CGAP CUSTOMER BEHAVIOR DASHBOARD LIBRARY: INSTRUCTIONS FOR DATA EXTRACTION, ANALYSIS AND VISUALIZATION

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1. Introduction

This is a companion document to the CGAP Technical Note Business Intelligence: A Bedrock of Successful Digitization in Microfinance and the tutorial video Data Analytics Journey. The Technical Note presents customer behavior dashboards and scenarios that illustrate how to interpret the dashboards. As a companion resource, this document includes a library of dashboards MFIs can choose from. It also provides guidance on how to create the dashboards, including customer segmentation, data extraction and warehousing, data query, analysis, and visualization.

The graphics in this dashboard library are illustrative and do not reference a particular institution.

2. Preparation: Segmentation

As a first step, customer segmentation is key. The main segmentation in this CGAP dashboard library is between digital and traditional customers. If possible, digital customers can be further segmented into 2 groups—customers who were digital customers form the start and customers who became digital customers later.

In our definition, once a customer becomes a digital customer, they remain a digital customer forever. Customers can only switch from being traditional to digital and not the other way around.

The dashboards refer to the following 2 approaches for segmentation of digital customers:

Approach 1	
Traditional	Digital
Customer who has only engaged with the institution as a traditional customer	Customer who has at least once engaged with the institution as a digital customer

Approach 2		
Traditional	Digital	
	NTB - New to Bank (Institution)	ETB - Existing to Bank (Institution)
Customer who has only engaged with the institution as a traditional customer	Customer who has engaged with the institution as a digital customer from the start	Customer who initially engaged with the institution as a traditional customer and then became a digital customer

Typically, the definition of digital vs traditional is based on the channel used by the customer to transact with the institution.

Traditional
- Traditional channels
  - Branches
  - Loan officers' visits

Digital
- Digital channels
  - Bank transfer
  - Digital wallet transfer
  - Agent banking
  - Mobile app
  - Internet banking
  - USSD channel

Sample output tables

Approach 1	
Customer ID	Segment Flag
A004793741	Digital
A013642514	Traditional
…	…
A018423402	Traditional

Approach 2			
Customer ID	Segment Flag	First Account Opened Month	First Digital Channel Engagement Month
A013893741	ETB	2020-01-07	2022-07-27
A017446131	NTB	2021-09-05	2021-09-05
…	…		…
A038445140	Traditional	2019-04-19	N/A

Query tips

It is recommended to create the query that separates digital vs. traditional customers and puts the output in a separate (or temporary) table so that in the follow-up dashboards that use the definition, the analyst can simply pull the temporary table rather than writing the query from the beginning. The temporary table should include the customer unique identifier, digital vs traditional flag, and ideally first account opened month and first digital channel engagement month.

The sample dashboards also segment clients by activity level, deposit balance, borrower segments (follow-up loan and first vs repeat borrower), and transaction type.

This CGAP dashboard library also uses the following additional segmentation:

Activity level
- 0 transactions per month (inactive clients)
- 1-2 transactions per month
- 3-4 transactions per month
- 5+ transactions per month (super users)

Deposit balance
- <$10
- $10-$100
- $101-$1,000
- >$1,000

Borrower segment
- Follow-up loan
  - 6-month follow-up loan
  - No 6-month follow-up loan

Transaction type
- Withdrawal
- Deposit payment
- Loan disbursement
- Loan repayment
- Other payment or transfer (Customer2Business (C2B), Business2Customer (B2C), Government2Person (G2P), Person2Government (P2G), Person2Person (P2P))

Examples:
- Transactions via traditional channels
  - Deposit via branch
  - Withdrawal via branch

- Transactions via digital channels
  - Mobile top-up
  - Mobile P2P transfer
  - Deposit via agent
  - Withdrawal via agent
  - Deposit payment via bank transfer or digital wallet transfer
  - Loan disbursement via bank transfer or digital wallet transfer
  - Loan repayment via bank transfer or digital wallet transfer

Borrower segment
- First vs repeat
  - First
  - Repeat

Institutions can use different ranges depending on their context. They can also adopt many more segmentations depending on their analytical needs (by income level, by gender, etc.) and use the dashboard library to analyze the behavior of their customers according to these segments.

3. Dashboard library

This library includes a range of dashboards (charts) for MFIs to track customer behavior, particularly in response to digital implementation.
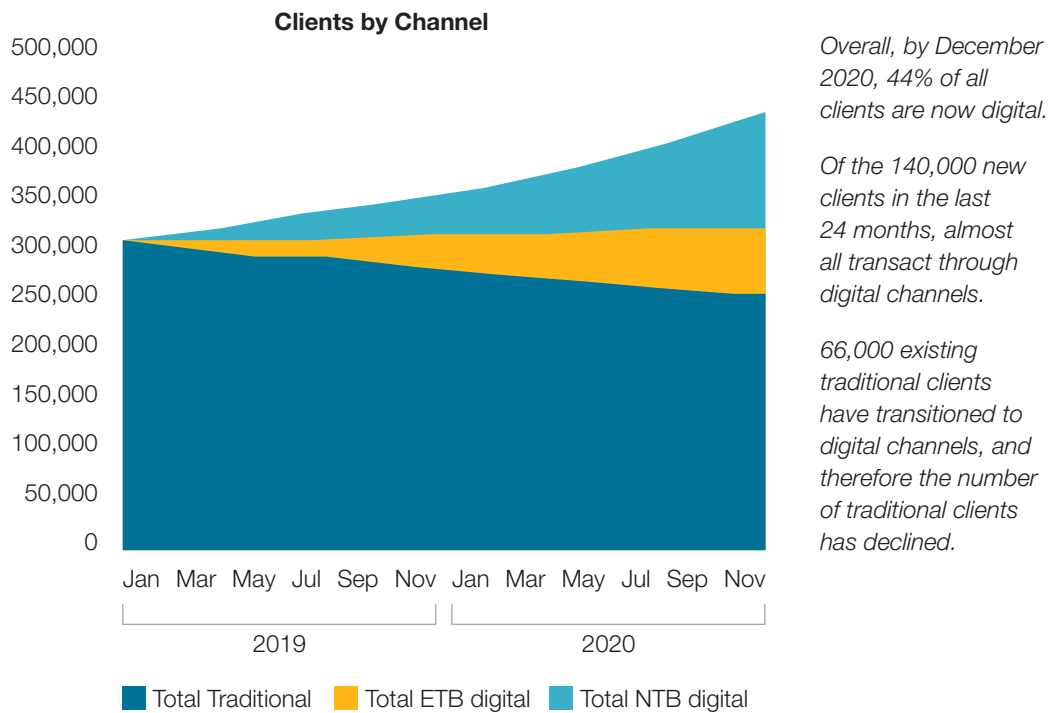
3.1. CLIENT GROWTH: CUSTOMER ACQUISITION BY CHANNEL

Description

Total customers acquired since the establishment of the institution (or as far as data is available), segmented by whether they use traditional or digital channels.

Business question

Is the customer base growing, and are existing and new customers adopting the digital products and channels?

Example

Clients by Channel

■ Total Traditional ■ Total ETB digital ■ Total NTB digital

Overall, by December 2020, 44% of all clients are now digital.

Of the 140,000 new clients in the last 24 months, almost all transact through digital channels.

66,000 existing traditional clients have transitioned to digital channels, and therefore the number of traditional clients has declined.

Sample output tables

Approach 1				
Acquisition Month	**Traditional** Customer Count (acquired for the month)	Cumulative **Traditional** Customer Count (running total since establishment)	**Digital** Customer Count (acquired for the month)	Cumulative **Digital** Customer Count (running total since establishment)
Jan-2021				
Feb-2021				
…				

Approach 2						
Acquisition Month	**Traditional** Customer Count (acquired for the month)	Cumulative **Traditional** Customer Count (running total since establishment)	**ETB** Customer Count (acquired for the month)	Cumulative **ETB** Customer Count (running total since establishment)	**NTB** Customer Count (acquired for the month)	Cumulative **NTB** Customer Count (running total since establishment)
Jan-2021						
Feb-2021						
…						

Query tips

- Use the temporary table created for the segmentation exercise to separate digital customers from traditional customers.
- Do not filter the time period in the query phase, your first row should be the month where the institution has started acquiring customers (collecting data). If not, the cumulative figures will be incorrect.
- Include all the customers acquired since establishment and the current inactive customers.

3.2. CLIENT TRANSACTION BEHAVIOR

There are two client transaction behavior dashboards: (i) activity levels, and (ii) customer journey.

3.2.1. Activity Levels

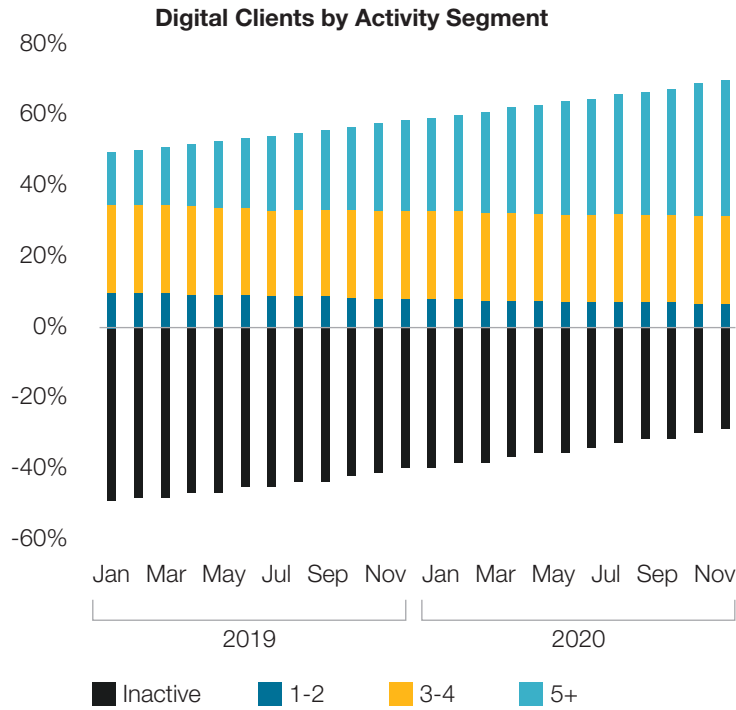**Description**

Total clients per month, segmented by activity level. In this example, we compare dashboards for traditional vs. digital clients.

Business questions

- How many transactions are clients doing in a given month and is that improving?
- How do digital clients compare to traditional clients?

Examples

Digital Clients by Activity Segment

Almost half of the active digital clients are conducting 5+ transactions per month, and this segment is growing.

Legend: ■ Inactive ■ 1-2 ■ 3-4 ■ 5+

Traditional Clients by Txn Segment
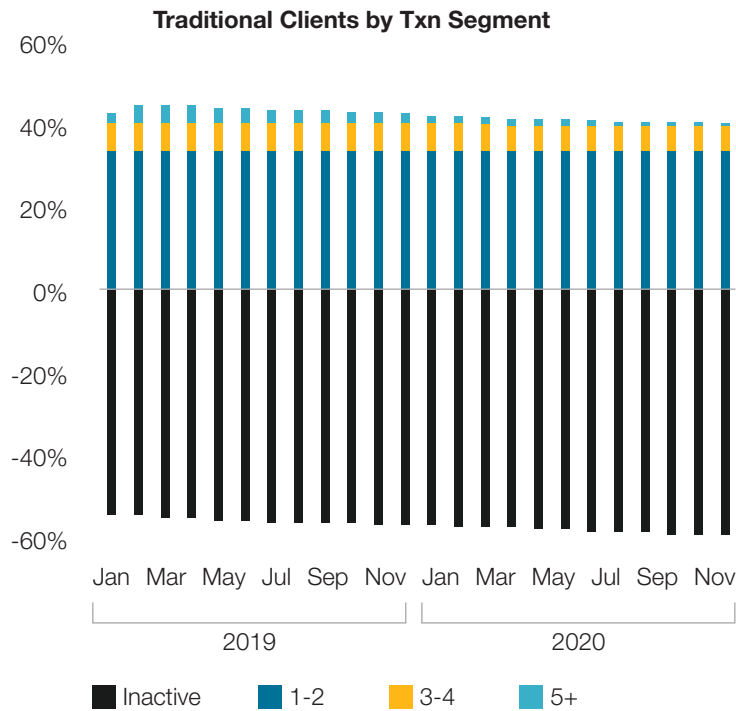
The percentage of active traditional clients has declined and 85% of traditional active clients only perform 1 transaction per month.

Legend: ■ Inactive ■ 1-2 ■ 3-4 ■ 5+

Sample output tables

Approach 1			
Month	Transaction activity bucket	**Traditional** Customer Count	**Digital** Customer Count
Jan-2021	0 Transaction		
Jan-2021	1-2 Transactions		
Jan-2021	3-4 Transactions		
Jan-2021	5+ Transactions		
Feb-2021	0 Transaction		
…	…		

Approach 2			**Digital** Customer Count	
Month	Transaction activity bucket	**Traditional** Customer Count	**ETB** Customer Count	**NTB** Customer Count
Jan-2021	0 Transaction			
Jan-2021	1-2 Transactions			
Jan-2021	3-4 Transactions			
Jan-2021	5+ Transactions			
Feb-2021	0 Transaction			
…	…			

Query tips

- Make sure your active customer count (all the buckets except for 0 transaction category) and inactive customer count (0 Transaction category), adding up together should tie to the total customer count as of last month in Client Growth: Customer Acquisition by Channel dashboard.
- Retrieve the transaction table without the accrual and interest posting transactions that are generated by the system. All the transactions you should be left with are monetary transactions, initiated by the customers.
- Aggregate using the month and unique customer identifier so that you get the table similar to Figure 1.

Figure 1: Transaction Active Customer List		
Month	Unique Customer Identifier	Monthly Transaction Count
Jan-2021	xxxx01	3
Feb-2021	xxxx02	7
…	…	…

- Use the temporary table created for the segmentation exercise to separate digital customers from traditional customers and combine it with Figure 1.

- Categorize the transaction count into respective buckets and you will get a table similar to Figure 2.

Figure 2: Transaction Active Customer List with Transaction Bucket

Month	Unique Customer Identifier	Segment	Monthly Transaction Count	Monthly Transaction Bucket
Jan-2021	xxxx01	Digital	3	3-4 Transactions
Feb-2021	xxxx02	Traditional	7	5+ Transactions
…	…	…	…	…
…	…	…	…	…

- Using Figure 2, you would be able to get the Figure 3 table by aggregating the transaction data.

Figure 3: Transaction Active Customer List with Transaction Bucket

Month	Monthly Transaction Bucket	No of Active Digital Customers	No of Active Traditional Customers	Total Transaction Active Customers
Jan-2021	3-4 Transactions	600	1,200	1,800
Feb-2021	5+ Transactions	500	1,800	2,300
…	…	…	…	…
…	…	…	…	…

- By aggregating Figure 3, you will be able to get total number of transaction active customers for both digital and traditional.
- Get total acquired customer count for each segment using the "Client Growth: Customer Acquisition by Channel" dashboard. You will be able to get Transaction Inactive Customer Count using the formula below and tag those customers as "0 Transactions" under the Monthly Transaction Bucket as shown in Figure 4.

(Total Acquired Customer Count) - (Total Transaction Active Customer Count) = (Transaction Inactive Customer Count)

Figure 4: Transaction Inactive Customer List with Transaction Bucket

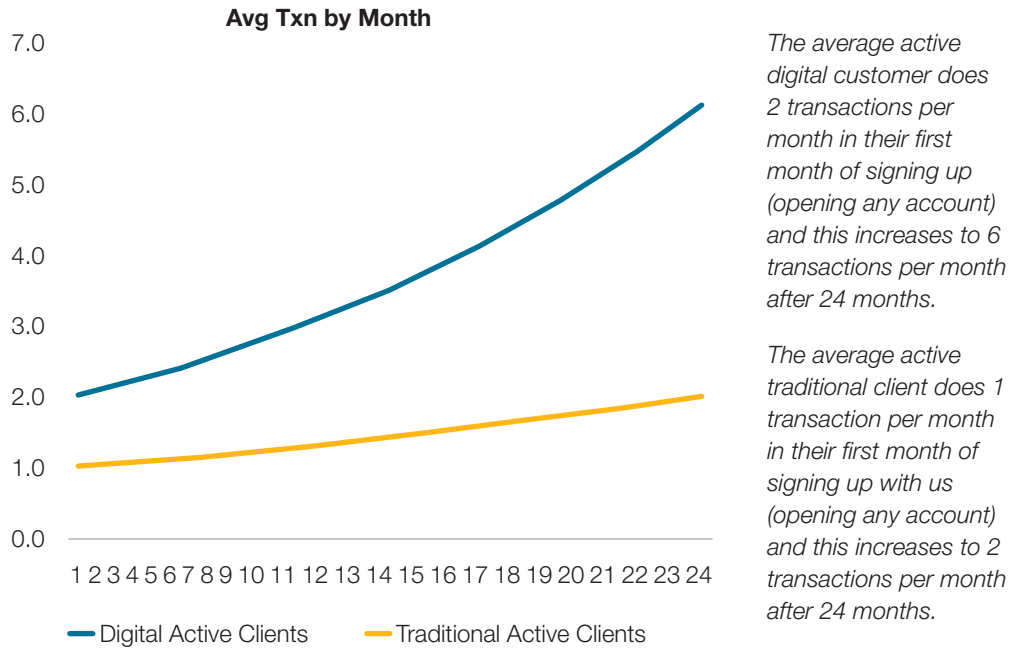| Month	Monthly Transaction Bucket	No of Inactive Digital Customers	No of Inactive Traditional Customers	Total Transaction Inactive Customers
Jan-2021	0 Transaction	400	200	600
Feb-2021	0 Transaction	700	400	1100
…	…	…	…	…
…	…	…	…	…

3.2.2. Customer Journey: Transaction Behavior

Description

Average activity level per client journey month, segmented by digital and traditional customers.

Business question

Do customers increase their monthly transaction activity after they sign up with us?

Example

Avg Txn by Month

The average active digital customer does 2 transactions per month in their first month of signing up (opening any account) and this increases to 6 transactions per month after 24 months.

The average active traditional client does 1 transaction per month in their first month of signing up with us (opening any account) and this increases to 2 transactions per month after 24 months.

Sample output table

Journey month	Average Monthly Transaction Count per month 3 (M3) Transaction Active Digital Customer	Average Monthly Transaction Count per M3 Transaction Active Traditional Customer
1		
2		

Query tips

- Retrieve the transaction table (without the accrual and interest posting and other transactions that are generated by the system), get monthly transaction count by using the unique customer identifier and transaction month.
- Aggregate using the month and unique customer identifier so that you get Figure 1.

Figure 1: Transaction Count		
Transaction Month	Unique Customer Identifier	Monthly Transaction Count
Jan-2021	xxxx01	3
Feb-2021	xxxx02	7
…	…	…

- Use the temporary table created for the segmentation exercise to separate digital customers from traditional customers.
- Get the first account opened month from the account table with unique customer identifier.
- After the above steps, you will get Figure 2 by combining the tables using the "Unique Customer Identifier" column.

Figure 2: Transaction Count by Segment

Transaction Month	First Account Opened Month	Unique Customer Identifier	Segment	Monthly Transaction Count
Jan-2021	Feb-2020	xxxx01	Digital	3
Feb-2021	Jan-2021	xxxx02	Traditional	7
…		…	…	…

- Calculate the journey month by taking Transaction Month minus First Account Opened Month.
- Create the temporary table with a list of customers (using Unique Customer Identifier as the unique value) who are active in their Journey Month 3 and name the temporary table as "Journey Month 3 Transaction Active Customers".
  - Note: This filter assumes that customers who are active in month 3 are active enough to be included in the segment of "active" clients for purposes of this customer journey dashboard. This means that the customer journey graph captures clients who become inactive in the later months but eliminates clients who are never active past journey month 2.
- Filter only Journey Month 3 active customers by using Figure 2 and the temporary table created above.
- You will then be able to get Figure 3 by aggregation. You will need to repeat the same for Traditional customers and join the tables to get the final output table.

Figure 3: Transaction Count by Journey Month for Journey Month 3 Active Digital Customers

Transaction Month (1)	First Account Opened Month (2)	Journey Month (1)-(2)	Total no of Transactions per month by M3 Transaction Active **Digital** Customers (3)	No of Transaction Active **Digital** Customers in Journey Month 3 (4)	Average Monthly Transaction per M3 Transaction Active **Digital** Customers (3)÷(4)
Jan-2021	Feb-2020	11	6000	1200	5
Feb-2021	Jan-2021	1	5000	1800	3
…	…	…	…	…	…

3.3. CLIENT DEPOSIT BEHAVIOR

There are two client transaction behavior dashboards: (i) deposits by balance, and (ii) customer journey.

3.3.1. Deposit Customers by Deposit Balance

Description

Total clients per month, segmented by activity level. In this example, we compare dashboards for traditional vs. digital clients (ETB and NTB).
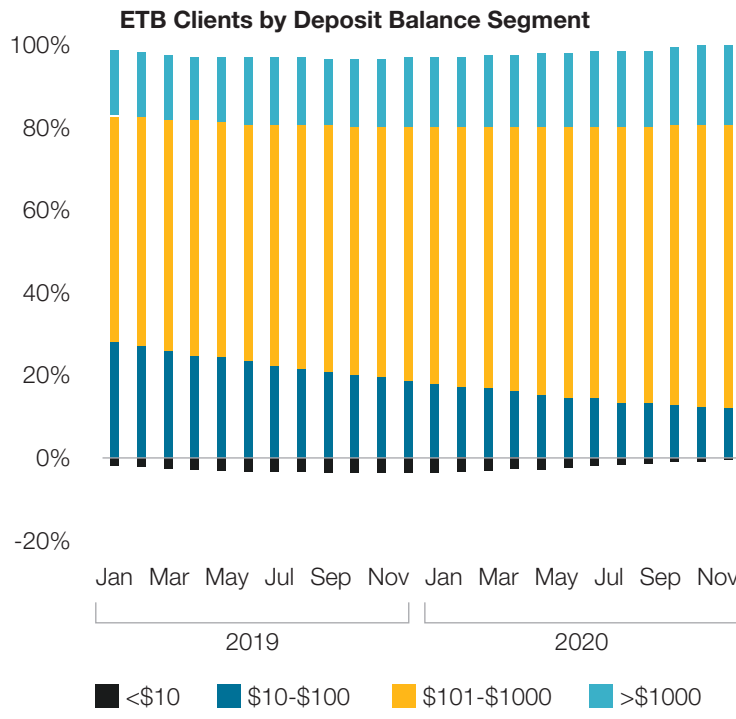
Business questions

- What is the distribution of depositors?
- Do we have many small depositors, or a few large depositors?
- And how does this compare between digital and traditional clients?

Examples

Traditional Clients by Deposit Balance Segment

Legend: ■ <$10 ■ $10-$100 ■ $101-$1000 ■ >$1000
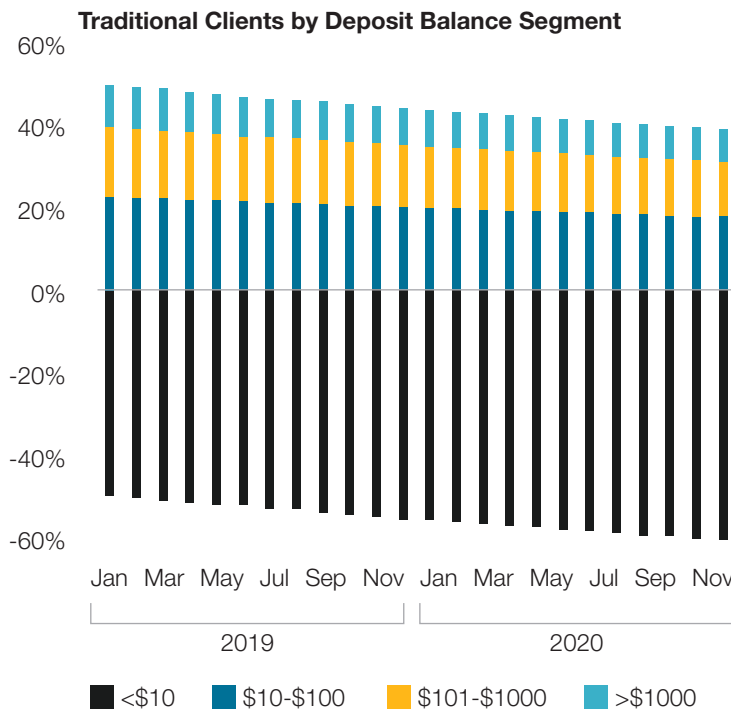
The distribution of traditional deposit clients has trended downward as the more active traditional clients migrate to digital.

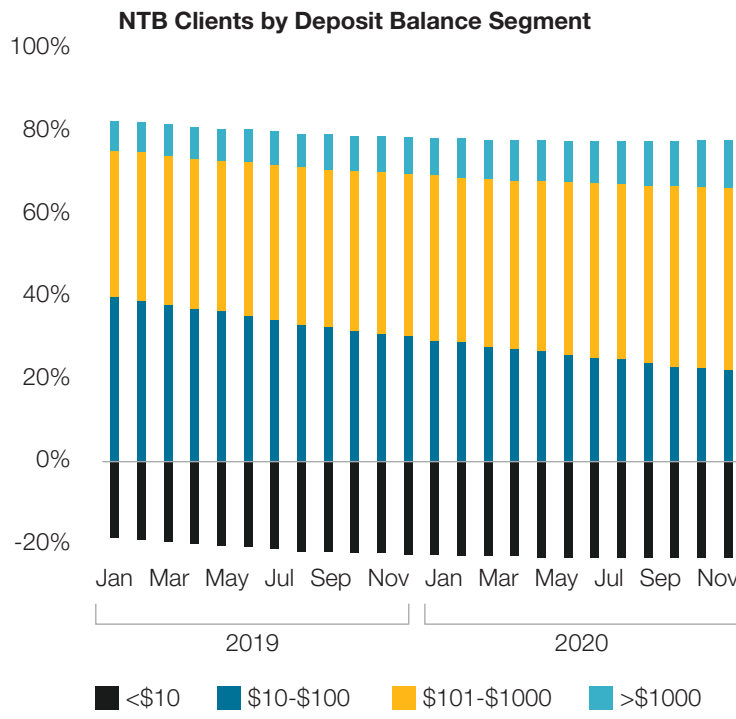*There is a significant segment of legacy traditional accounts that are inactive.*

ETB Clients by Deposit Balance Segment

Jan Mar May Jul Sep Nov | Jan Mar May Jul Sep Nov

2019 | 2020

■ <$10   ■ $10-$100   ■ $101-$1000   ■ >$1000

ETB digital clients are almost all active depositors when they transition to digital.

Over time, many of the lower value depositors increase their balances into the $101 - $1000 category.

The bank continues to add significant numbers of high value depositors, but the segment is stable as a % of total depositors.

NTB Clients by Deposit Balance Segment

Jan Mar May Jul Sep Nov | Jan Mar May Jul Sep Nov

2019 | 2020

■ <$10   ■ $10-$100   ■ $101-$1000   ■ >$1000

NTB digital clients are also growing into the higher deposit balance categories.

Around 20% are inactive.

Sample output table

Balance month	Balance Category	No of Traditional Customers	No of Digital Customers (ETB + NTB)	
			No of ETB Digital Customers	No of NTB Digital Customers
Jan-2021	A: <$10	…	…	…
Jan-2021	B: $10 - $100	…	…	…
Feb-2021	A: <$10	…	…	…
…	…	…	…	…

Query tips

- First, it's important to talk to business/product owners to discuss what is the best way to slice the total monthly balance. Typical questions to ask include:
  - Is $10 too much for inactive customers?
  - What's the minimum account balance?
  - How do we define affluent customers in terms of deposit balance?
- Retrieve the balance table and aggregate using the month and unique customer identifier so that you get Figure 1 below.

Figure 1		
Balance Month	Unique Customer Identifier	Average Monthly Balance
Jan-2021	xxxx01	…
Feb-2021	xxxx02	…
…	…	…

- Use the temporary table created for the segmentation exercise to separate digital customers from traditional customers.
- Categorize the average monthly balance into respective balance categories and you will get Figure 2.

Figure 2				
Balance Month	Unique Customer Identifier	Segment	Average Monthly Balance	Balance Bucket
Jan-2021	xxxx01	Traditional	$4	A: <$10
Feb-2021	xxxx02	ETB Digital	$95	B: $10 - $100
…	…	…	…	…

- Using Figure 2 you can get Figure 3 by aggregation.
  - For those who use segmentation approach 1, you will only see a single Digital customers column instead of two—one for NTB and the other for ETB.

Figure 3: Transaction Active Customer List with Transaction Bucket				
Balance Month	Balance Bucket	No of ETB Digital Customers	No of NTB Digital Customers	No of Traditional Customers
Jan-2021	A: <$10	600	1200	1800
Feb-2021	B: $10 - $100	500	1800	2300
…	…	…	…	…

- By selecting only the respective customer segment from the above table, you can create a visualization accordingly.

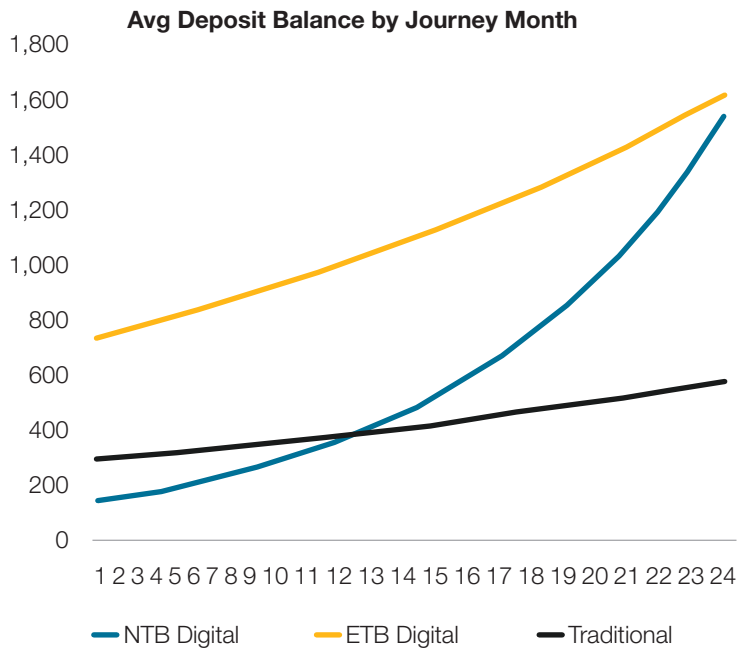### 3.3.2. Customer Journey – Deposit Behavior

Description

Average deposit balances by customer journey month, segmented by digital vs traditional clients.

Business question

Do clients continue to increase their deposit balances with us after they sign up?

Example

Avg Deposit Balance by Journey Month

The ETB Digital customer journey begins when the client transitions to digital.

They are typically more active depositors, and they increase their deposits significantly as they adopt the digital channels/services.

NTB digital clients are generally growing their deposits aggressively, reaching the same level as ETB digital clients in 24 months.

Traditional clients tend to be modest depositors and grow their deposits relatively slowly over time.

Sample output table

Journey Month	Average Deposit Balance by Journey Month - M3 Deposit Active ETB Digital Customers	Average Deposit Balance by Journey Month - M3 Deposit Active NTB Digital Customers	Average Deposit Balance by Journey Month - M3 Deposit Active Traditional Customers
1			
2			
…			
…			

Query tips

- Retrieve the Balance table, aggregate using the month and unique customer identifier to get Figure 1.

Figure 1		
Balance Month	Unique Customer Identifier	Total Monthly Balance
Jan-2021	xxxx01	…
Feb-2021	xxxx02	…
…	…	…

- Use the temporary table created for the segmentation exercise to separate digital customers from traditional customers.
- Get the first account opened month from the account table with unique customer identifier.
- After the above steps, you will get Figure 2 by joining the tables using the unique customer identifier.

Figure 2				
Balance Month	First Account Opened Month	Unique Customer Identifier	Segment	Total Monthly Balance
Jan-2021	Feb-2020	xxxx01	ETB Digital	…
Feb-2021	Jan-2021	xxxx02	Traditional	…
…	…	…	…	…

- Calculate the journey month by taking Balance Month minus First Account Opened Month.
- Create the temporary table with a list of customers (using Unique Customer Identifier as the unique value) who are active in their Journey Month 3 and name the temporary table as "Journey Month 3 Transaction Active Customers".
- Filter only Journey Month 3 active customers by using Figure 2 and the temporary table created above.
- You'd then be able to get Figure 3 by aggregation and will need to repeat the same for Digital (ETB + NTB) customers and join the table to get the final output table.

Figure 3

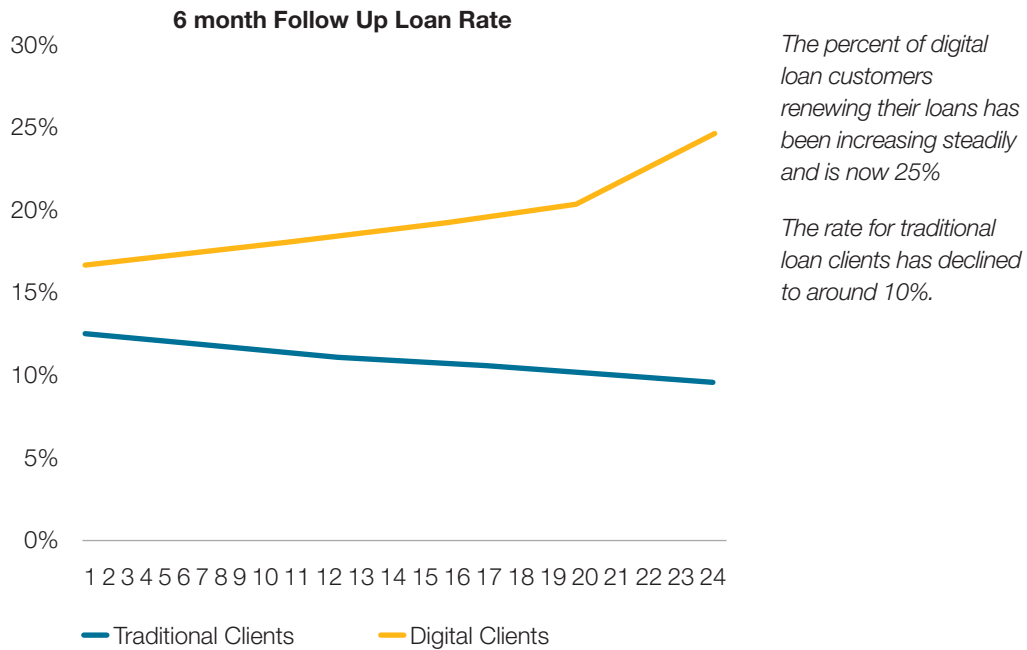| Balance Month (1)	First Account Opened Month (2)	Journey Month (1)-(2)	Total Monthly Balance by M3 Deposit Active Traditional Customers (3)	No of Deposit Active Traditional Customers in Journey Month 3 (4)	Average Deposit Balance by Journey Month - M3 Deposit Active Traditional Customers (3)÷(4)
Jan-2021	Feb-2020	11	…	…	…
Feb-2021	Jan-2021	1	…	…	…
…	…	…	…	…	…

3.4. CLIENT BORROWING BEHAVIOR

Description

Percentage of borrowers who paid off their loan and took a new loan within a 6-month timeframe, segmented by digital vs. traditional borrowers.

Business question

Are borrowers coming back for repeat loans?

Example

6 month Follow Up Loan Rate

The percent of digital loan customers renewing their loans has been increasing steadily and is now 25%

The rate for traditional loan clients has declined to around 10%.

— Traditional Clients   — Digital Clients

Sample output tables

Month	6-months follow-up loan rate for Digital customers	6-months follow-up loan rate for Traditional customers
Jan-2021	57%	45%
Feb-2021	…	…
…	…	…
…	…	…
…	…	…

Month	Traditional customers who take follow-up loan within 6 months (1)	Total Traditional customers who closed loans in the month (2)	6-months follow-up loan rate for Traditional customers (1)÷(2)
Jan-2021	45	100	45%
Feb-2021	…	…	…
…	…	…	…
…	…	…	…
…	…	…	…

Month	Digital customers who take follow-up loan within 6 months (1)	Total Digital customers who closed loans in the month (2)	6-months follow-up loan rate for Digital customers (1)÷(2)
Jan-2021	45	100	45%
Feb-2021	…	…	…
…	…	…	…
…	…	…	…
…	…	…	…

Query tips

Numerator (customers who take a follow-up loan within 6 months)

- Get the customers who are more than 1 in terms of loan cycle (i.e., whose current loan is not the first loan with the institution).
- Sort the customer-by-customer unique identifier, loan disbursed date and loan closed date (Figure 1).

Figure 1

Unique Customer Identifier	Loan Disbursed Month (2)	Previous Loan Closed Month (2)	Loan Cycle	Month taken to take follow-up loan (2-1)
xxxx01	Jan-2021	Nov-2020	1	
xxxx02	Feb-2021	Aug-2020	2	
…	…			

- Check if the customer's second loan disbursed date is within the 6-month period since the first loan was closed. If yes, flag them as follow-up loans.
- Use the temporary table for the segmentation exercise to get the segment.
- Aggregate by counting the customers with the follow-up loan (Figure 2).

Figure 2		
Month	Segment	No of customers who take the follow-up loan within 6 months
Jan-2021	Digital	508
Feb-2021	Traditional	390
…	…	

Denominator (customers who closed loans in the past 6 months)
- Get the customers who closed the loans by month by using Figure 1 and by combining it with the segmentation table (Figure 3).

Figure 3		
Loan Closed Month	Segment	Customers who closed the loans during the month
Jan-2021	Digital	1203
Feb-2021	Traditional	450
…	…	

- By joining the table after the count, you will get Figure 4 and will need to repeat the same for Traditional customers.

Figure 4			
Month	Digital customers who take follow-up loan within 6 months since dated month (1)	Total Digital customers who closed loans in the month (2)	6-months follow-up loan rate for Digital customers (1)÷(2)
Jan-2021	45	100	45%
Feb-2021	…	…	…
…	…	…	…
…	…	…	…

4. Conclusion

This is intended to be a companion document to the CGAP Technical Note Business Intelligence: A Bedrock of Successful Digitization in Microfinance. Readers can pick and choose from the dashboards presented in this library based on their needs. This tutorial video (Data Analytics Journey) provides additional practical tips on implementation and more information about CGAP's work on microfinance digitization can be found at www.cgap.org/microfinance.