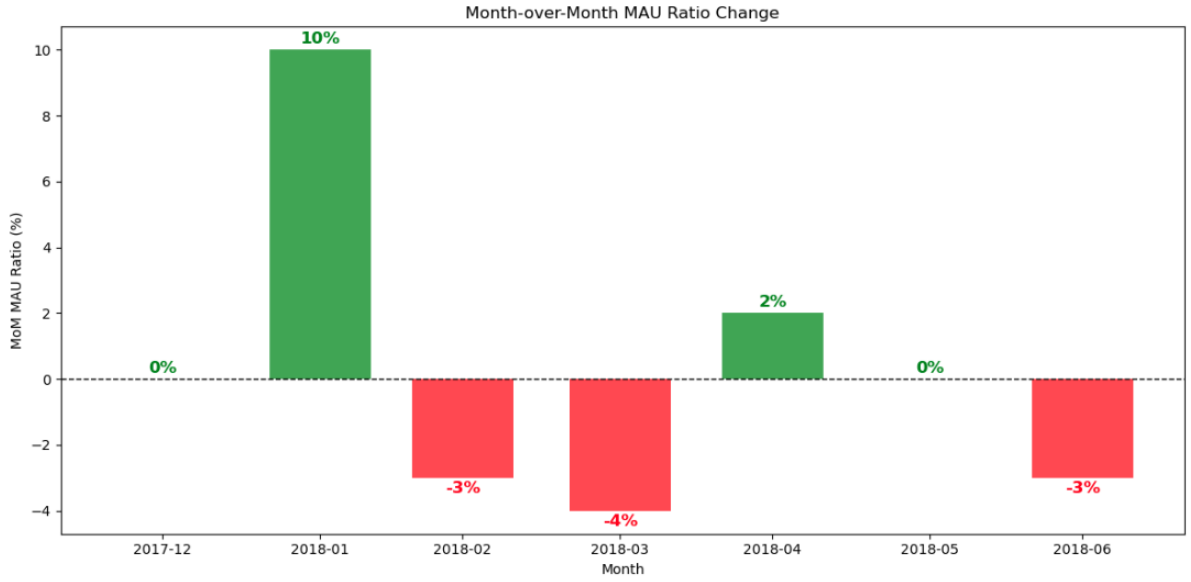
Monthly Cohorts Survival Analyis & Curves

- **Survival Trends:** The survival analysis shows that the December 2017 cohort is the most likely to survive the first month, followed by the December 2018 cohort, and then the January 2018 cohort. This represents a standard d**ownward trend in survival (retention) over time**, highlighting the increasing challenge of retaining new users as the user base expands.



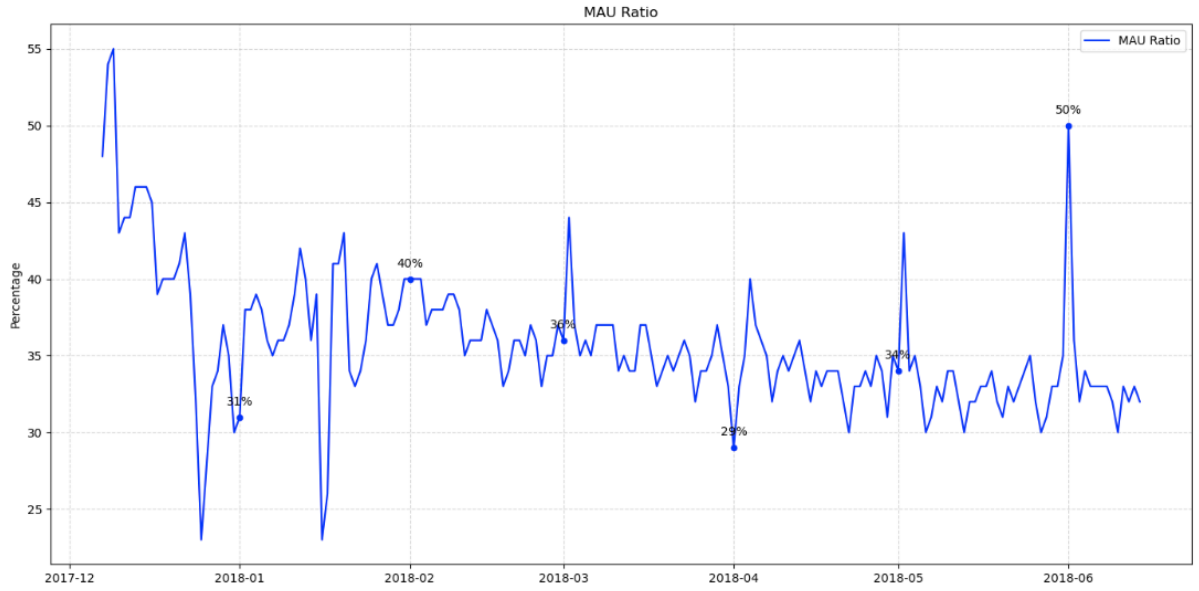
L0 Metric: MoM Change of MAU Ratio

- This metric shows a mix of positive and negative fluctuations and indicates **periods of both growth** **and** **decline in user engagement**, and points to a need for continuous monitoring and timely interventions to sustain user engagement.



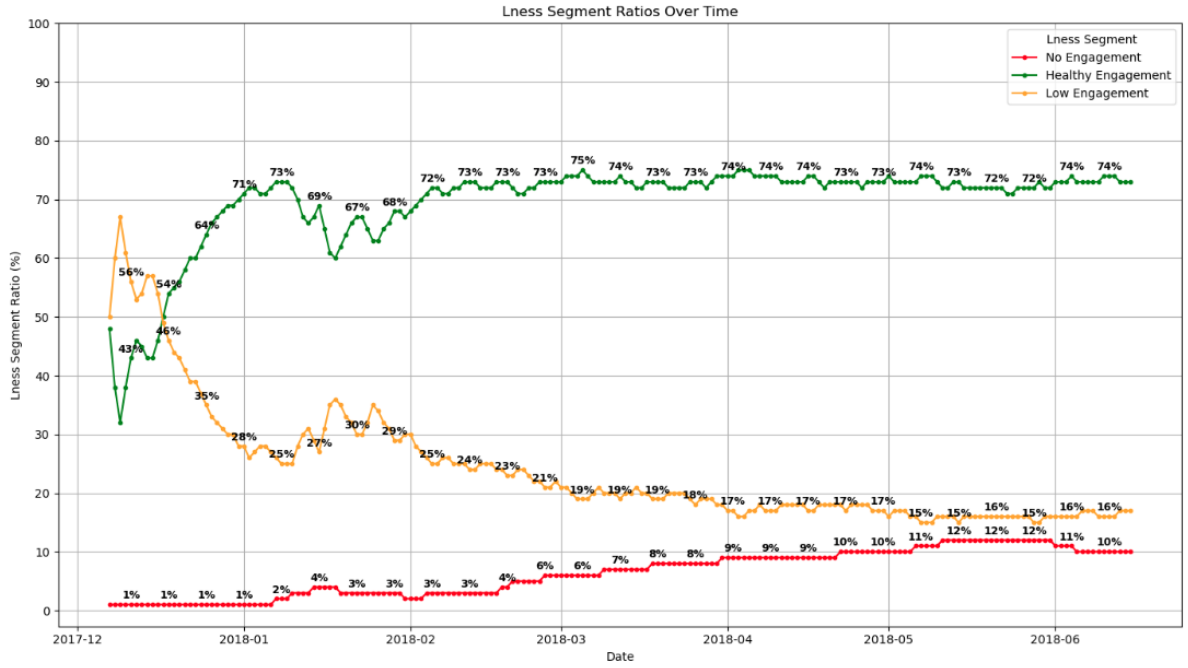
L1 Metric: Daily MAU Ratio

- This metric reveals **a gradual decline in user engagement**, with the ratio decreasing from 35-40% to 30-35% over the past six months. This trend suggests that, despite the growing user base, the proportion of active users is gradually decreasing. Weekly fluctuations, with peaks on Fridays and lows on Sundays, indicate higher engagement towards the end of the workweek, possibly due to users managing their finances before the weekend. These insights can help in scheduling targeted campaigns and feature releases to boost engagement during low-activity periods with the help of A/B tests.



L2 Metric: Lness 2+/30 Ratio by Day

- Healthy Engagement segment has increased from the 50%s to 72-75%, indicating that a significant portion of users are highly engaged. However, while High Engagement was relatively stable during the last months, Low Engagement segment has decreased from the 25%s to 16%s, while the No Engagement segment has increased from 3-4% to 10-12%. This shift suggests that **while many users are becoming more engaged**, a **growing number are disengaging entirely.**


Lness Segment Ratios Over Time
Lness Segment
No Engagement
Healthy Engagement
Low Engagement
Lness Segment Ratio (%)
Date
2017-12
2018-01
2018-02
2018-03
2018-04
2018-05
2018-06

💡 **Takeaway**

Overall, the metrics indicate that Digibank's user engagement is experiencing mixed trends during a period of rapid user base expansion.
While there are positive signs of increased healthy engagement, the **overall decline in the Daily MAU Ratio and the rise in the no engagement segment are areas of concern.**

Recommendations

- **Investigate Underlying Causes:** Conduct thorough analysis to identify the root causes of declining engagement and address any user pain points or issues.
- **Leverage A/B Testing and Experiments:**
  - **Implement Re-engagement Strategies:** Develop targeted re-engagement campaigns for inactive users, such as personalized emails, push notifications, or in-app messages.
  - **Enhance User Experience:** Improve the app by adding new features, optimizing user experience, and addressing user feedback to retain highly engaged users.

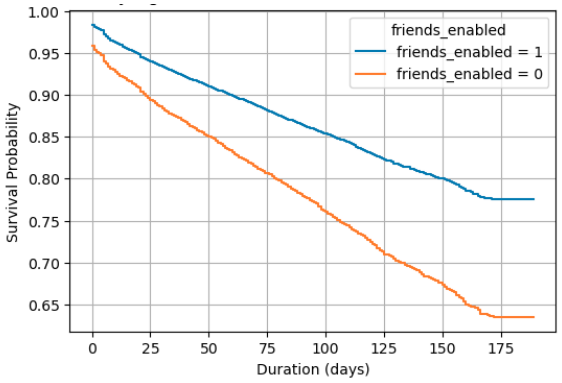
Segment Analysis

To identify which segments of Digibank users are more likely to be engaged and retained, various user attributes and their impact on retention are analysed using survival curves and statistical significance for churn ratios. This analysis is also based on the last 6 months of available data to avoid fluctuations driven by “Innovators” Digibank users.

- **Survival Analysis:** A statistical method to analyse the expected duration of time until an event (e.g., churn) occurs. Survival curves are graphical representations of survival analysis showing the probability of survival (retention) over time, allowing comparison between different groups until event.

1. Hypothesis: Users with Friends Enabled Are Likelier to be Retained Longer

- The survival analysis indicates that **users who have enabled this feature are likelier to be retained longer**. The survival curves for this attribute are statistically significant ($p < 0.05$).
- The **churn ratio for users with friends enabled is 13%, compared to 22% for users without this feature,** which is also statistically significant ($p < 0.05$).

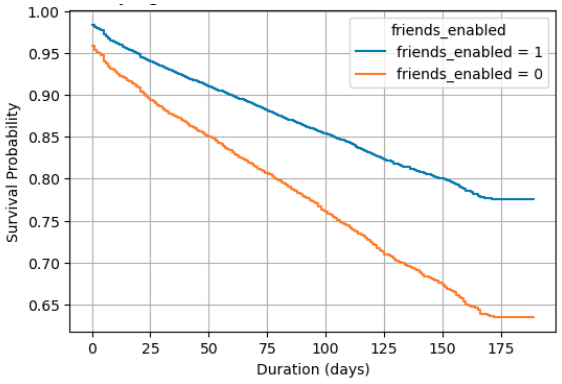


Segment	Churn Ratio
Friends Enabled	13%
Friends Not Enabled	22%

2. Hypothesis: Users Who Upload Profile Photos Are Likelier to be Retained Longer

This attribute can be taken as a signal of onboarding experience for understanding engagement.

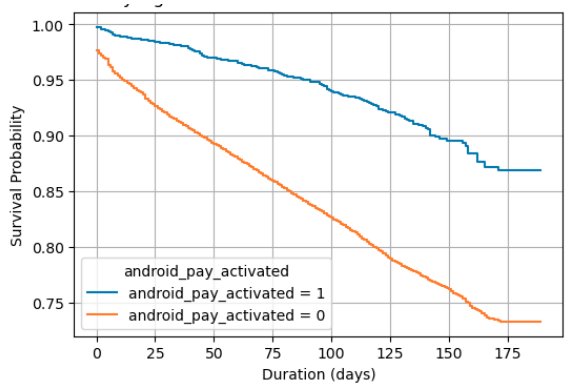
- The analysis reveals that **users who upload profile photos are likelier to be retained longer**, and the survival curves are statistically significant ($p < 0.05$).
- The **churn ratio for users who have uploaded a profile photo is 6%, compared to 16% for those who have not,** and this difference is statistically significant ($p < 0.05$).



Segment	Churn Ratio
Profile Photo Uploaded	6%
Profile Photo Not uploaded	16%

3. Hypothesis: Users Who Activate Android Pay Are Likelier to be Retained Longer

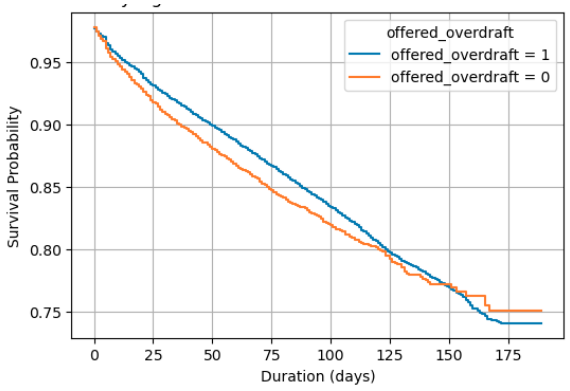
- The survival analysis shows that **users who activate Android Pay are likelier to be retained longer,** and the survival curves are statistically significant ($p < 0.05$).
- The **churn ratio for users who have activated Android Pay is 7%, compared to 15% for those who have not,** and this difference is statistically significant ($p < 0.05$).



Segment	Churn Ratio
Android Pay Activated Uploaded	7%
Android Pay Not Activated	15%

4. Hypothesis: Users Offered Overdraft Are Likelier to be Retained Longer

- Survival analysis indicates that **users who are offered an overdraft are likelier to survive longer**, **but the difference is minimal**. While the survival curves are statistically significant ($p < 0.05$), **the practical significance may be limited**.
- The churn ratio for **users offered an overdraft is 15%, compared to 12% for those not offered**, and this difference is statistically significant ($p < 0.05$).

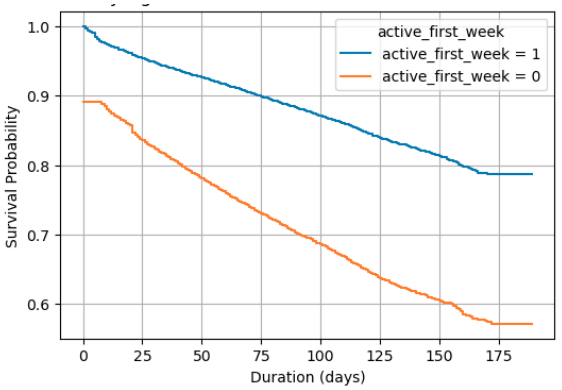


Segment	Churn Ratio
Offered Overdraft	15%
Not Offered Overdraft	12%

5. Hypothesis: Users Active in Their First Week Are Likelier to be Retained Longer

This is a good signal for onboarding experience and its future impact on retention.

- The survival analysis shows **if a user has been active in the first week after activating their account, they are likelier to survive longer,** and the survival curves are statistically significant ($p < 0.05$).
- The **churn ratio for users active in their first week is 11%, compared to 29% for those who are not**, and this difference is statistically significant ($p < 0.05$).

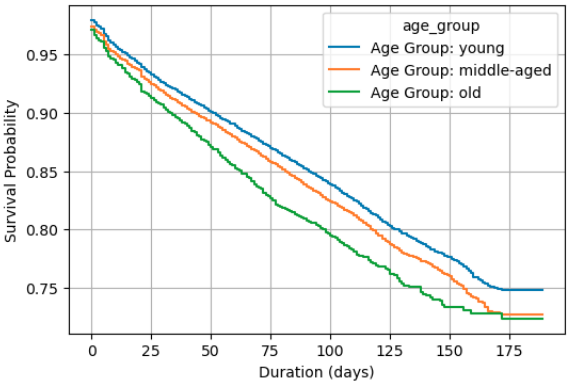


Segment	Churn Ratio
Active First Week	11%
Not Active First Week	29%

6. Hypothesis: Younger Users Are Likelier to be Retained Longer

The age groups are defined as 18 to 30 (young), 30 to 50 (middle-aged), and 50 and above (old).

- The survival analysis indicates that younger users are likelier to survive longer than middle-aged users, who in turn are likelier to survive longer than older users. The differences between these groups are not enormous, but the survival curves are statistically significant ($p < 0.05$), and the difference might be practically significant especially between young and old users.
- The **churn ratios for these groups are as follows: Young (14%), Middle-Aged (16%), Old (17%)**, and the differences are statistically significant ($p < 0.05$).



Segment	Churn Ratio
Young	14%
Middle Aged	16%
Old	17%

Recommendations

Based on above insights, following recommendations are provided to increase user retention and engagement.

1. Enhance Onboarding Experience

Objective: Reduce the high churn rate among users by improving onboarding experience.

Rationale: Users who are active in their first week have a significantly lower churn rate (11%) compared to those who are not (29%). Similarly, users who upload a profile photo, which can be an indicator of better onboarding experience, have a lower churn rate (6%) compared to those who do not (16%). Improving the onboarding experience can capitalize on these insights to boost early engagement and retention.

Possible Strategies:

- **Enhanced Onboarding Flow:** Simplify the onboarding process to remove friction points..
- **Welcome Campaigns:** Implement in and out of product notifications to guide new users.
- **Profile Completion Prompts:** Send notifications to prompt users to complete their profile.
- **Incentives for Early Engagement:** Offer incentives such as cashback, discounts, rewards, or gamify onboarding by introducing elements like badges or points for completing specific actions during onboarding period.

Experimentation:

- A/B test different onboarding flows, welcome campaigns, prompts and incentives.

2. Leverage Social Features

Objective: Increase user retention by encouraging social interactions within the app.

Rationale: Users who enable friends on Digibank feature have a lower churn rate (13%) compared to those who do not (22%). Encouraging social interactions can enhance user engagement and retention.

Strategies:

- **Increase Feature Awareness:** Promote the benefits of enabling friends to be seen on Digibank, such as easier peer-to-peer payments and social engagement.
- **Referral Programs:** Start a referral program that reward users for inviting friends to join Digibank.
- **Community Building:** Personal finance comes with many taboos that people cannot have conversations about. Foster communities with anonymous users through social features, like group savings or shared financial goals.

Experimentation:

- A/B test different campaigns, referral incentives and community-building features.

3. Deprioritise Overdraft Offers

Objective: Allocate resources more effectively by deprioritizing features with minimal impact on retention.

Rationale: The difference in churn rates between users offered overdrafts (15%) and those not offered (12%) is minimal compared to other segments and might not be practically significant relatively. Resources can be better allocated to higher-impact features. However, continuously monitor the impact of overdraft offers as need based on feedback and data.

Next Steps

- **Diversify Activity Definition:** Develop clear definitions for different types of user activities, such as app usage (e.g., app opens) and banking services (e.g., transactions).
- **Refine Churn Definition:** Create a more detailed definition of churn to better understand when users are becoming inactive.
- **Improve Lness Cut-off Points:** Update the Lness cut-off points, currently based on the 25th percentile, using advanced analysis to make them more accurate for different user groups or even individual users.
- **Analyse Effect of Combined Features/Segments:** Study how different user attributes, like age and onboarding experience, work together and impact retention.
- **Deep Dive into Segment-specific Strategies:** Develop specific strategies for different user groups to improve engagement and retention.
- **Implement Longitudinal Studies:** Track user behavior and engagement over longer periods to identify trends and patterns.
- **A/B Testing for Onboarding Improvements:** Test different onboarding processes to find the most effective ways to engage new users..
- **Develop Predictive Models:** Create models to predict user behavior and identify users who are at risk of becoming inactive.