full_note_techno_max_20251001

October 1, 2025

1 Business Intelligence Dashboard

Automated insights for data-driven decisions

[1]:

```
input_file = 'data/techno_max/techno_max_transactions.csv'  # Input CSV file

config = {
    'project_name': 'techno_max',       # 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': '2024-12-01',      # Or 'current' for today
    'top_products_threshold': 0.2,
    'dead_stock_days': 30,
    'currency_format': 'CLP',
    'language': 'EN',
}

save = 0  # True or 1 to save outputs, False or 0 to just print
```

[2]:

```
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)
```

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

```
Data date range: 2024-10-01 to 2024-11-30
Recommended analysis_date: 2024-12-01 or later
Business initialized with data from: data/techno_max/techno_max_transactions.csv
(7965, 13)
Output directory: outputs\techno_max\20251001_2031
  All base metrics calculated
BusinessAnalyzer initialized for project: techno_max
Dashboard output directory: outputs\techno_max\20251001_2031
AdvancedAnalytics initialized for project: techno_max
```

1.1 Quick Summary

[3]:

```python
summary = dashboard.create_quick_summary()
print_info(summary, analyzer.out_dir, "DASH_quick_summary.txt", save=save)
```

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

  KEY METRICS:
  • Total Revenue: $ 4.922.300.000
  • Growth Rate: -2.7%
  • Transactions: 7,965

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

  KEY INSIGHTS:
  • Top 20% of products = 76.1% of revenue
  • Inventory Health: 33% healthy
  • Dead Stock: 0 products

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

1.2 KPIs

[4]:

```python
kpis = analyzer.get_kpis()
print_info(analyzer.print_kpis(), analyzer.out_dir, "BA_kpi.txt", save=save)
```

```

  Periods considered for growth:
  • Previous: 2024-10-01 -> 2024-10-31
  • Current:  2024-10-31 -> 2024-11-30
```

```
Growth: -2.7%

Revenue: $ 4.922.300.000
Transactions: 7,965
```

1.3 Alerts & Actions

[5]:

```
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

SUCCESS INDICATORS:

 Revenue well distributed across products
   Next Step: Maintain current portfolio balance
```

1.4 Revenue Concentration Analysis

[6]:

```
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 76.1% of revenue!

Concentration Risk Level: Medium

  Top 5 Revenue Generators:
   1. IPHONE 15 PRO MAX 256GB: $ 1.046.400.000
   2. SAMSUNG GALAXY S24 ULTRA: $ 772.200.000
   3. MACBOOK AIR M3 13 PULGADAS: $ 549.450.000
   4. IPHONE 15 REGULAR 128GB: $ 548.150.000
   5. LENOVO THINKPAD X1 CARBON: $ 420.000.000

  80/20 Rule: Top 20% = 76.1% of revenue
```

1.5 Inventory Health Check

[7]:

```
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):
• CAMARA ACCION GOPRO HERO 8: 56.0 days since last sale
```

1.6 Operational Efficiency

[8]:
```
peak_times = analyzer.get_peak_times()
print_info(analyzer.print_peak_times(), analyzer.out_dir, "BA_peak_times.txt",␣
↪save=save)
```

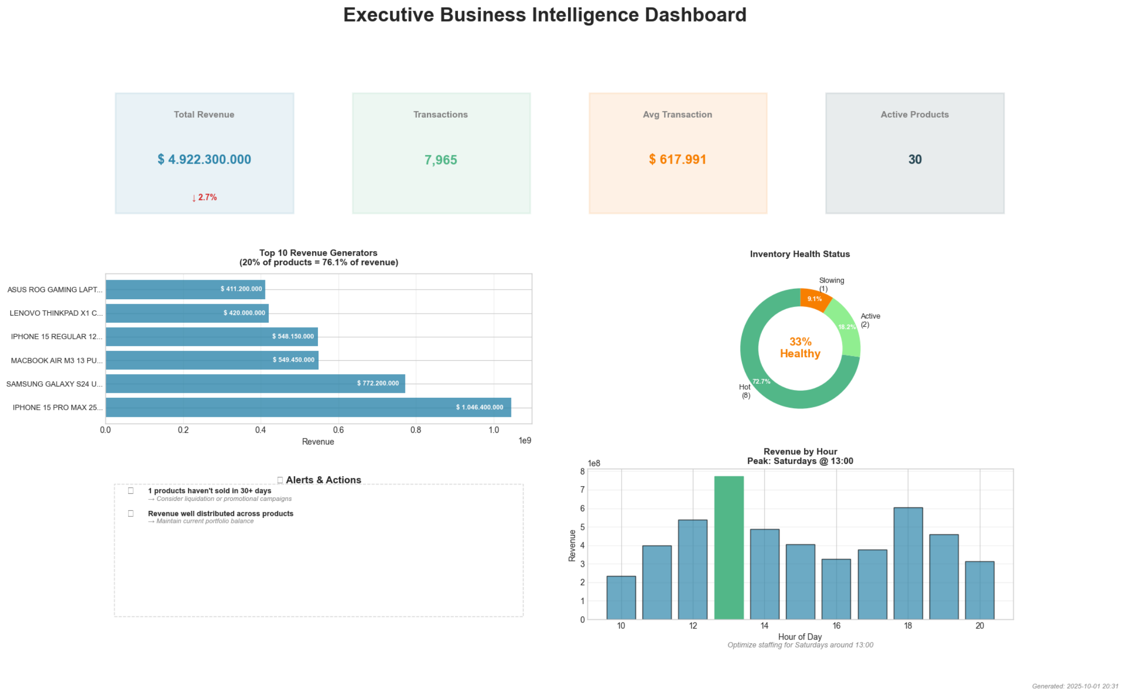
```
Peak Performance Windows:
• Best Day: Saturdays
• Peak Hour: 13:00
• Slowest Day: Mondays

Optimize staffing for Saturdays around 13:00
```

2 Visuals

2.1 Executive Dashboard

[9]:
```
# 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)
```

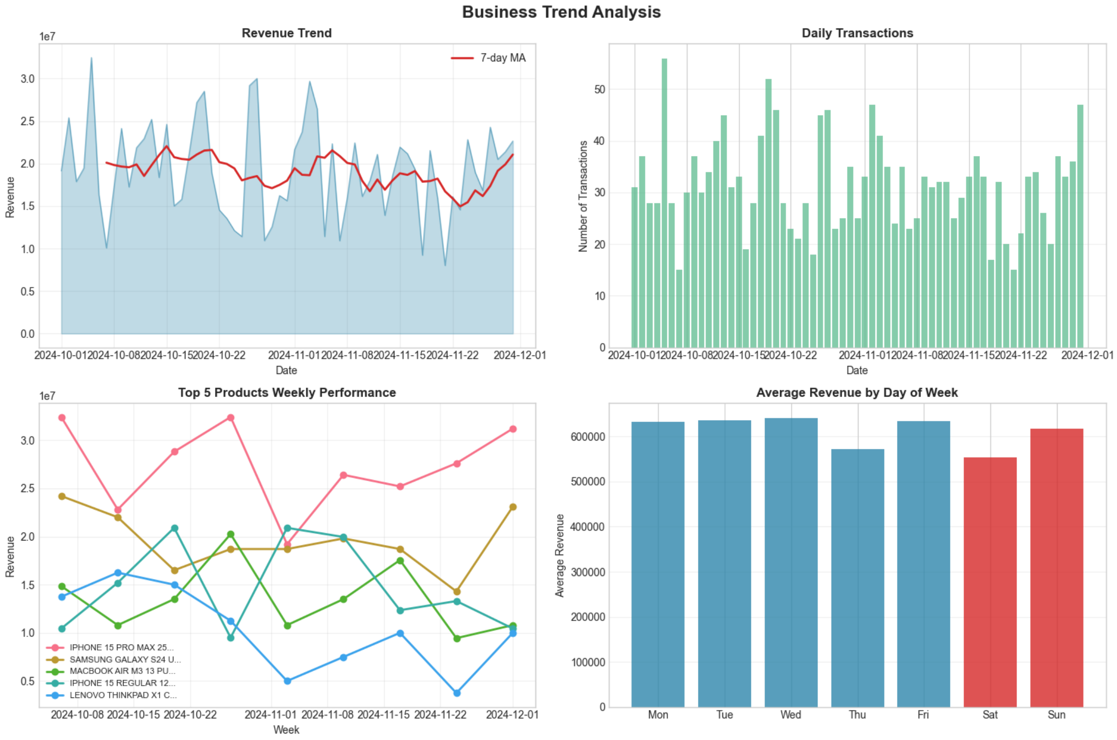


□ 1 products haven't sold in 30+ days
→ Consider liquidation or promotional campaigns

□ Revenue well distributed across products
→ Maintain current portfolio balance

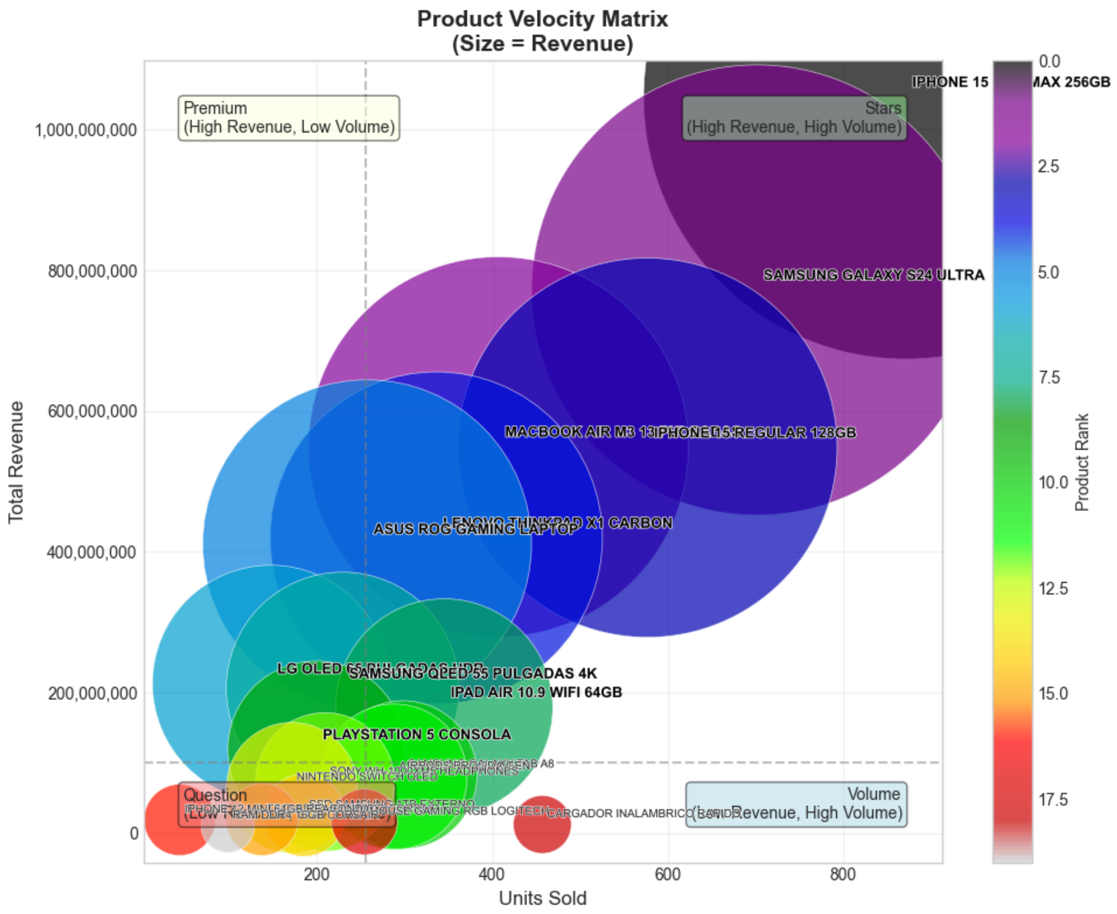
2.2 Trend analysis

[10]:
```
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

[11]:
```
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

```
[12]: 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: $ 21.056.143
- Std Dev: $ 5.570.431
- 95% Confidence Interval: ($ 10.138.097, $ 31.974.188)
Total:
- Forecast: $ 631.684.286
- 95% Confidence Interval: ($ 304.142.920, $ 959.225.651)
- Trend: Increasing
```

3.2 Cross-sell opportunities

[13]:
```
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

[14]:
```
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

[15]:
```
recommendations = advanced.calculate_recommendations()
print_info(advanced.print_recommendations(), analyzer.out_dir,␣
 ↪"ADV_recommendations.txt", save=save)
```

```
No actionable recommendations found.
```

4 Reports

4.1 Weekly Comparison Report

[16]:
```
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:     $ 124.583.000
  Previous Week: $ 108.154.000
  Change:          ↑ 15.19%

Transactions:
  Last Week:     199
  Previous Week: 173
  Change:          ↑ 15.03%

Products Sold:
  Last Week:     24
  Previous Week: 26
  Change:          ↓ 7.69%

Avg Transaction:
  Last Week:     $ 626.045
  Previous Week: $ 625.168
  Change:          ↑ 0.14%
```