Group 6

IB9EO0 Pricing Analytics

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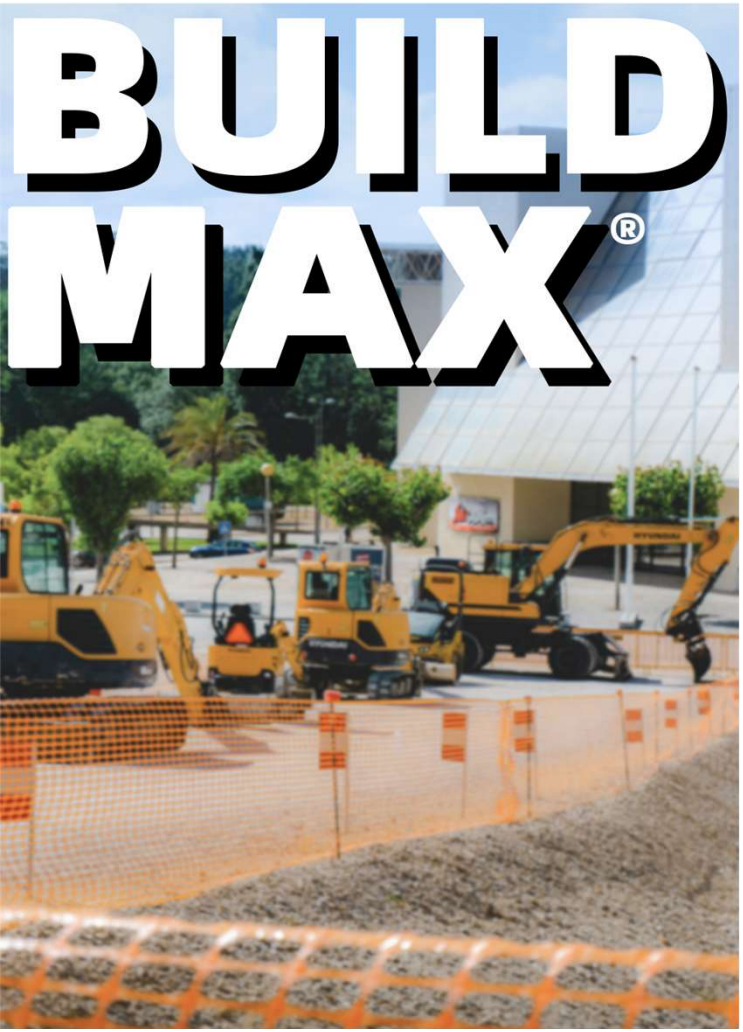
01

Introduction

A summary of the Project

Business Context and Challenges

RM suitability for BuildMax and Potential challenges



- **BuildMax** is a construction equipment rental companies with a diverse customer base spanning industries such as construction, mining, and public works.
- **However**, it faces challenges in optimizing fleet utilization and maximizing revenue.

Our Team

- **Revenue Management (RM)** Implementation by leveraging linear programming.
- **To enhance overall profitability**, optimize equipment allocation and improve pricing decisions.

PART
02

Business Context and Challenges

RM suitability for BuildMax and Potential challenges

Business Context and Challenges

RM suitability for BuildMax and Potential challenges

Business Context

1. **Fixed** Capacity

   Fixed fleet availability, and each branch has a fixed availability of machine

2. **Perishable** Resources

   Idle machines do not generate revenue and loses value over time because machines depreciate

3. Price **Sensitivity**.

   Distinct rental segments: short-term rentals (1 week) and long-term rentals (4, 8 or 16 weeks)

4. **Low** Variable Cost

   Cost of letting an additional machine is low

5. **Variable** Demand

   Higher demand during spring and summer

Business Context and Challenges

RM suitability for BuildMax and Potential challenges

Fleet Constraints

Fleet cannot be expanded

Machines need to be maintained between rentals,

Machine Allocation

Different pricing structures can be operationally challenging.

Average willingness to pay (WTP) is different for each segments (challenging to create segments)

Multiple Customer Segments

Misallocation could lead to shortages in high demand areas and under-utilisation in low demand areas.

One-way rentals increase transport costs and reduce model stability.

Government and Private

Fixed pricing for government project reduce pricing flexibility.

Corporate bulk discount leads to a trade-off between the reduced revenue per-unit and utilisation rates

PART
03

LP model and Results

LP Model and Results

Objective function, Decision variables & Constraints

Maximise Revenue=Price* Approved rentals*Duration*7

Decision variables:

Approved Rentals: The number of rental request approved.

Equipment Returns: The number units returned each week.

Available inventory: The number of equipment units available for new rentals after returns.

Constraints:

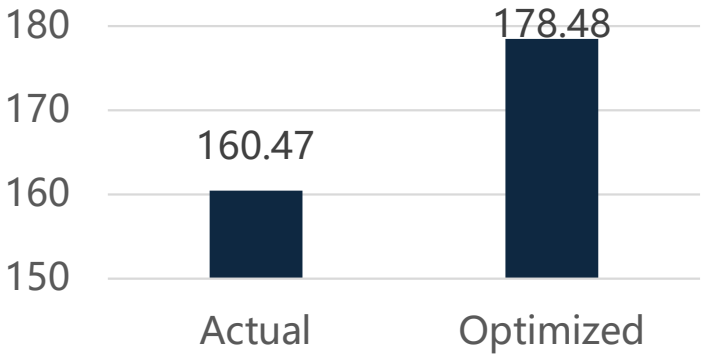
Demand Constraint: Approved rentals not exceed demand.

Inventory Update Constraint: Inventory is updated over time.

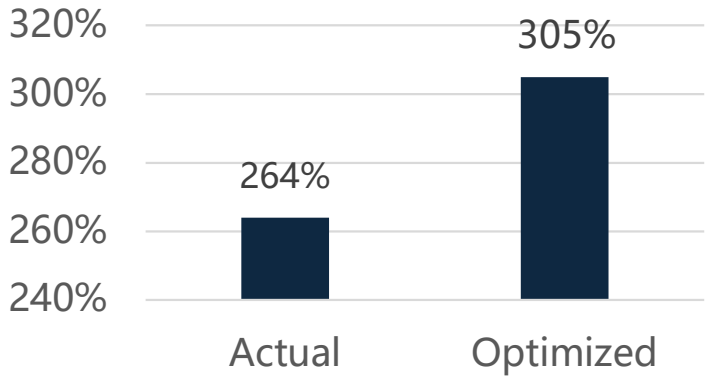
Returns Constraint: Track returns based on previous rentals.

Allocation Constraint: Rentals cannot exceed available inventory

Non-negative Constraint.



Revenue increased: **11.22%**



ROI increased: **15.17%**

PART
04

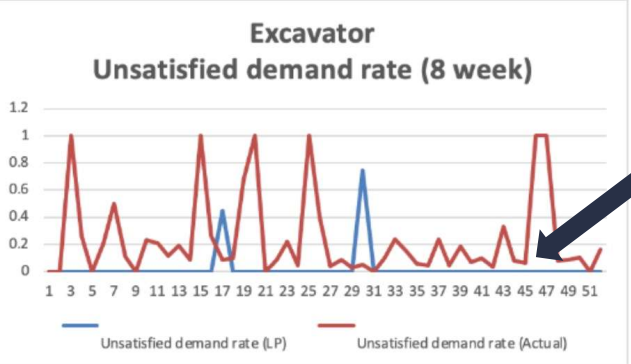
Actual and Optimized Comparison

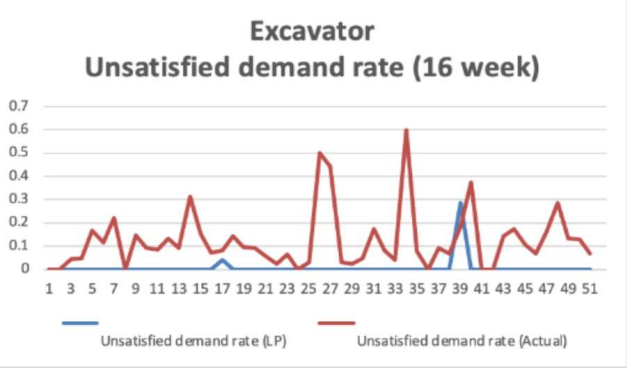
Optimized vs Actual Acceptance Comparison

Unsatisfied demand rate = (Demand – Accept Number) / Demand

0%: all demand is satisfied for given week.
100% : reject all demands for given week.

Optimized unsatisfied demand rate(%)
Actual unsatisfied demand rate(%)





- Optimized demand rate equals o

Demand for 16-week and 8-week rentals is almost fully satisfied

Prioritize long-term rentals

Optimized vs Actual Acceptance Comparison

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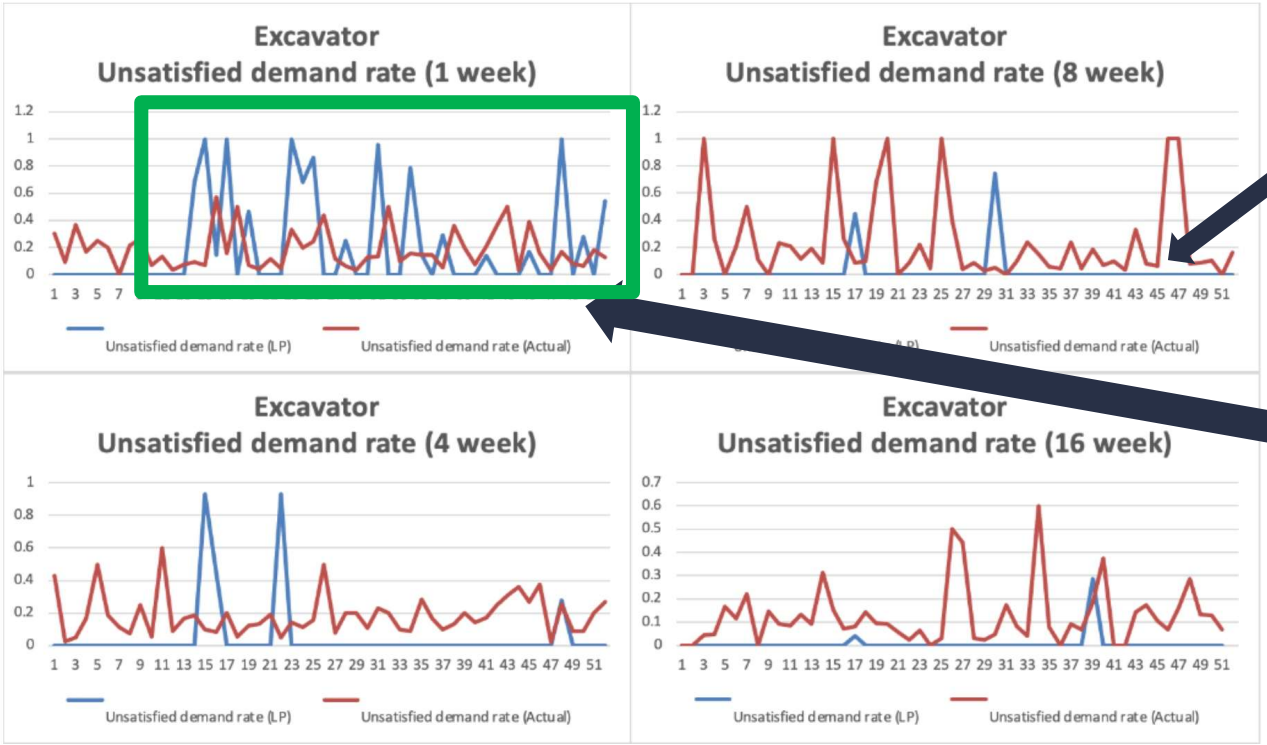

- Optimized demand rate equals o

  Demand for 16-week and 8-week rentals is almost fully satisfied

  Prioritize long-term rentals

- Optimized demand rate changes dramatically

  Mainly occurs week 13 - week 37 from mid-spring to late summer.

  Sacrificing short-term Demand

Optimized vs Actual Acceptance Comparison

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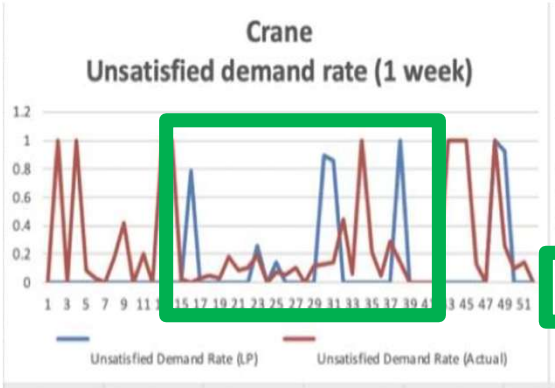
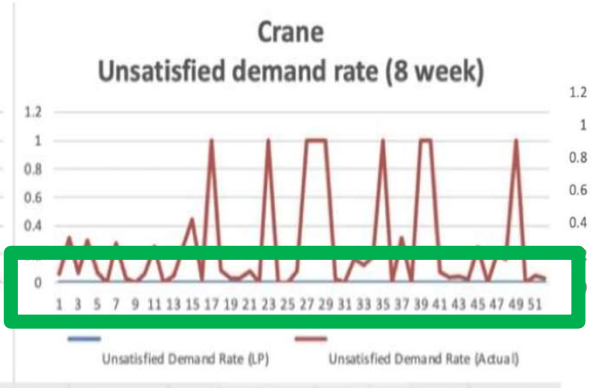
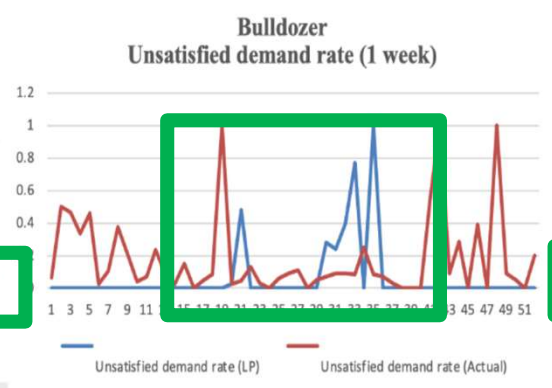
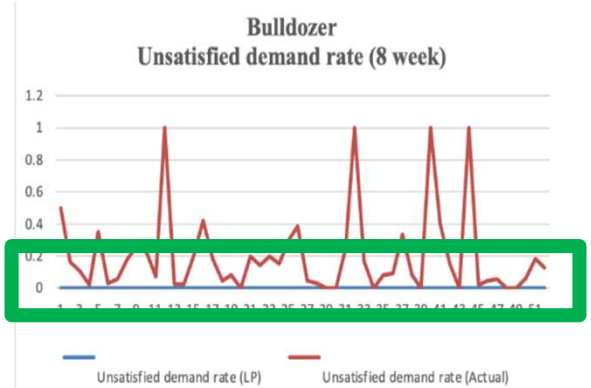
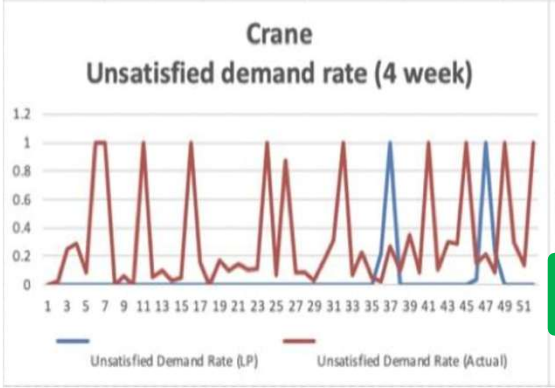
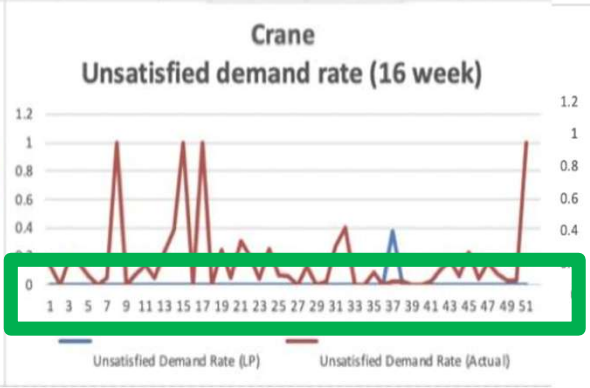


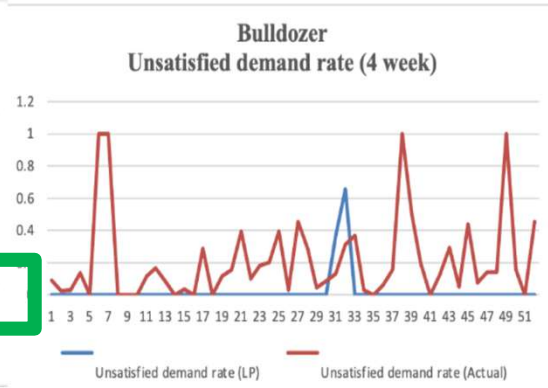


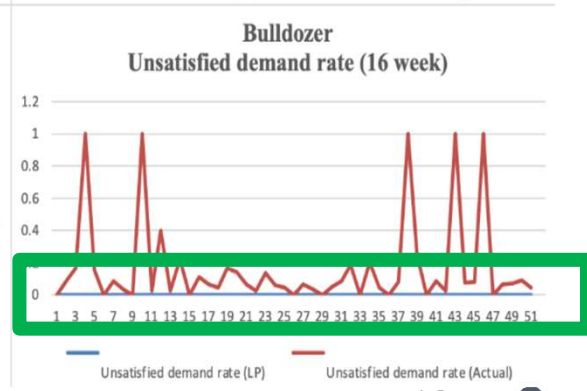










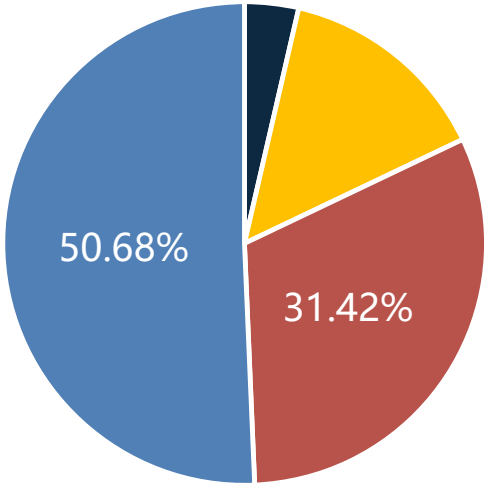


Optimized vs Actual Revenue Comparison

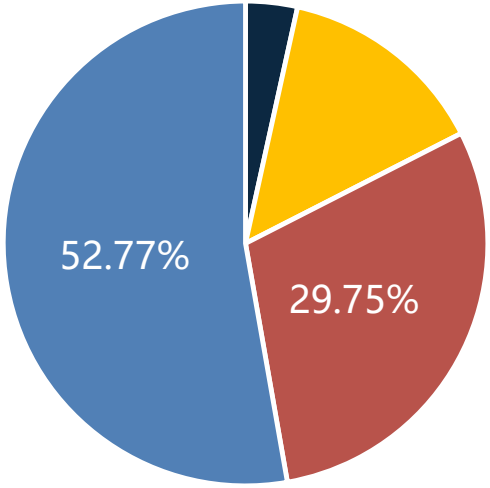
Long-term rentals contributes more to revenue

Long-term rentals (especially 8 and 16 weeks) approximately accounted for 80% of the total annual revenue for each equipment type.

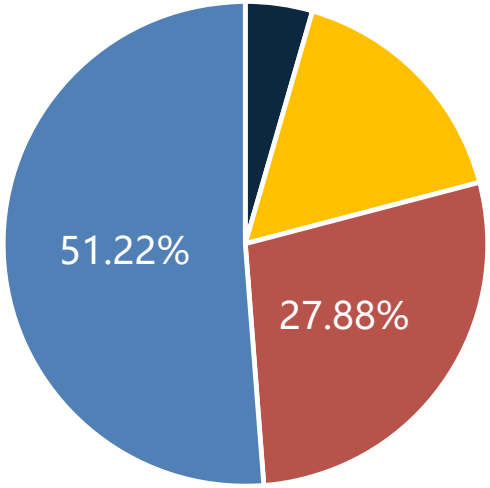
Revenue Proportion by Rental Duration for **Extractor**



Revenue Proportion by Rental Duration for **Crane**

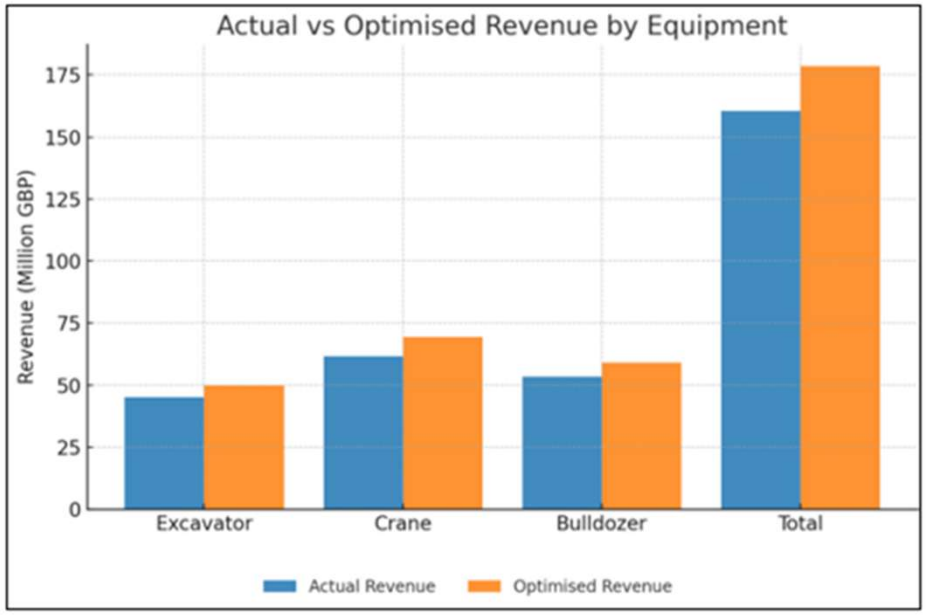


Revenue Proportion by Rental Duration for **Bulldozer**



1-week duration
4-week duration
8-week duration
16-week duration

Optimized vs Actual Revenue Comparison



Equipment	Actual Revenue (GBP)	Optimised Revenue (GBP)	Revenue Increase (%)
Excavator	45,274,005.00	49,866,264.00	10.14
Crane	61,785,689.00	69,471,738.00	12.44
Bulldozer	53,413,920.00	59,140,634.00	10.72
Total	160,473,614.00	178,478,636.00	11.22

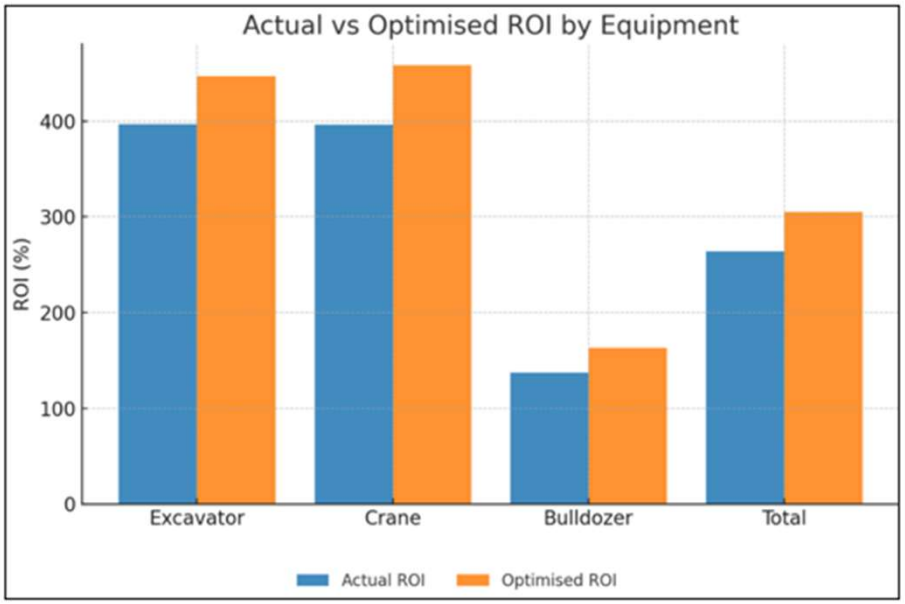
1. Prioritise long-term rentals strategy ; long-term rentals contribute 80% of revenue.

2. 11.22% growth in the total revenue; indicates strategy effectiveness.

3. The Revenue Increase % of the three different types of equipment is very similar.

4. Revenue growth facilitated; ROI improvement.

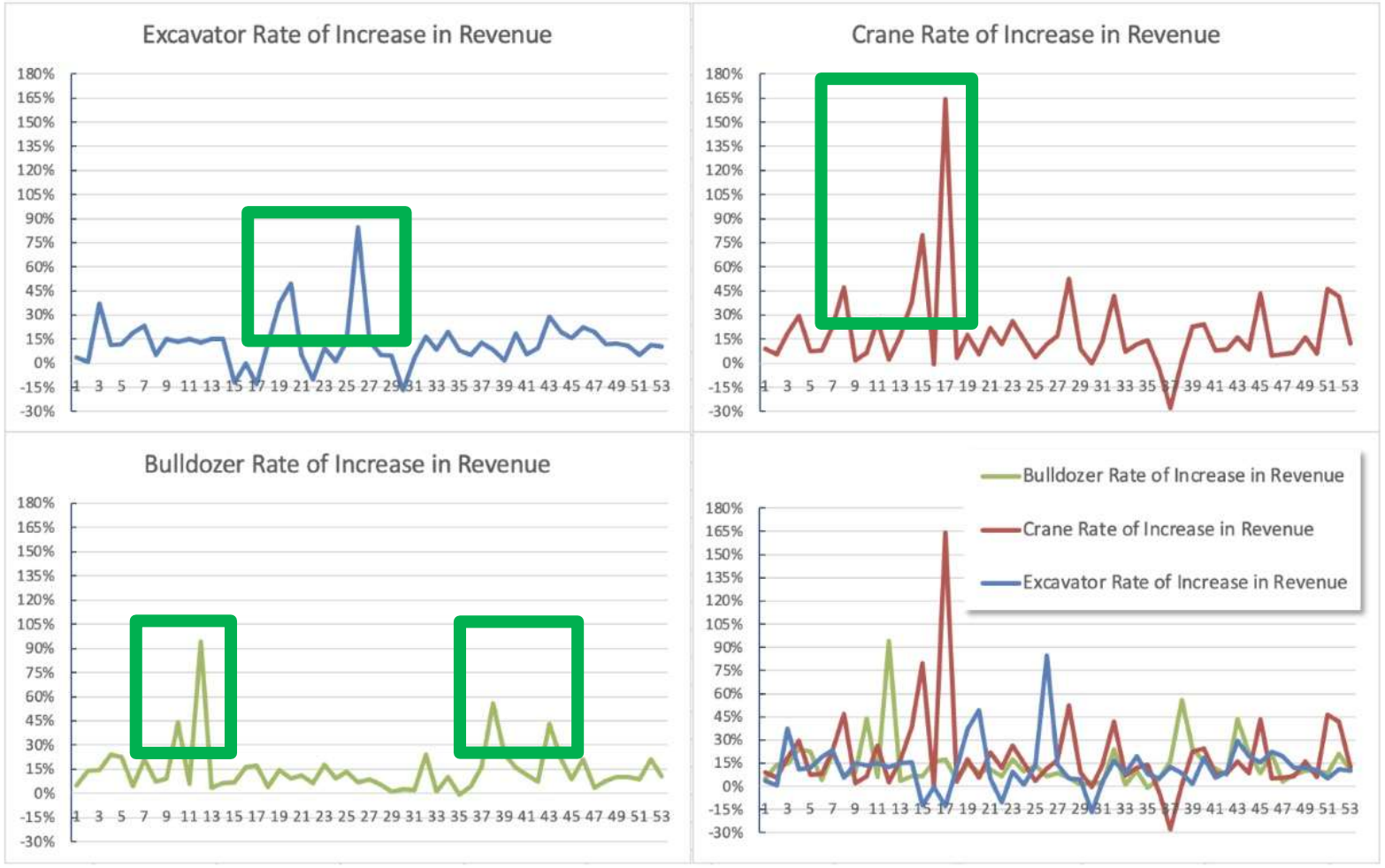
Optimized vs Actual ROI Comparison



Equipment	Actual ROI (%)	Optimised ROI (%)	ROI Change (%)
Excavator	396.43	446.78	12.70
Crane	396.27	458.01	15.58
Bulldozer	137.4	162.85	18.52
Total	264.1	304.99	15.47

1. Total ROI increased by 15.47%
2. Bulldozers: Highest relative ROI growth (18.52%), indicating revenue potential
3. Excavators & Crane: Highest absolute ROI

Optimized vs Actual
Focus on important high increasing potential periods

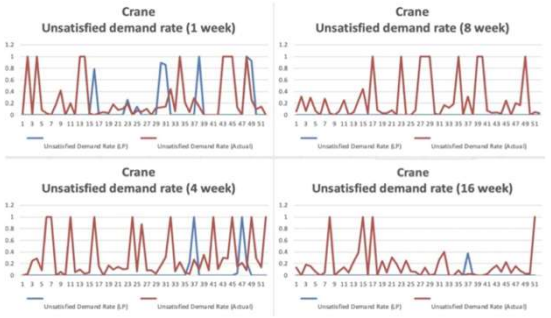


Excavators
(weeks 18-20);

Cranes
(weeks 7-17);

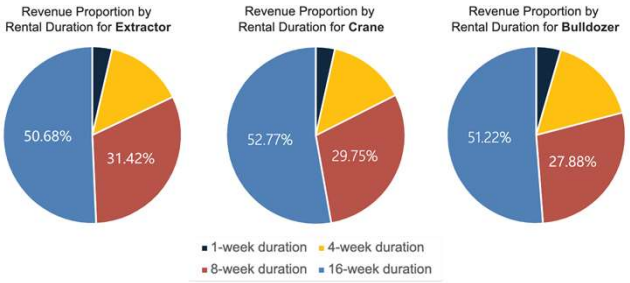
Bulldozers
(weeks 8-13 and 38-43).

Optimized vs Actual
Summary of insights from the comparison



Acceptance Comparison:

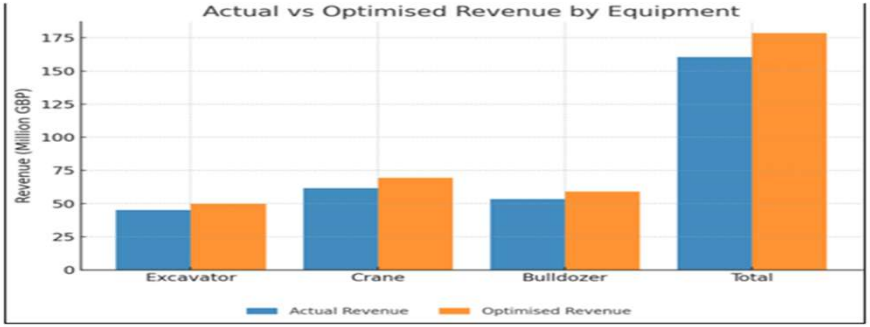
Prioritize long-term rentals;
Sacrificing short-term Demand.



Revenue & ROI Comparison:

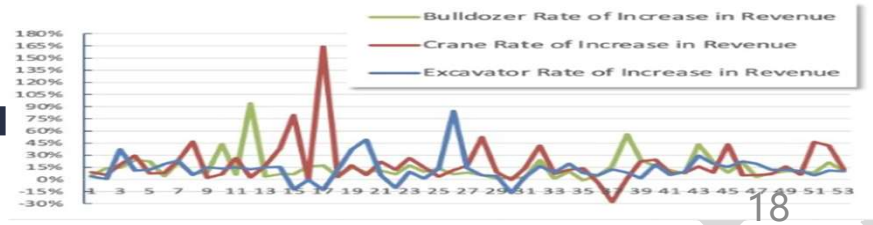
Long-term rentals (especially 8 and 16 weeks) accounted for 81.27% of the total annual revenue.

The Revenue Increase percentage of the three different types of equipment is very similar.



Revenue Comparison (weekly):

Important high potential periods are marked.

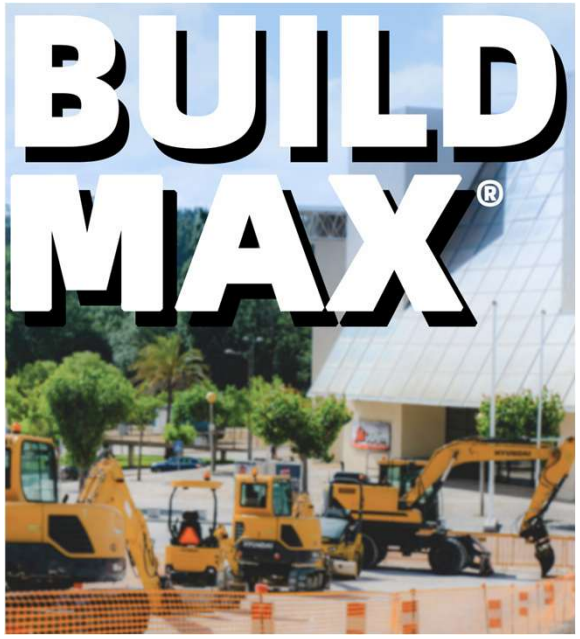


PART
05

Revenue Management Approach

Revenue Management Approach

Key Approaches



1. **Prioritise Long-Term Rentals**

   especially for mining and oil companies
   sacrificing short-term orders during peak demand

2. **Manage Inventory Shortages**

   During weeks 13 and 37, sacrifice short-term orders
   to fulfil long-term rental demand and maintain revenue stability.

3. **Target High-Profit Periods**

   Excavators (weeks 18-20), Cranes (weeks 7-17), and Bulldozers (weeks 8-13)

4. **Adopt Dynamic Pricing**

   Shift to dynamic pricing based on demand fluctuations, seasonality,
   and rental duration, other than based on bulldozers' inventory.

5. **Fixed Contract Price & Flexible Return Policy**

   The ROI of the contract have to exceeds 265%.

PART
06

Implementation, Limitation, and Solutions

Potential Implementation

Prioritise long-term rentals

Maximising around 80% of revenue.

Leverage historical rental data

Forecast peak demand period and set premium prices.

Customer Segmentation

Identify high value customers and offer them priority to long-term rental access.

Switch to Dynamic Pricing Strategy

Change pricing strategy from fully decided by Bulldozers' inventory to dynamic pricing strategy based on demand fluctuations.

Discount rates

Offer discount rates during off peak periods.

Current Limitations & Proposed Solutions

Prioritisation of long-term rentals

- Apply constraints to prioritise short-term rentals in approval process.

Inter-Branch Rental Distribution

- Current model lacks inter-branch transfers. Implementing demand-driven reallocation can improve flexibility and optimise equipment utilisation.

Limited Granularity in Demand data

- Incorporating day-level data would allow more accurate, real-time equipment allocation.

Maintenance bandwidth considerations

- Use daily demand data to set precise maintenance thresholds, prioritising long-term rentals.

Misaligned Pricing Strategy

- Improvement through dynamically adjusting price per equipment demand, for better market alignment.

Absence of Sector-Specific Demand Optimisation

- Incorporating sector specific demand forecasting to target high-margin sectors and optimise equipment utilisation.

PART
07

Conclusion

Conclusion

Our findings highlight the importance of balancing short-term and long-term rentals, considering sector-specific pricing needs, addressing limited granularity in demand data, issues with maintenance schedules, and the misaligned pricing strategy. Implementing these RM strategies will allow BuildMax to stay competitive, increase revenue potential, and improve overall business performance.

THANK YOU