



Final Project - Tarot Deck Store Management Database

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Wan Dang

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1 Background

The Tarot Deck Store Management Database is designed to analyze and manage the operations of a previously active tarot card store. The store, now closed, struggled because it didn't keep track of its stock, couldn't get customers to return, and had prices that were too high to sustain.

The database is intended to organize historical sales, inventory, and supplier data that was originally stored in Excel files. By transforming this disorganized data into a structured relational database, the system aims to support business insights and enable improved decision-making.

The system is built for the store owner to reflect on past business failures, manage inventory, and plan for potential reopening; future employees to manage stock and process customer transactions; and potential investors or partners to evaluate the feasibility of relaunching the business using data-driven insights.

2 Research Questions

The database supports analysis to answer the following business questions:

- Which tarot decks sold the most or least?
- What was the profit margin per product and supplier?
- How much inventory remained unsold, and what was its cost?
- Who were the most frequent or high-spending customers?
- Were there seasonal patterns or trends in sales performance?

- How did imported inventory affect cost over time?
- Which suppliers offered the most profitable or reliable options?

3 Database Design

The database is designed to reflect the operations of a tarot deck store, including inventory management, customer transactions, and supplier imports.

At the core of the database is the **Deck** table, which represents individual tarot decks for sale. Each deck record contains a unique identifier (*deck_id*), descriptive fields such as *name*, *category*, *publisher*, and *description*, and a *sale_price* indicating its selling value. The **Deck** table is connected to several other tables, reflecting the deck's participation in sales, inventory, and suppliers relationships. Each tarot deck may be represented by multiple images stored in the **DeckImage** table, where each image has a unique *image_id* and a URL for access. The one-to-many relationship between **Deck** and **DeckImage** arises from the need to display multiple photos per deck (e.g., front cover, card art, packaging). In the SQL schema, this is implemented through a composite primary key on (*deck_id*, *image_id*) and a foreign key linking to **Deck**.

The **Customer** table tracks individual customer profiles with fields such as *customer_id*, *name*, *contact_no*, and *address*. Each customer can place many orders, but each order is tied to a single customer, resulting in a one-to-many relationship from **Customer** to **Order**. This is modeled in SQL through a foreign key from **Order** to **Customer**. Customer transactions are recorded in the **Order** table, which tracks *order_id* and timestamp (*datetime*). The *total_amount* is a derived attribute - it can be computed dynamically by summing the quantities and unit prices of decks listed in the corresponding **OrderDetail** entries. The many-to-many relationship between orders and decks is managed through the **OrderDetail** table. This table records which decks are included in each order, along with the quantity purchased. Each entry in this table corresponds to a single item in a customer's shopping cart, and the composite key (*order_id*, *deck_id*) ensures no duplication of entries for the same deck within the same order. Payments are handled through the **Payment** table, which is designed to support both simple and complex payment structures. Each payment is associated with an *order_id* and a unique *payment_id*, enabling one-to-many relationships between orders and payments. While many customers pay for their order in full through a single transaction, this design accommodates cases such as partial payments, installment plans, and refunds. Fields include *payment_method*, *payment_date*, and *amount*.

The supply chain side of the business is managed using the **Supplier**, **PotentialSupplier**, and **ImportRecord** tables. The **Supplier** table contains contact and web information for business that provide tarot decks. Since a single tarot deck may be sourced from multiple suppliers depending on availability, price, or reliability, a many-to-many relationship exists between decks and suppliers. This relationship is captured in the **PotentialSupplier** table. Actual

inventory purchases are logged in the `ImportRecord` table. Each import event has a unique *import_id* and is tied to one deck and one supplier. The table also records the *quantity* imported, *import_date*, and *original_price*.

4 Data Sources

The dataset is derived from real business data collected by the store owner in XLSV format. It includes customer purchase history, inventory and deck details, import and supplier records, payments. Where gaps existed, synthetic data was generated to simulate plausible missing records, especially for supplier relationships and product metadata (e.g., images and publishers).

5 Data Analysis

5.1 Revenue and financial performance

The total expected revenue based on unit prices and quantities sold is \$59,769.97, while the actual recorded revenue from payments is \$60,483.53 (Query 1). This results in a discrepancy of $-\$713.51$, indicating that customers paid slightly more than what the sales records suggest. This gap may stem from overcharges, data entry errors, or additional fees (such as delivery fee, tax, etc.) not reflected in the unit sale prices. Although the discrepancy is small relative to total sales (around 1.2%), it signals the importance of reconciling accounting records and transaction logs to maintain financial accuracy.

The monthly revenue trend (Figure 3) shows that the store experienced highly fluctuating sales performance over the operational period from mid-2022 through the end of 2023. Most months saw revenue in the range of \$2,000 to \$5,000, but a significant spike occurred in May and June 2023, where revenue exceeded \$13,000—nearly three times the monthly average. This dramatic increase suggests a successful marketing campaign, bulk customer purchases, or possibly the release of high-demand decks during that period. However, the surge was not sustained, as revenue dropped sharply in the following months. The Average Order Value (AOV) fluctuated month to month, with highs surpassing \$220 and lows dipping below \$80. The earlier months of operation featured higher AOV, which may reflect the purchasing behavior of early adopters who made larger or bundled purchases. Conversely, toward the end of the timeline, especially in late 2023, AOV decreased substantially, possibly due to clearance discounts, lower-priced items being sold, or declining customer interest. The Seasonal Deck Sales Trend chart reveals that sales volume followed a similar pattern to revenue, peaking in May and June 2023 with over 400 decks sold in a single month. This confirms that the revenue spike was primarily driven by increased volume rather than just higher AOV. Prior to this peak, monthly sales were modest, and afterward, they declined sharply, indicating potential overstocking or diminished demand. These seasonal insights highlight oppor-

tunities to align marketing strategies and stock levels with high-traffic periods, especially in Q2 of each year.

Lastly, the Top 10 Profitable Products bar chart shows that a few standout products accounted for a disproportionate share of total profit. The Madhouse Tarot alone generated nearly \$2,000 in profit, followed by the Ars Goetia Tarot Deck Standard 1st Edition and The Cosmic Coven Tarot Deck. These products significantly outperformed others in terms of profitability, suggesting that focused promotion and reliable supply chains for a select few high-margin decks could be a more effective business strategy than a wide inventory with unpredictable sales.

5.2 Customer and purchase behavior analysis

The customer data reveals that the majority of purchases came from one-time buyers, who accounted for 240 out of 300 total customers, or 80% of the store's customer base. In contrast, only 60 customers (20%) made repeat purchases (Query 7).

Despite being a smaller group, repeat customers made a substantial contribution to the store's overall revenue. The bar chart shows the top 10 repeat customers, each of whom spent between \$600 and \$1,150 across multiple orders (Figure 4). At the top of the list, Nguyen Sara alone spent more than \$1,100, followed closely by Nguyen Tan Sang and Tran Ngoc. This pattern reflects a classic 80/20 distribution, where a small percentage of loyal customers drives a significant portion of revenue. These findings highlight a key area for improvement: implementing customer retention strategies such as loyalty programs, email marketing, or exclusive pre-orders for new decks could increase repeat business.

5.3 Inventory and Supplier performance analysis

The overstock analysis reveals that the tarot store ended operations with a total of 773 unsold deck units, carrying a combined inventory cost of \$7,863.17 (Query 9). This unsold stock represents a significant loss in tied-up capital, particularly given the store's total expected revenue of around \$59,770—meaning over 13% of the store's potential income was effectively locked in unsold goods. The average cost per unsold deck was calculated at \$10.17, which, while modest per unit, becomes substantial when aggregated across hundreds of items. While certain products like Paracelsus Dreams Tarot White Edition, Midnight City Tarot, and Smith-Waite Tarot Deck (Borderless Edition) had the highest unsold quantities (each over 15 units), they were not always the most financially burdensome. The right-hand chart highlights that Midnight City Tarot alone accounted for over \$400 in overstock value, significantly contributing to tied-up capital. Meanwhile, other decks like Crystalstruck Tarot and COMBO 1: Winterlust & Autumn Night had relatively fewer unsold units but incurred high overstock costs due to higher import prices. The mismatch between unsold quantity and overstock value, as visualized in the Inventory Risk Overview (Figure 5), indicates that

not all overstock risk is tied to volume—product cost plays a critical role. For example, CBD Tarot de Marseille appears in both top-quantity and top-cost lists, suggesting it was both over-ordered and relatively expensive. On the other hand, some titles like The Wild Unknown Pocket Animal Spirit Deck or Disney Villains Tarot Deck had unsold quantities but did not make a significant financial impact.

The SQL query checking for decks that were never sold (Query 10) returned no results, confirming that every tarot deck imported into the database was sold at least once. This is a positive indicator, suggesting there were no completely stagnant or irrelevant products in the catalog. Even for decks that experienced overstock issues, some level of demand existed, which implies potential for clearance, bundling, or discount-based liquidation strategies.

The Import Price Trend chart for the top five frequently imported decks (Figure 6) shows that import costs remained stable over time, with minimal to no fluctuations. For instance, the Angel Answer Oracle Cards maintained an average import cost near \$6, and Ars Goetia Tarot Deck Standard 1st Edition consistently stayed at the high end of the spectrum around \$30. This consistency indicates that supplier pricing was predictable and not subject to inflation or volatility, which would have made cost forecasting and pricing strategy more manageable.

The Top 10 Suppliers by Total Profit chart (Figure 7) reveals that a small number of suppliers—especially Braun, Crona and Macejkovic and Runolfsson-Klocko—were responsible for delivering the most profitable inventory. These vendors contributed over \$2,000 and \$1,900 in profit respectively, indicating a strong alignment between the decks they supplied and customer demand. Most other suppliers in the top 10 cluster around the \$1,800 mark, which implies that the supply chain was relatively balanced and not overly dependent on a single source. Nonetheless, the business could benefit from closer partnerships with high-performing suppliers and further analysis of which products contributed most to each supplier’s total profit.

6 User Access Design

While current access is unrestricted for development, user roles can be implemented to protect sensitive data:

- Owner: full access to all tables
- Employee: access to orders, payments, inventory
- Partner/Investor: view-only access to summarized analytics or visual dashboards

Simple access control can be enforced via SQL views and GRANT statements.

A Appendix

A.1 Diagram

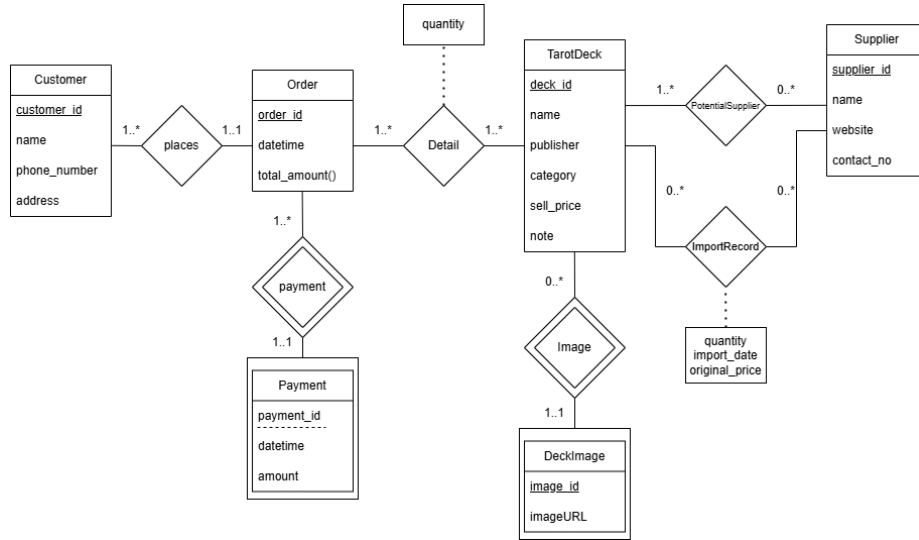


Figure 1: The ER diagram for Tarot Deck Store Management database

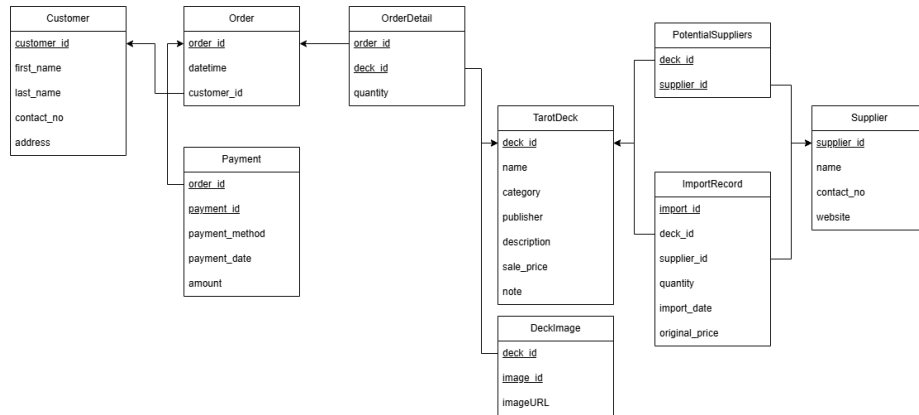


Figure 2: The relational diagram for Tarot Deck Store Management database

A.2 MySQL Queries

```

1 SELECT
2     expected.expected_revenue ,

```

```

3      actual.actual_revenue,
4      expected.expected_revenue - actual.actual_revenue AS
      discrepancy
5 FROM
6      (SELECT SUM(od.quantity * d.sale_price) AS
          expected_revenue
7      FROM OrderDetail od
8      JOIN Deck d ON od.deck_id = d.deck_id) AS expected,
9
10     (SELECT SUM(p.amount) AS actual_revenue
11     FROM Payment p) AS actual;

```

Query 1: Total revenue of the shop

```

1 SELECT
2     YEAR(o.datetime) AS year,
3     MONTH(o.datetime) AS month,
4     SUM(p.amount) AS monthly_revenue
5 FROM 'Order' o
6 JOIN Payment p ON o.order_id = p.order_id
7 GROUP BY YEAR(o.datetime), MONTH(o.datetime)
8 ORDER BY year, month;

```

Query 2: Total revenue per month

```

1 SELECT
2     YEAR(o.datetime) AS year,
3     MONTH(o.datetime) AS month,
4     ROUND(SUM(p.amount) / COUNT(DISTINCT o.order_id), 2)
          AS avg_order_value
5 FROM 'Order' o
6 JOIN Payment p ON o.order_id = p.order_id
7 GROUP BY YEAR(o.datetime), MONTH(o.datetime)
8 ORDER BY year, month;

```

Query 3: Monthly average revenue per order

```

1 SELECT
2     DATE_FORMAT(o.datetime, '%Y-%m') AS month,
3     SUM(od.quantity) AS total_decks_sold
4 FROM 'Order' o
5 JOIN OrderDetail od ON o.order_id = od.order_id
6 GROUP BY month
7 ORDER BY month;

```

Query 4: Seasonal and behavioral trend

```

1 SELECT
2     d.name AS deck_name,
3     s.name AS supplier_name,
4     AVG(ir.original_price) AS avg_import_price,
5     d.sale_price,
6     SUM(od.quantity) AS total_sold,
7     SUM(od.quantity) * (d.sale_price - AVG(ir.
8         original_price)) AS total_profit,
9     ROUND((d.sale_price - AVG(ir.original_price)) / d.
10         sale_price * 100, 2) AS margin_percent
11 FROM Deck d
12 JOIN OrderDetail od ON d.deck_id = od.deck_id
13 JOIN ImportRecord ir ON d.deck_id = ir.deck_id
14 JOIN Supplier s ON ir.supplier_id = s.supplier_id
15 GROUP BY d.deck_id, s.supplier_id;

```

Query 5: Profit margin per product and supplier

```

1 SELECT
2     c.name,
3     COUNT(DISTINCT o.order_id) AS total_orders,
4     SUM(p.amount) AS total_spent
5 FROM Customer c
6 JOIN 'Order' o ON c.customer_id = o.customer_id
7 JOIN Payment p ON o.order_id = p.order_id
8 GROUP BY c.customer_id
9 ORDER BY total_spent DESC;

```

Query 6: Most frequent and highest-spending customers

```

1 SELECT
2     c.name,
3     COUNT(DISTINCT o.order_id) AS total_orders,
4     SUM(p.amount) AS total_spent
5 FROM Customer c
6 JOIN 'Order' o ON c.customer_id = o.customer_id
7 JOIN Payment p ON o.order_id = p.order_id
8 GROUP BY c.customer_id
9 ORDER BY total_spent DESC;

```

Query 7: First time vs repeat customers

```

1 CREATE VIEW view_overstocked_decks AS
2 SELECT
3     d.deck_id,
4     d.name AS deck_name,
5     COALESCE(ir.total_imported, 0) AS total_imported,

```



```

6      COALESCE(od.total_sold, 0) AS total_sold,
7      COALESCE(ir.total_imported, 0) - COALESCE(od.
      total_sold, 0) AS unsold_quantity,
8      ir.avg_cost AS avg_cost,
9      (COALESCE(ir.total_imported, 0) - COALESCE(od.
      total_sold, 0)) * ir.avg_cost AS overstock_cost
10 FROM Deck d
11 LEFT JOIN (
12     SELECT deck_id,
13            SUM(quantity) AS total_imported,
14            AVG(original_price) AS avg_cost
15     FROM ImportRecord
16     GROUP BY deck_id
17 ) ir ON d.deck_id = ir.deck_id
18 LEFT JOIN (
19     SELECT deck_id,
20            SUM(quantity) AS total_sold
21     FROM OrderDetail
22     GROUP BY deck_id
23 ) od ON d.deck_id = od.deck_id
24 WHERE (COALESCE(ir.total_imported, 0) - COALESCE(od.
      total_sold, 0)) > 0;

```

Query 8: Unsold inventory and overstock cost

```

1 SELECT deck_name, unsold_quantity
2 FROM view_overstocked_decks
3 ORDER BY unsold_quantity DESC
4 LIMIT 1;
5
6 SELECT deck_name, overstock_cost
7 FROM view_overstocked_decks
8 ORDER BY overstock_cost DESC
9 LIMIT 1;
10
11 SELECT
12     ROUND(SUM(overstock_cost) / NULLIF(SUM(
13         unsold_quantity), 0),
14         2) AS avg_cost_per_unsold_deck
15 FROM
16     view_overstocked_decks;

```

Query 9: Overstocked analysis

```

1 SELECT d.deck_id, d.name
2 FROM Deck d
3 LEFT JOIN OrderDetail od ON d.deck_id = od.deck_id
4 WHERE od.deck_id IS NULL;

```

Query 10: Decks never sold at all

```
1 SELECT
2     d.name AS deck_name,
3     DATE_FORMAT(ir.import_date, '%Y-%m') AS month,
4     AVG(ir.original_price) AS avg_import_cost
5 FROM ImportRecord ir
6 JOIN Deck d ON ir.deck_id = d.deck_id
7 GROUP BY d.deck_id, month
8 ORDER BY d.name, month;
```

Query 11: Import price changes over time

```
1 SELECT
2     s.name AS supplier_name,
3     COUNT(ir.import_id) AS total_imports,
4     SUM(ir.quantity * (d.sale_price - ir.original_price))
5     AS total_profit
6 FROM ImportRecord ir
7 JOIN Deck d ON ir.deck_id = d.deck_id
8 JOIN Supplier s ON ir.supplier_id = s.supplier_id
9 GROUP BY s.supplier_id
10 ORDER BY total_profit DESC;
```

Query 12: Most profitable or reliable supplier

A.3 Figure

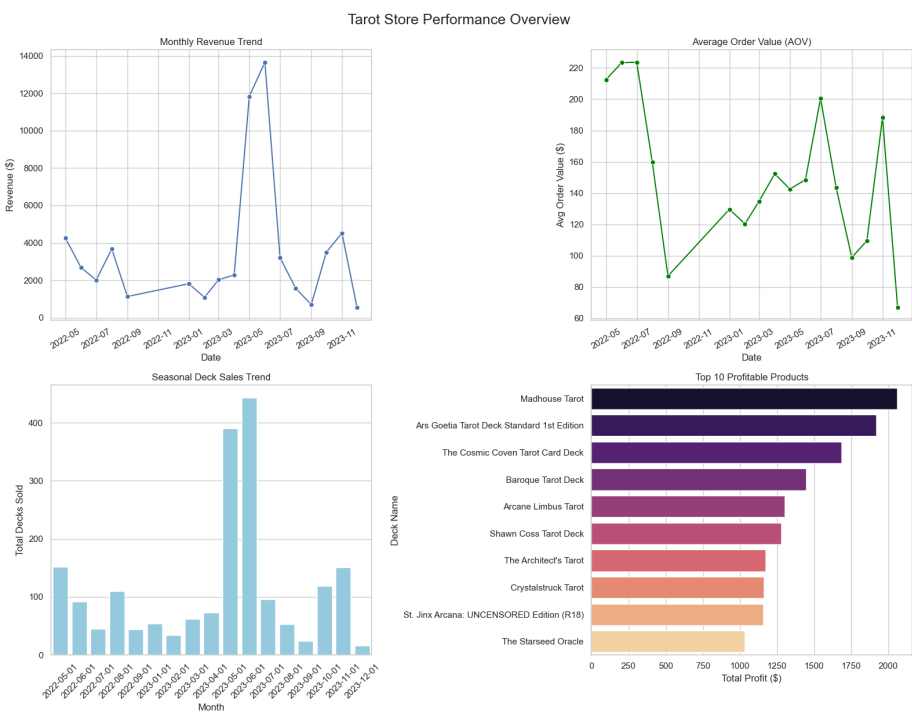


Figure 3: Tarot Store Performance Overview

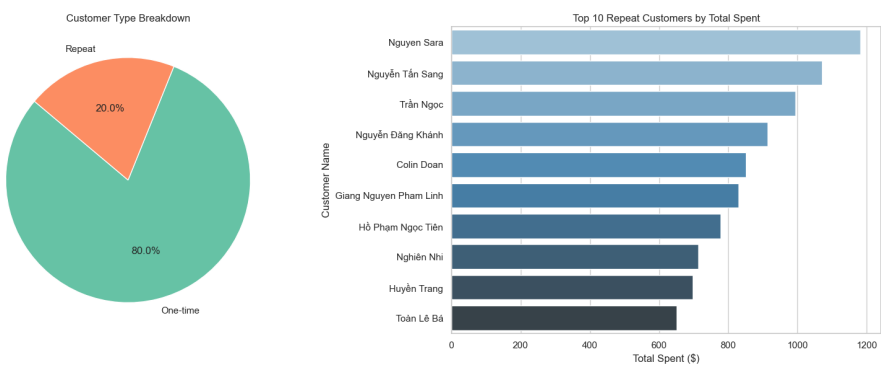


Figure 4: Customer Behavioral Breakdown

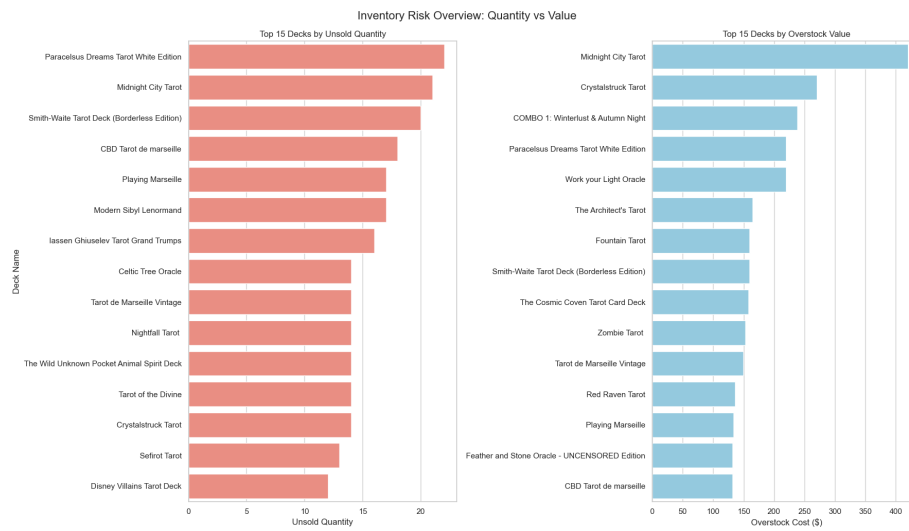


Figure 5: Unsold inventory and overstock cost

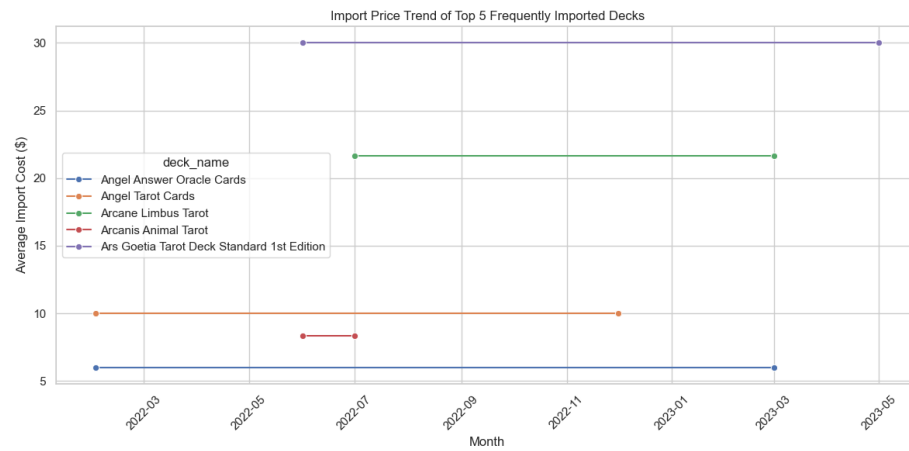


Figure 6: Import price changes over time

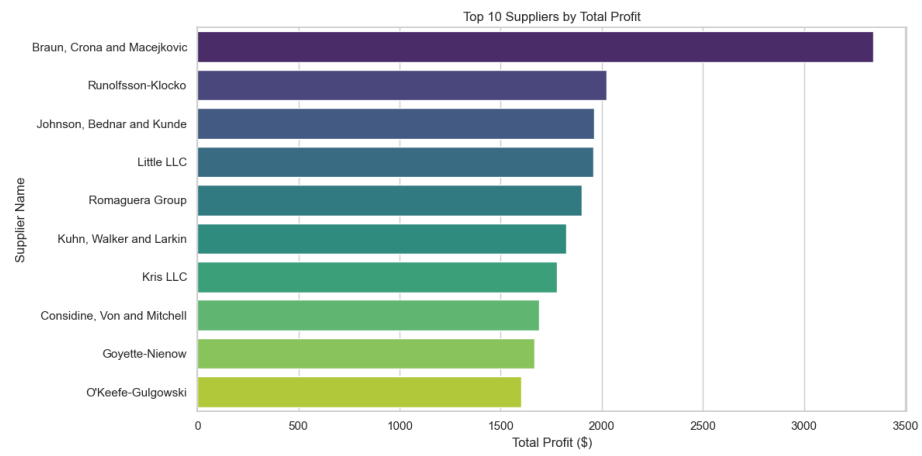


Figure 7: Most profitable or reliable supplier