full_note_bookstore_20251001

October 1, 2025

1 Business Intelligence Dashboard

Automated insights for data-driven decisions

[49]:
```
# input_file = 'data/auto_partes/auto_partes_transactions.csv'  # Input CSV file
input_file = 'data/bookstore/bookstore_transactions.csv'  # Input CSV file

config = {
    'project_name': 'bookstore',       # Project name
    'out_dir' : 'outputs',               # Output directory

    # Data mapping
    'date_col': 'fecha',
    'product_col': 'producto',
    'description_col': 'glosa',
    'revenue_col': 'total',
    'quantity_col': 'cantidad',
    'transaction_col': 'trans_id',
    'cost_col': 'costo',

    # Analysis settings
    'analysis_date': '2024-05-01',      # Or 'current' for today
    'top_products_threshold': 0.2,
    'dead_stock_days': 30,
    'currency_format': 'CLP',
    'language': 'EN',
}

save = False  # True to save outputs, False to just print
```

[50]:
```
from modules.business_analytics import BusinessAnalyzer
from modules.dashboard import ExecutiveDashboard
from modules.advanced_analytics import AdvancedAnalytics
from modules.reports import *
from modules.utils import *

# Initialize with AdvancedAnalytics (includes all functionality)
# AdvancedAnalytics -> BusinessAnalyzer -> Business (inheritance chain)
```

```
analyzer = BusinessAnalyzer(data_source=input_file, config=config)

# Create dashboard and advanced analytics instances
dashboard = ExecutiveDashboard(analyzer)
advanced = AdvancedAnalytics(analyzer)
```

```
Data date range: 2024-03-01 to 2024-04-30
Business initialized with data from: data/bookstore/bookstore_transactions.csv
(5211, 14)
Output directory: outputs\bookstore\20251001_2019
  All base metrics calculated
BusinessAnalyzer initialized for project: bookstore
Dashboard output directory: outputs\bookstore\20251001_2019
AdvancedAnalytics initialized for project: bookstore
```

1.1 Quick Summary

[51]:
```
summary = dashboard.create_quick_summary()
print_info(summary, analyzer.out_dir, "DASH_quick_summary.txt", save=save)
```

```
============================================================
DASHBOARD SUMMARY
============================================================

  KEY METRICS:
  • Total Revenue: $ 275.022.600
  • Growth Rate: -0.8%
  • Transactions: 5,211

  CRITICAL ACTIONS:
  • 1 products haven't sold in 30+ days
    → Consider liquidation or promotional campaigns

  KEY INSIGHTS:
  • Top 20% of products = 90.9% of revenue
  • Inventory Health: 33% healthy
  • Dead Stock: 0 products

============================================================
```

1.2 KPIs

[52]:
```
kpis = analyzer.get_kpis()
print_info(analyzer.print_kpis(), analyzer.out_dir, "BA_kpi.txt", save=save)
```

```
  Periods considered for growth:
  • Previous: 2024-03-01 -> 2024-03-31
  • Current:  2024-03-31 -> 2024-04-30
```

```
Growth: -0.8%

Revenue: $ 275.022.600
Transactions: 5,211
```

1.3 Alerts & Actions

[53]:
```
alerts = analyzer.get_alerts()
print_info(analyzer.print_alerts(), analyzer.out_dir, "BA_alerts.txt",␣
 ↪save=save)
```

```
CRITICAL ACTIONS REQUIRED:

 1 products haven't sold in 30+ days
 Impact: Cash tied up in non-moving inventory
   Action: Consider liquidation or promotional campaigns

WARNINGS:

 Top 20% of products generate 90.9% of revenue
   Action: Diversify product portfolio
```

1.4 Revenue Concentration Analysis

[54]:
```
pareto = analyzer.get_pareto_insights()
print_info(analyzer.print_pareto(), analyzer.out_dir, "BA_pareto.txt",␣
 ↪save=save)
```

```
TOP INSIGHT: Your top 6 products (20% of catalog) generate 90.9% of revenue!

Concentration Risk Level: High

Top 5 Revenue Generators:
 1. FISICA UNIVERSITARIA SEARS ED.2024: $ 57.138.000
 2. CALCULO DIFERENCIAL STEWART ED.2024: $ 55.380.000
 3. QUIMICA GENERAL CHANG ED.2024: $ 38.704.000
 4. DERECHO CIVIL ALESSANDRI ED.2024: $ 34.865.000
 5. CONTABILIDAD FINANCIERA HORNGREN ED.2024: $ 34.056.000

80/20 Rule: Top 20% = 90.9% of revenue
```

1.5 Inventory Health Check

[55]:
```
inventory = analyzer.get_inventory_health()
print_info(analyzer.print_inventory_health(), analyzer.out_dir, "BA_inventory.
 ↪txt", save=save)
```

```
Inventory Health Score: 33%
```

```
Dead Stock Alert: 0 products

Products At Risk (Slowing):
  • CALCULO DIFERENCIAL STEWART ED.2022: 49.0 days since last sale
```

1.6 Operational Efficiency

[56]:
```
peak_times = analyzer.get_peak_times()
print_info(analyzer.print_peak_times(), analyzer.out_dir, "BA_peak_times.txt",␣
↪save=save)
```

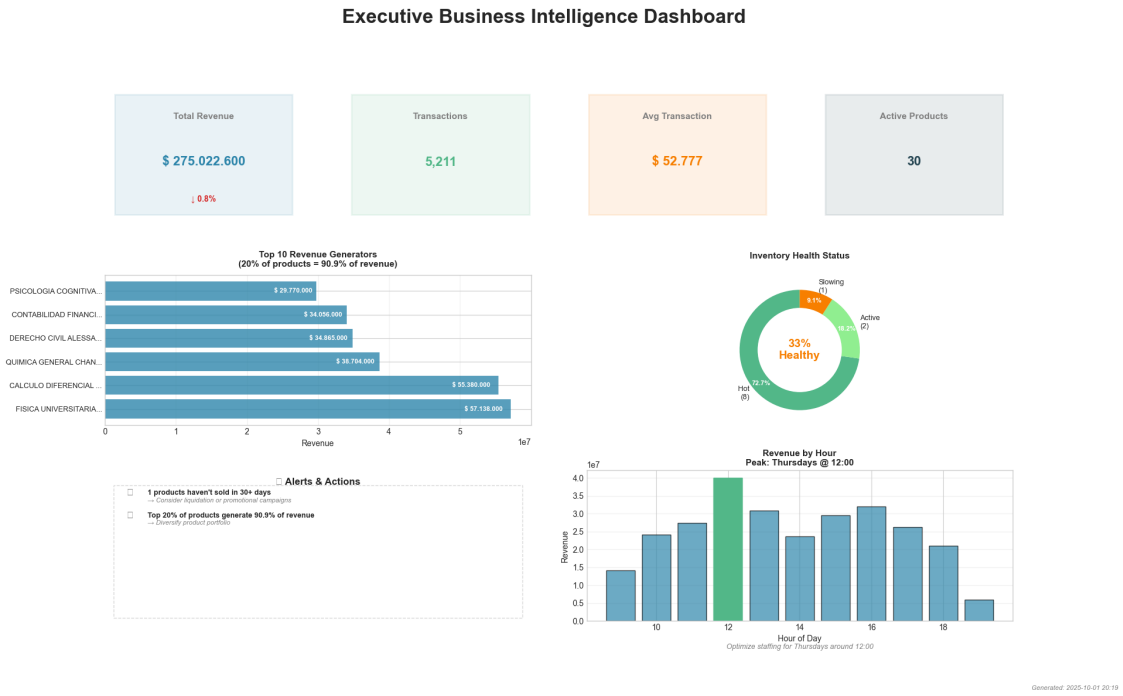
```
Peak Performance Windows:
  • Best Day: Thursdays
  • Peak Hour: 12:00
  • Slowest Day: Sundays

Optimize staffing for Thursdays around 12:00
```

2 Visuals

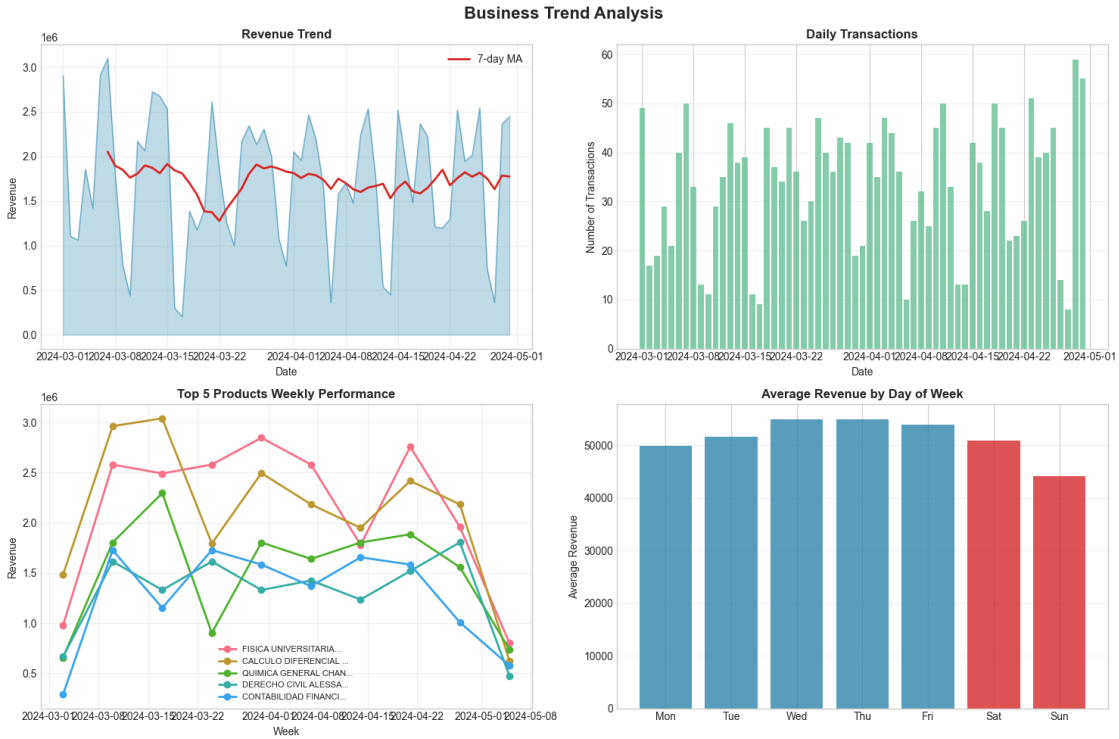
2.1 Executive Dashboard

[57]:
```
# Create and display the executive dashboard
fig = dashboard.create_full_dashboard(figsize=(20, 12))
print_fig(fig, dashboard.analyzer.out_dir, "DASH_executive.png", save=save)
```



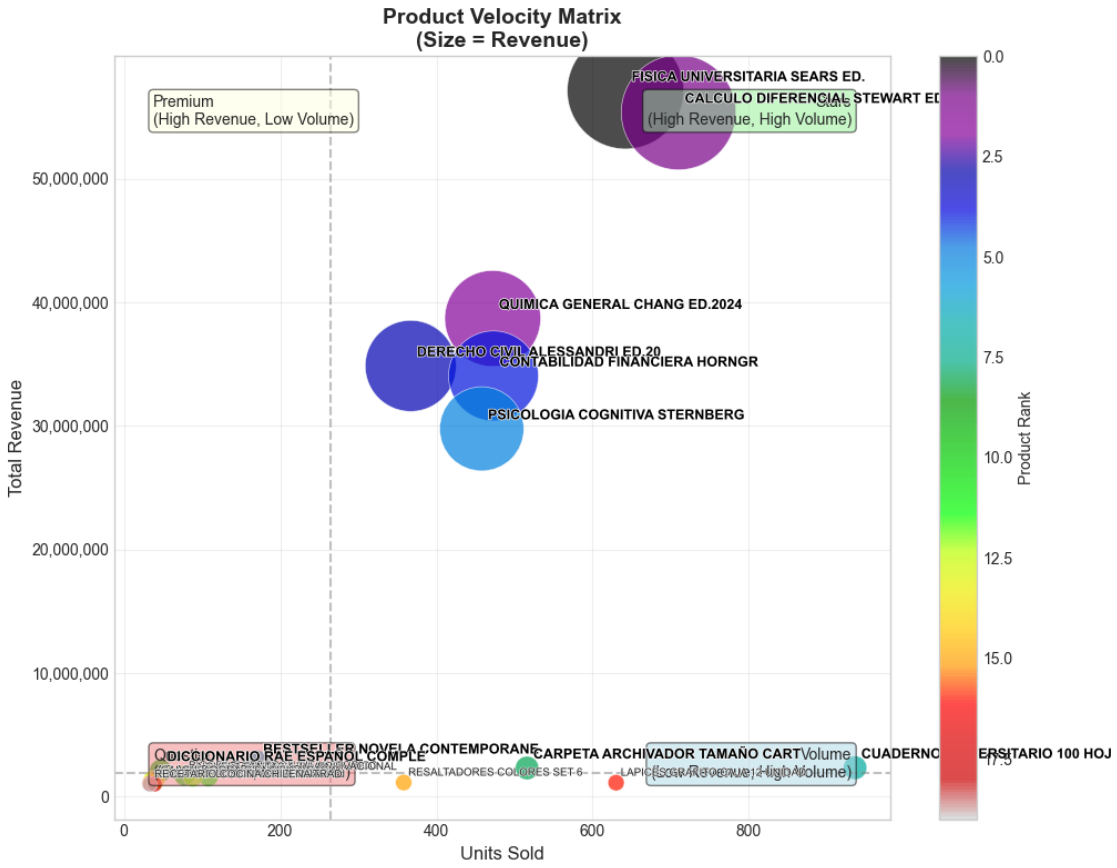
2.2 Trend analysis

[58]:
```
trend_fig = advanced.create_trend_analysis(figsize=(15, 10))
print_fig(trend_fig, dashboard.analyzer.out_dir, "DASH_trend.png", save=save)
```



2.3 Product velocity

[59]:
```
velocity_fig = product_velocity_matrix(analyzer)
print_fig(velocity_fig, dashboard.analyzer.out_dir, "DASH_velocity.png",␣
↪save=save)
```



3 Advanced Analytics

3.1 Forecast

[60]:
```
forecast = advanced.calculate_revenue_forecast(days_ahead=30)
print_info(advanced.print_revenue_forecast(), analyzer.out_dir, "ADV_forecast.
↪txt", save=save)
```

```
 Revenue Forecast for next 30 days:
Daily:
- Average: $ 1.774.386
- Std Dev: $ 754.082
- 95% Confidence Interval: ($ 296.386, $ 3.252.386)
Total:
- Forecast: $ 53.231.571
- 95% Confidence Interval: ($ 8.891.573, $ 97.571.570)
- Trend: Increasing
```

3.2 Cross-sell opportunities

[61]:
```
cross_sell = advanced.calculate_cross_sell_opportunities(limit=3)
print_info(advanced.print_cross_sell_opportunities(), analyzer.out_dir,␣
 ↪"ADV_cross_selling.txt", save=save)
```

```
No significant cross-sell opportunities found.
```

3.3 Anomalies

[62]:
```
anomalies = advanced.calculate_anomalies(limit=3)
print_info(advanced.print_anomalies(), analyzer.out_dir, "ADV_anomalies.txt",␣
 ↪save=save)
```

```
No anomalies detected.
```

3.4 Top Recommmendations

[63]:
```
recommendations = advanced.calculate_recommendations()
print_info(advanced.print_recommendations(), analyzer.out_dir,␣
 ↪"ADV_recommendations.txt", save=save)
```

```
TOP RECOMMENDATIONS:

1. [HIGH] Diversify Revenue Sources
   Your top 20% of products generate 90.9% of revenue
   Action: Develop marketing campaigns for mid-tier products to reduce
concentration risk
   Impact: Reduce business risk by 30% | Timeline: 3 months
```

4 Reports

4.1 Weekly Comparison Report

[64]:
```
weekly_comparison_report = weekly_comparison_report(analyzer)
print_info(weekly_comparison_report, analyzer.out_dir, "REPORTS_weekly_compare.
 ↪txt", save=save)
```

```
============================================================
WEEKLY COMPARISON REPORT
============================================================

Revenue:
  Last Week:     $ 4.812.000
  Previous Week: $ 11.426.100
  Change:          ↓ 57.89%
```

```
Transactions:
  Last Week:     114
  Previous Week: 223
  Change:          ↓ 48.88%

Products Sold:
  Last Week:     22
  Previous Week: 21
  Change:          ↑ 4.76%

Avg Transaction:
  Last Week:     $ 42.211
  Previous Week: $ 51.238
  Change:          ↓ 17.62%
```