Case Study: Feed Ingredient Logistics Optimization Project
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Business Challenge

CPF, a leading agribusiness company, faced significant inefficiencies in its feed ingredient logistics operations. The company imports and distributes large quantities of feed ingredients (such as rapeseed meal and soy meal) to multiple factories across Thailand. However, its manual planning process was creating bottlenecks that led to increased costs and operational inefficiencies:

- **Time Consumption:** The logistics team spent 2 full days per week manually planning the distribution of over 20,000+ tons of ingredients.
- **Warehouse Utilization:** Limited optimization of factory warehouses resulted in an overreliance on expensive rented warehouse space.
- **Transportation Costs:** Complex shipping options created countless routing combinations, making it impossible to select the optimal routes manually.
- **Information Flow Issues:** The team struggled with inefficiencies due to siloed data. Planners had to manually coordinate with 13 factories, 3 warehouses, and shipping companies, consuming valuable time.

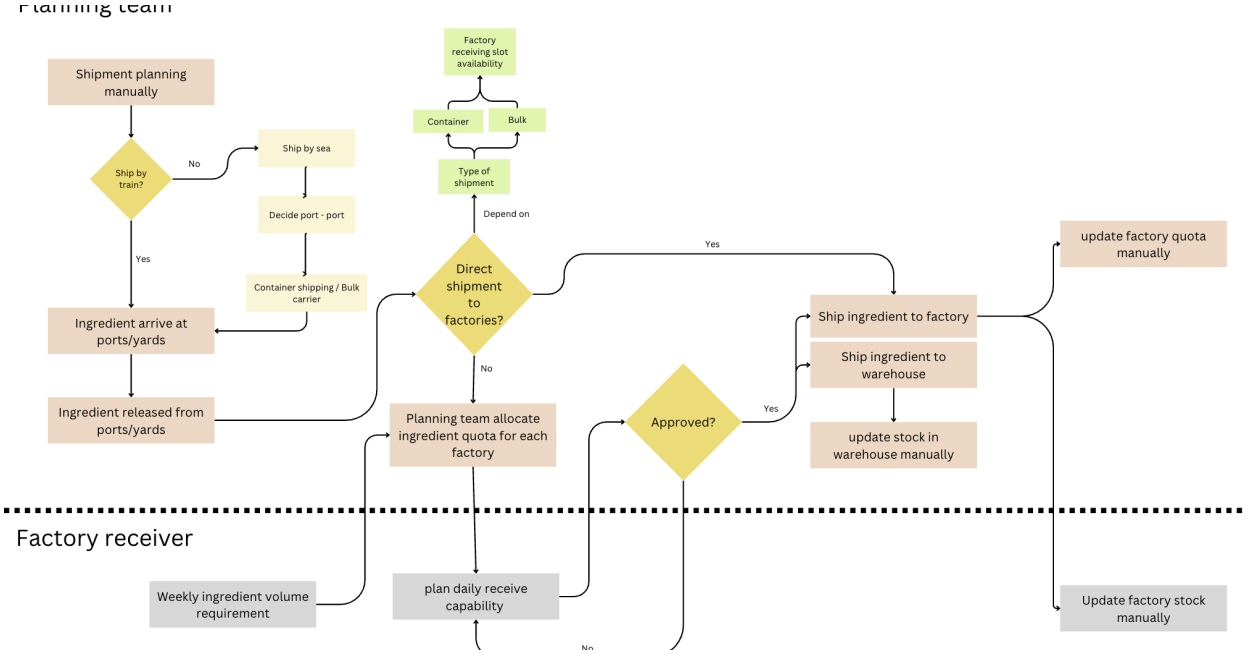
The manual process involved collecting factory needs, matching them against port releases, direct shipping where possible, and allocating remaining inventory to rented warehouses—creating a complex logistical puzzle that was being solved sub-optimally through manual work.

CPF needed a solution that could streamline decision-making, optimize warehouse utilization, and reduce logistics costs while improving overall efficiency.

My Approach

1. Discovery & Requirement Gathering

- Conducted in-depth interviews with the logistics planning team to understand existing workflows.



Original manual workflow

- Shadowed planners through their full 2-day process to identify pain points and inefficiencies.
- Met with factory receiving managers to understand warehouse constraints and usage patterns.
- Mapped the complete process flow, identifying critical decision points and constraints.
- Translated business needs into formal user stories and technical requirements.

2. Solution Design & MVP Development

To address these challenges, I designed a **mathematical optimization model** based on **linear programming** that focused on three key objectives:

- **Minimizing total logistics costs** (transportation + warehouse costs)
- **Maximizing factory warehouse utilization**
- **Reducing planning time**

Key Features of the MVP:

- **Route Optimization Model:** Used linear programming to determine the most cost-effective transport combinations.
- **Warehouse Capacity Constraints:** Ensured that storage utilization was optimized to reduce reliance on rented warehouses.
- **Factory Receiving Constraints:** Ensured timely deliveries without overloading factory warehouses.
- **Transportation Cost Comparison Matrix:** Helped planners select the most cost-effective shipping methods.

(The MVP was built in **Excel** to allow for easy testing and quick iteration before transitioning to a full-scale system.)

3. Pilot Implementation & Testing

To validate the effectiveness of the model, I implemented a **one-month parallel testing approach**:

- Ran the mathematical model alongside the traditional manual planning approach using real shipment data.
- Measured outcomes across cost, warehouse utilization, and planning time.
- Documented exceptions and edge cases for future refinement.

4. Stakeholder Management & Approval

- Created data visualizations comparing model performance vs. manual process.
- Prepared comprehensive ROI analysis highlighting both immediate and projected savings.
- Presented findings to upper management, emphasizing cost savings and efficiency gains.
- Secured approval and funding for full-scale implementation.

5. Full Solution Implementation

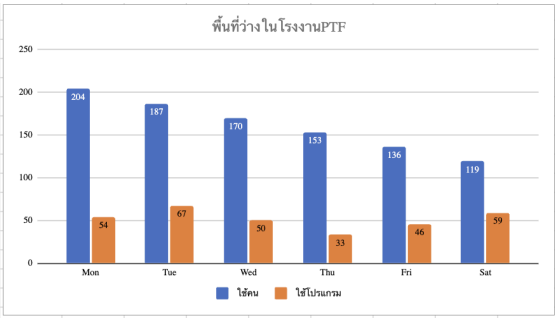
- Collaborated with the development team to translate the Excel prototype into a production system.
- Created detailed technical specifications for developers.
- Facilitated knowledge transfer sessions between logistics experts and the technical team.
- Oversaw development iterations and testing phases.

Results & Business Impact

Quantitative Results:

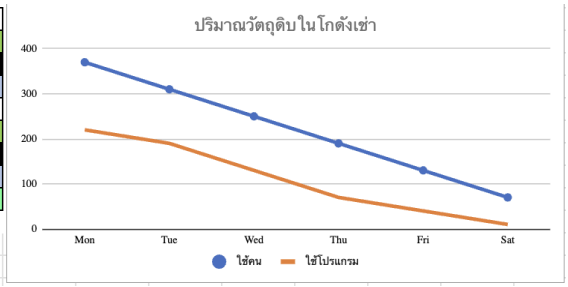
- **Time Savings:** Reduced planning process from 2 days to under 30 minutes (**97% reduction**).
- **Cost Reduction:** Decreased overall logistics costs by **10%+ per shipment**.
- **Warehouse Optimization:** Improved factory warehouse utilization by **30%**.
- **Financial Impact:** Reduced warehouse rental costs by ~ **100,000 THB in the first month alone**.

PTF								
พื้นที่ทั้งหมด	582							
สต็อคตั้งต้น	391							
การใช้	43							
		Mon	Tue	Wed	Thu	Fri	Sat	Total
ใช้คน		30	60	60	60	60	60	330
สต็อคหลังหักการใช้		378	395	412	429	446	463	
พทว่าง		204	187	170	153	136	119	
		Mon	Tue	Wed	Thu	Fri	Sat	Total
ใช้โปรแกรม		180	30	60	60	30	30	390
สต็อคหลังหักการใช้		528	515	532	549	536	523	
พทว่าง		54	67	50	33	46	59	



Comparing empty space left in factory warehouse between manually planning vs using mathematical model

สต็อค	400	Mon	Tue	Wed	Thu	Fri	Sat	รวม
คนจัดแผน		30	60	60	60	60	60	330
ของเหลือในโกดังเช่า		370	310	250	190	130	70	
ค่าเช่า		592	496	400	304	208	112	2112
สต็อค	400	Mon	Tue	Wed	Thu	Fri	Sat	รวม
โปรแกรมจัดแผน		180	30	60	60	30	30	390
ของเหลือในโกดังเช่า		220	190	130	70	40	10	
ค่าเช่า		352	304	208	112	64	16	1056
						ลดค่าเช่าโกดังได้		1056



Comparing amount of ingredient left in rented warehouse between manually planning vs using mathematical model

Qualitative Benefits:

- **Scalability:** System could handle volume increases without additional staff.
- **Consistency:** Eliminated human error and variability in planning decisions.
- **Transparency:** Provided a clear audit trail for logistics decisions.
- **Employee Satisfaction:** Freed planning staff from repetitive tasks for higher-value work.

Key Learnings & Takeaways

- **Complex Problems, Simple Solutions:** Even highly complex logistics operations can be significantly improved through mathematical modeling.
- **Proof-of-Concept Value:** The Excel MVP approach allowed for low-risk validation before major investment.
- **Stakeholder Involvement:** Regular engagement with both planning staff and factory teams ensured the solution addressed real operational needs.
- **Data Visualization:** Presenting complex logistics data visually was crucial for securing management buy-in.

Areas for Improvement

- **Automation & System Integration:** The initial MVP relied on Excel, which, while effective, would benefit from full integration into an ERP or cloud-based system for scalability.
- **Real-Time Data Updates:** Incorporating real-time shipment tracking and automated data feeds would further improve efficiency.
- **User Interface Enhancements:** A more intuitive dashboard with interactive features could improve user experience for planners.

Relevant Skills for a Business Analyst Role

This project showcases key business analysis and optimization skills that are valuable for a Business Analyst position:

- **Process Mapping & Optimization:** Ability to analyze and streamline complex workflows.
- **Data Analysis & Visualization:** Using data-driven insights to drive decision-making and present findings effectively.
- **Stakeholder Management:** Engaging with cross-functional teams to gather requirements and ensure alignment.
- **Requirement Documentation:** Translating business needs into formal user stories and technical specifications.
- **Mathematical Modeling & Optimization:** Applying quantitative methods to solve real-world business problems.
- **Software Development Collaboration:** Working closely with developers to implement solutions that drive business impact.

Conclusion

This project demonstrated how business analysis skills, combined with process optimization expertise, can transform labor-intensive manual operations into streamlined, data-driven systems that deliver measurable business value.