Using financial transaction Big Data to support household surveys

The case of monitoring consumer spending behaviors during COVID19 pandemic

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About the project

The project provides an analytical view of consumers spending behaviours using big data for bank cards (credit - direct debit). The project first phase implemented in cooperation with the private sector to analyze the data of bank card transactions in the United Arab Emirates. Data provide a continuous monthly time series for a period of 3 years (36 months) in addition to the transactions made by residents of the country while they were outside the country. The project provides a prolific source for informal statistics using advanced data analysis.

UAE Financial Transactions Big Data Project

Level of detail: Monthly

Period: 3 Years [Starting Mid 2017]

Update: Quarterly

Segments: Residents & Travelers

Coverage: All transactions in UAE &
          Cross borders for residents
Spending Category : ALL
Data Source: One primary service provider

Monitoring consumer spending behaviors [COVID19]

Level of detail: Weekly & Monthly

Period: 1 Years [Starting 2020]
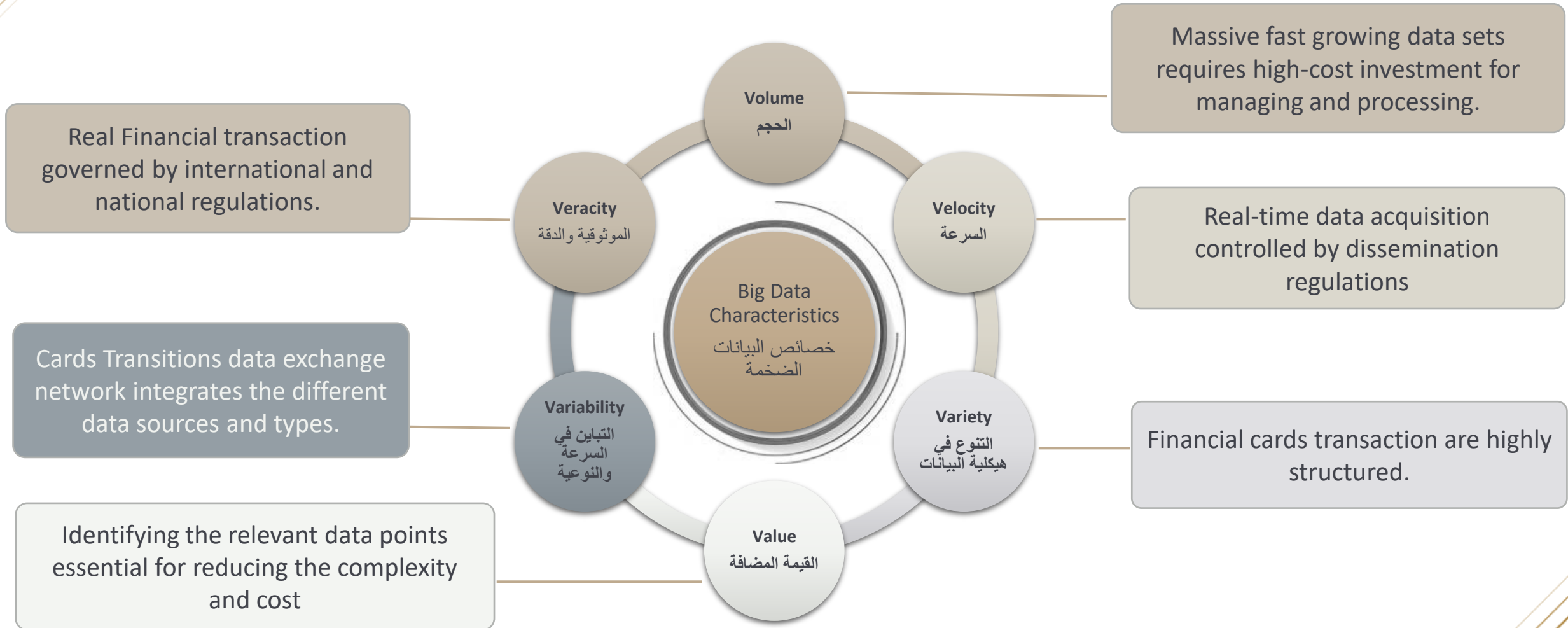
Update: Weekly

Segments: Residents

Coverage: All transactions in UAE &
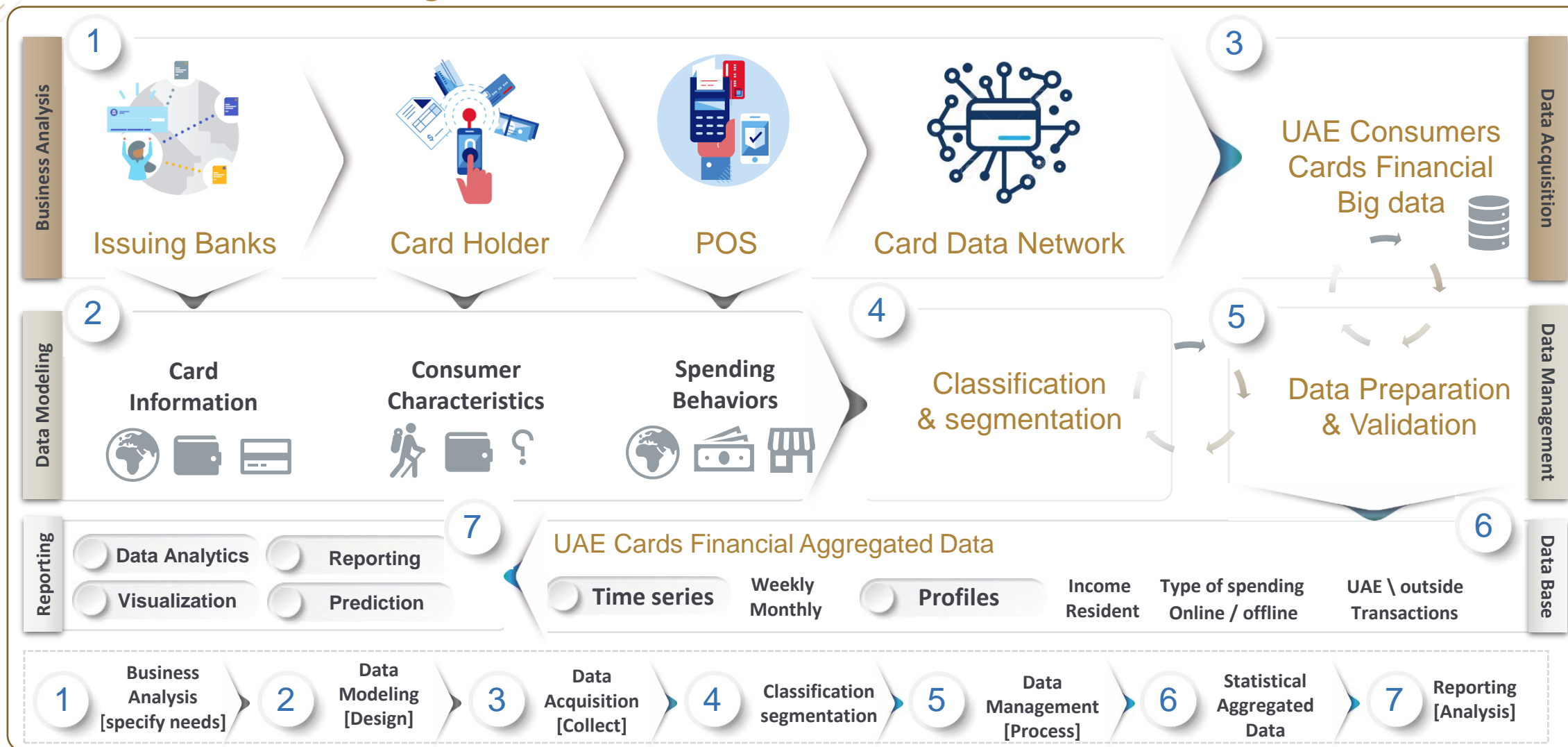   Cross borders
Spending Category : Limited
Data Source: One primary service provider

Big Data Characteristics & Financial Cards Transactions

Massive fast growing data sets requires high-cost investment for managing and processing.

Real-time data acquisition controlled by dissemination regulations

Financial cards transaction are highly structured.

Identifying the relevant data points essential for reducing the complexity and cost

Cards Transitions data exchange network integrates the different data sources and types.

Real Financial transaction governed by international and national regulations.

Volume
الحجم

Velocity
السرعة

Veracity
الموثوقية والدقة

Big Data Characteristics
خصائص البيانات الضخمة

Variety
التنوع في هيكلية البيانات

Variability
التباين في السرعة والنوعية

Value
القيمة المضافة

Financial Transaction Big data General Framework

Business Analysis

1. Issuing Banks
Card Holder
POS
Card Data Network

3. **Data Acquisition** — UAE Consumers Cards Financial Big data

Data Modeling

2. Card Information
Consumer Characteristics
Spending Behaviors

4. Classification & segmentation

5. **Data Management** — Data Preparation & Validation

Reporting

7. Data Analytics | Reporting
Visualization | Prediction

UAE Cards Financial Aggregated Data
Time series — Weekly Monthly
Profiles — Income Resident
Type of spending Online / offline
UAE \ outside Transactions

6. **Data Base**

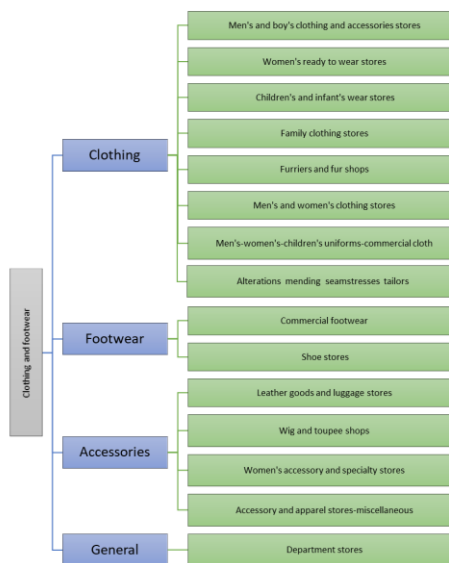| 1 | Business Analysis [specify needs] | 2 | Data Modeling [Design] | 3 | Data Acquisition [Collect] | 4 | Classification segmentation | 5 | Data Management [Process] | 6 | Statistical Aggregated Data | 7 | Reporting [Analysis] |

Methodology considered the biggest challenges that concern statisticians in their use of Big Data.

Statisticians and Domain experts must work together to interpret, and map different classification used in financial transactional records to international statistics classifications to derive information about the expenditure behavior of the people and compare with the household surveys data.

Classification of Individual Consumption According to Purpose (COICOP)

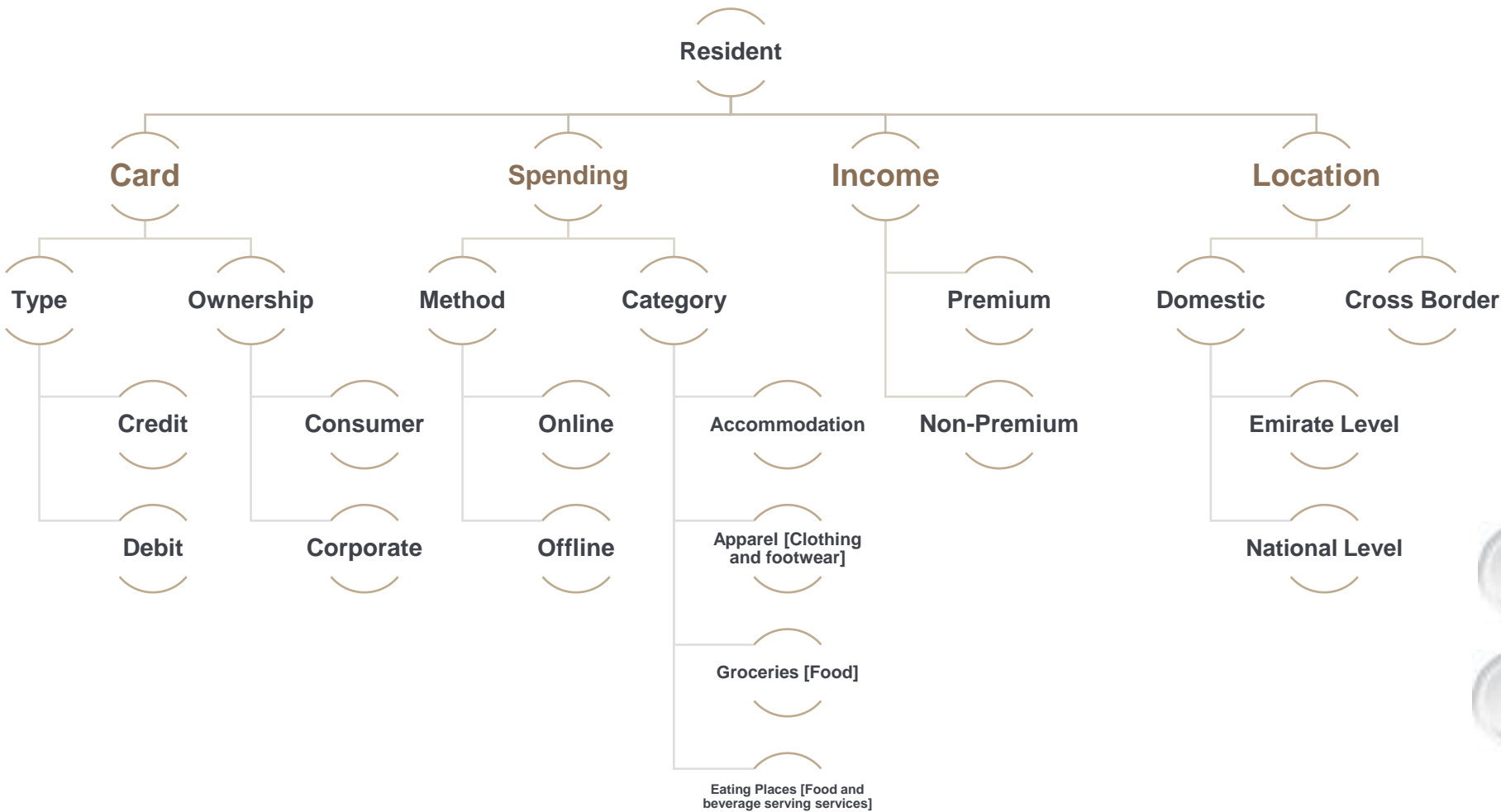| Code	Description
01	Food and non-alcoholic beverages
01.1	Food
01.2	Non-alcoholic beverages
01.3	Services for processing primary goods for food and non-alcoholic beverages
02	Alcoholic beverages, tobacco and narcotics
02.1	Alcoholic beverages
02.2	Alcohol production services
02.3	Tobacco
02.4	Narcotics
03	Clothing and footwear
03.1	Clothing
03.2	Footwear
04	Housing, water, electricity, gas and other fuels
04.1	Actual rentals for housing
04.2	Imputed rentals for housing
04.3	Maintenance, repair and security of the dwelling
04.4	Water supply and miscellaneous services relating to the dwelling
04.5	Electricity, gas and other fuels
05	Furnishings, household equipment and routine household maintenance
05.1	Furniture, furnishings, and loose carpets

Mapping Classifications

Clothing and footwear

Clothing:
- Men's and boy's clothing and accessories stores
- Women's ready to wear stores
- Children's and infant's wear stores
- Family clothing stores
- Furriers and fur shops
- Men's and women's clothing stores
- Men's-women's-children's uniforms-commercial cloth
- Alterations mending seamstresses tailors

Footwear:
- Commercial footwear
- Shoe stores

Accessories:
- Leather goods and luggage stores
- Wig and toupee shops
- Women's accessory and specialty stores
- Accessory and apparel stores-miscellaneous

General:
- Department stores

Merchant Category Codes (MCC)

MCC	Description
5611	Men's and Boys' Clothing and Accessories Stores
5621	Women's Ready to Wear Stores
5631	Women's Accessory and Specialty Stores
5641	Children's and Infants' Wear Stores
5651	Family Clothing Stores
5655	Sports Apparel, and Riding Apparel Stores
5661	Shoe Stores
5681	Furriers and Fur Shops
5691	Men's and Women's Clothing Stores
5697	Alterations, Mending, Seamstresses, Tailors
5698	Wig and Toupee Shops
5699	Accessory and Apparel Stores-Miscellaneous

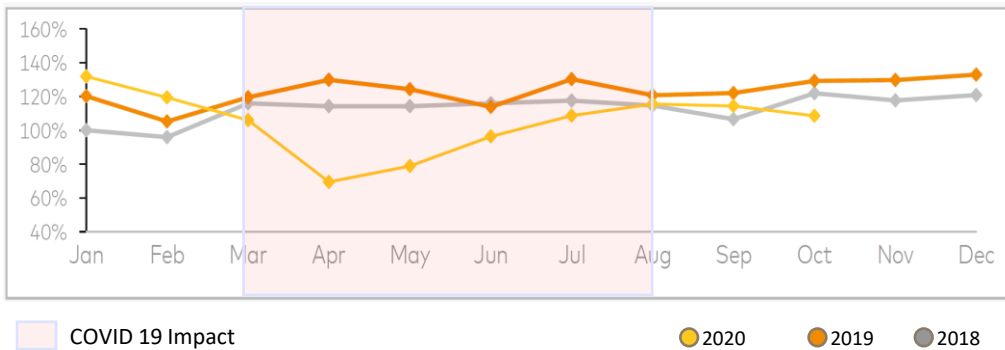# Monitoring consumer spending behaviors during COVID19 pandemic [Data Model]

Resident

- Card
  - Type
    - Credit
    - Debit
  - Ownership
    - Consumer
    - Corporate
- Spending
  - Method
    - Online
    - Offline
  - Category
    - Accommodation
    - Apparel [Clothing and footwear]
    - Groceries [Food]
    - Eating Places [Food and beverage serving services]
- Income
  - Premium
  - Non-Premium
- Location
  - Domestic
    - Emirate Level
    - National Level
  - Cross Border

Historical Monthly Time series [3 Years]

Weekly Monitoring Insights

المركز الاتحادي للتنافسية والإحصاء | FCSC UAE

Monitoring consumer spending behaviors during COVID19 pandemic [Insights]
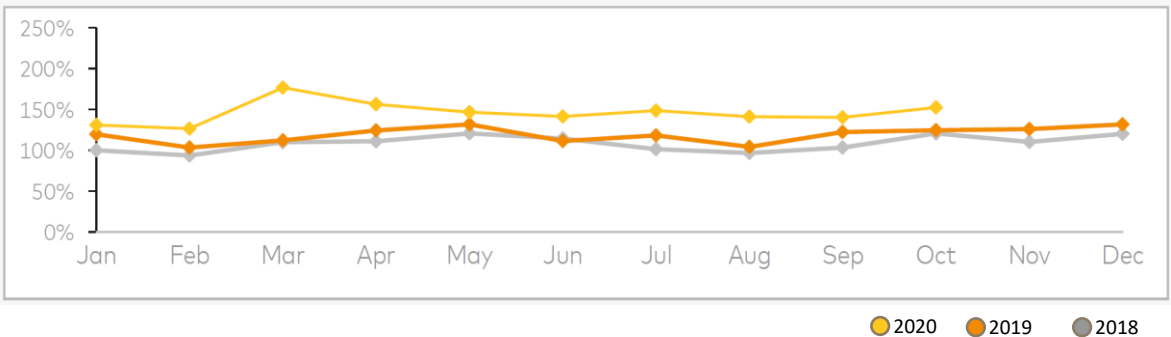
UAE Non-Premier Monthly Spend Index

COVID 19 Impact   ● 2020   ● 2019   ● 2018

UAE Consumer Weekly Spend during 2020

Covid'19 Outbreak

● 2019   ● 2020
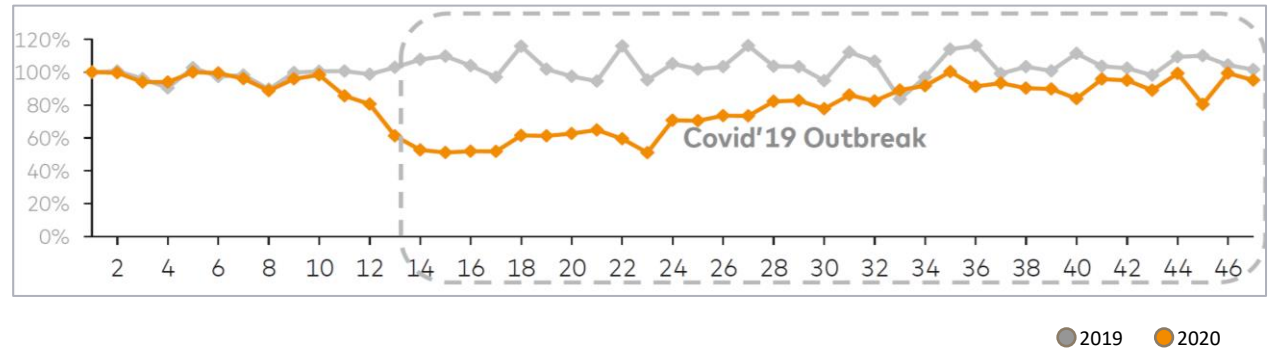
UAE Domestic Weekly Spend According to Purpose [2020]

Covid'19 Outbreak

◆ Accomodations   ◆ Apparel   ◆ Eating Places   ◆ Fuel   ◆ Groceries
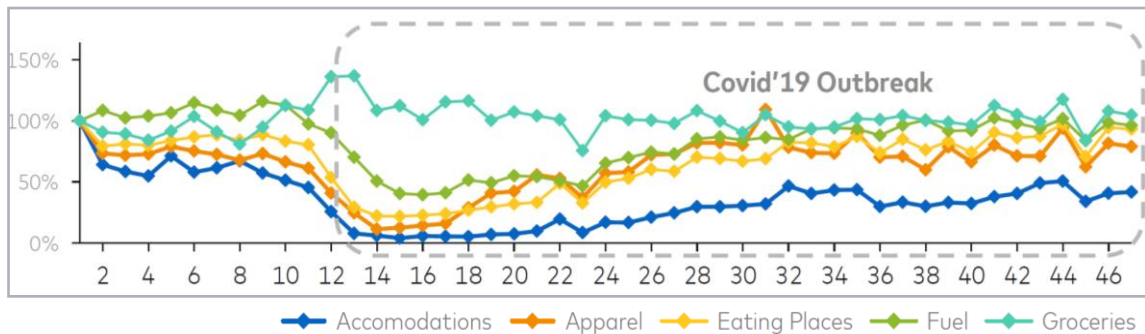
Domestic Monthly Spend Index for Groceries

● 2020   ● 2019   ● 2018
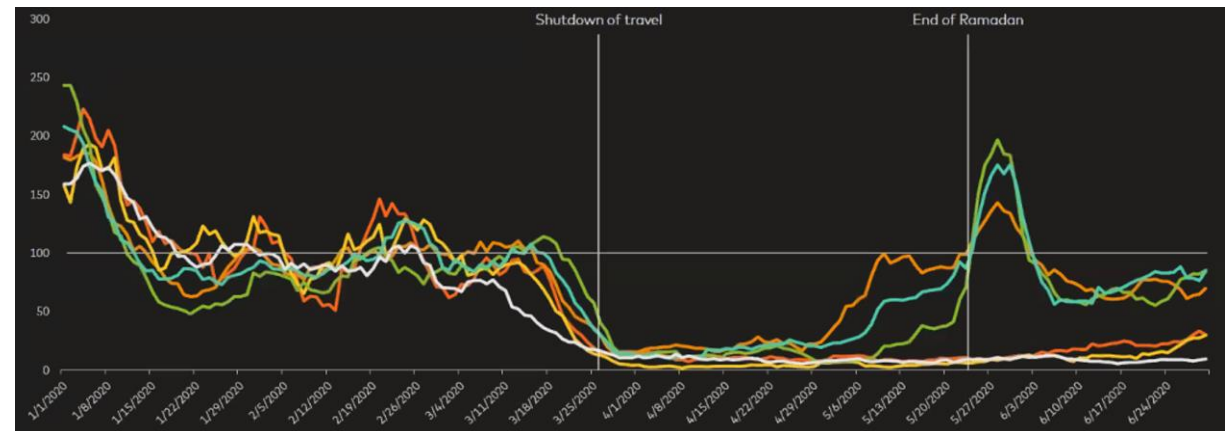
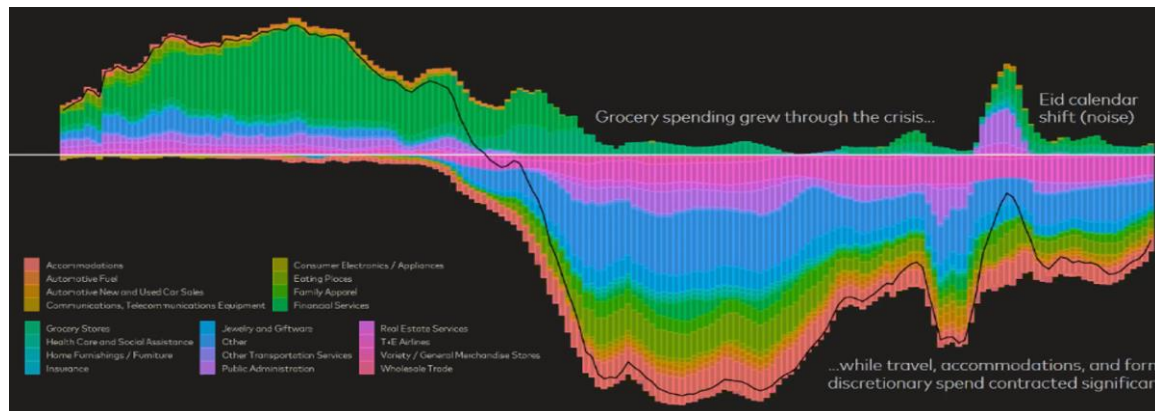# Monitoring consumer spending behaviors during COVID19 pandemic [Insights]

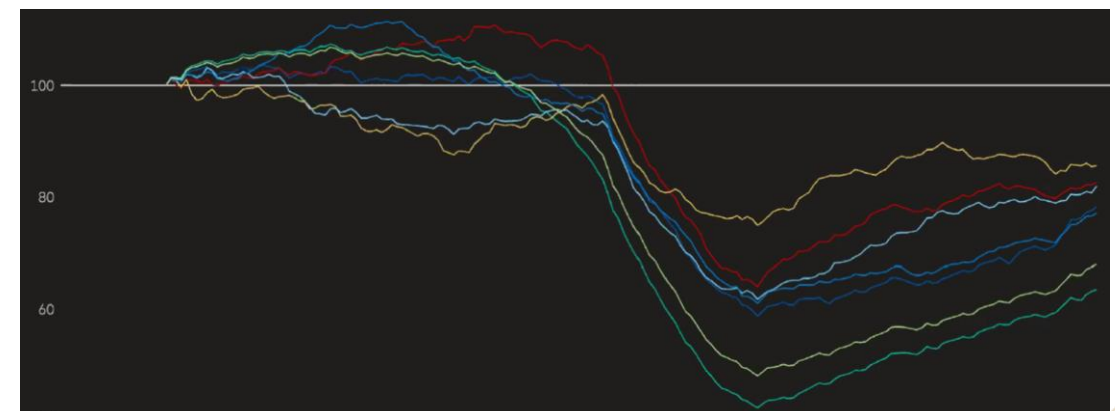## UAE Retail & Services eCommerce Spending

UAE Domestic Tourism Spending by Emirate

Monitoring The impact of protective measures on spending

Monitoring spending behaviors at emirates level

Financial Cards Transactions Big data [Challenges]

1. Developing methodologies for using big data and adopting it as a source for official statistics.

2. The different classifications used in the bank card data exchange network from the statistical classifications.

3. Consumer privacy protection and commercial competition protection laws represent a barrier to obtaining many important data elements.

4. The high cost of sourcing, storing and processing big data.

5. Multiple data sources due to the presence of different companies that provide services to provide comprehensive coverage of bank card transactions data.

6. legal issues relate to copyright and the ownership of data.

7. Don't cover the use of cash

Financial Cards Transactions Big data [opportunities]

1. Availability and consistency of data on bank card transactions at the global level, which provides the possibility of using them in measuring SGDs indicators.

2. The availability of data in a real-time and periodic manner that bridges the gap in the availability of statistics on family income and expenses, especially in times of crisis.

3. Although sampling theory is difficult to use in a big data framework, it provides great coverage for the population.

4. Strategic cooperation with data owners in big data analysis reduces the cost of technological and human resources.

5. Anonymized real detailed financial transactional records from individual bank cards provide very accurate information.

6. Saving time and cost compared to traditional surveys

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Thank You