

Web-app

Decision Support System
for Improving Drug Acquisition Price

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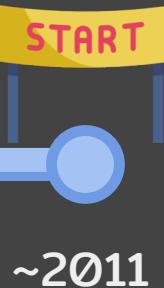
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PAC-DSS

(Pharmaceutical Acquisition Capability - Decision Support System)



~2011

The screenshot shows the homepage of the PAC website. At the top, there is a navigation bar with links for 'Menu PAC', 'ประวัติยาจาก PAC', 'รัฐกิจด้านยา PAC', and 'ติดต่อ Contact us'. Below the navigation bar, there is a main content area featuring two images: one of two women in lab coats working in a laboratory, and another of a laboratory machine with the text 'HSRI Welcome to Health System Research Institute'. A 'read more' button is visible next to the second image. On the left side of the content area, there is a sidebar with a 'Main Menu' section containing 'Home' and 'Feedback' options. The central content area has a 'Home' link and the text 'Welcome to PAC (Pharmaceutical Acquisition Capability Approach)'. Below this, there is a section titled 'เกี่ยวกับ PAC' with a timestamp 'วันเสาร์ที่ 07 กันยายน 2007 เวลา 09:54 น.' and an author 'Author: Administrator'. There are also icons for a magnifying glass, a bar chart, and a pie chart. At the bottom of the content area, there is a copyright notice '©2014 PAC (Pharmaceutical Acquisition Capability Approach)'.



Drug Price
Mechanism



Improve drug
purchasing

PAC-DSS

(Pharmaceutical Acquisition Capability -
Decision Support System)



~2011

PAC
index



Show

Acquisition Capability
of buyers



Gini
Coefficient



Show

Price Dispersion

PAC index

How much purchasing capability user has.

PAC = 0.5

PAC = 0.7

PAC = 1.3



Gini Coefficient

How much inequality of drug price in the market.



High price dispersion

Critical G value = 0.5



Low price dispersion

Critical G value = 0

= Fix price, not depend on volume

Goal

Provide information as much as possible to make users have a better decision and planning



Policy Maker

1. Know good/bad situation
2. Plan better policy
3. Support decision making

Healthcare Organization

1. Reasonable price
2. Performance
3. Support decision making

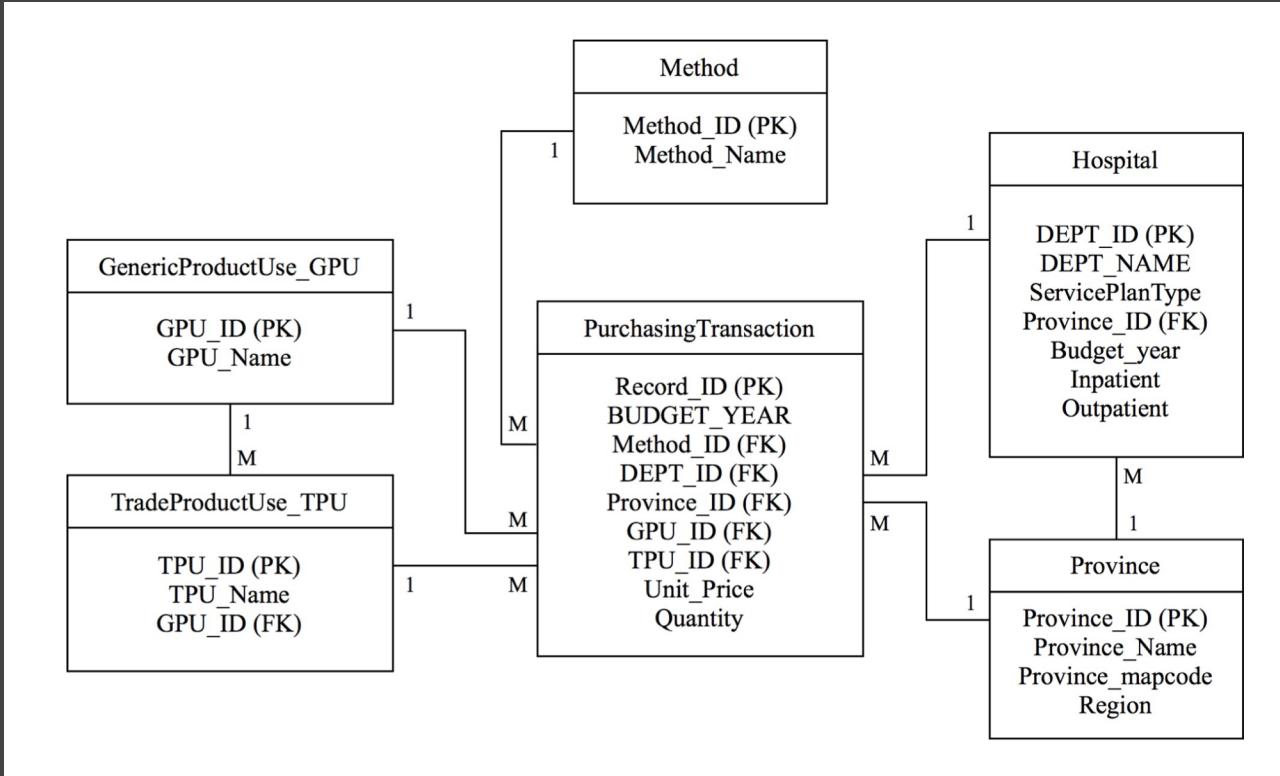


- ★ Data Analytics
- ★ Data Visualization
- ★ Website Implementation

SYSTEM DESIGN



Data Preparation



Data analysis & visualization



Data Analysis > Data Visualization



Policy Maker User Design



Drug-related



Hospital-related

Policy Maker Design : Drug-related



What they want to know

Which drug has high price dispersion?



What can answer

Use Gini coefficient
If $G > 0.5$, it means that in the market it is high price dispersion



How to visual

Top 10 drug price dispersion

GPU ▾

Name ▾	Code ▾	Gini coeff ▾
Drug Name	111111	0.97

*Gini Coefficient higher than 0.5 indicates high inequality

[Show more](#)

Policy Maker Design : Drug-related



What they want to know

If using the suggested price, how much does it save?

What can answer

Compare between the suggested price (from calculation) and the real purchasing price (from actual record)

How to visual

Cost Saving						
Total potential cost saving = 77,000,000 THB						
Code	General Name	Code	Trade Name	Real purchasing cost (THB)	Potential saving cost (THB)	Saving (%)
0101	Paracetamol...	0101	Paracetamol...	1,000,000	250,000	25
0101	Paracetamol...	0101	Paracetamol...	1,000,000	250,000	25
0101	Paracetamol...	0101	Paracetamol...	1,000,000	250,000	25
0101	Paracetamol...	0101	Paracetamol...	1,000,000	250,000	25
0101	Paracetamol...	0101	Paracetamol...	1,000,000	250,000	25
0101	Paracetamol...	0101	Paracetamol...	1,000,000	250,000	25
0101	Paracetamol...	0101	Paracetamol...	1,000,000	250,000	25

Show more

Policy Maker Design : Drug-related



**What they
want to know**

Total Annual Spending



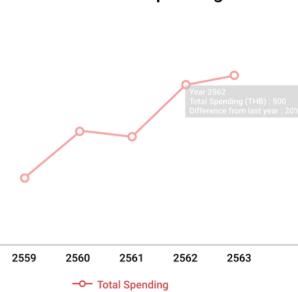
What can answer

Sum all total spending in
each year



How to visual

Total Annual Spending



Policy Maker Design : Hospital-related



What they want to know

(1) How is the acquisition capability of the whole country in the specific drug?

(2) Does any region or province have a problem with low purchasing power?

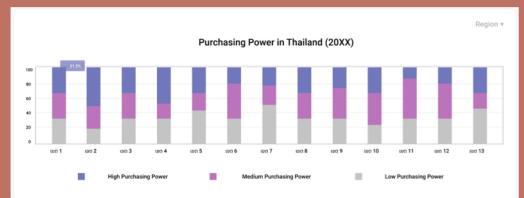
What can answer

PAC index = represent how much acquisition capability of users

3 subgroups

- Above PAC (High)
- At average PAC (Moderate)
- Below PAC (Low)

How to visual



Policy Maker Design : Hospital-related



What they want to know

Does the information of each hospital (e.g. number of patients) affect the demand of drugs?



What can answer

Finding a correlation coefficient between the number of patients and the purchasing amount

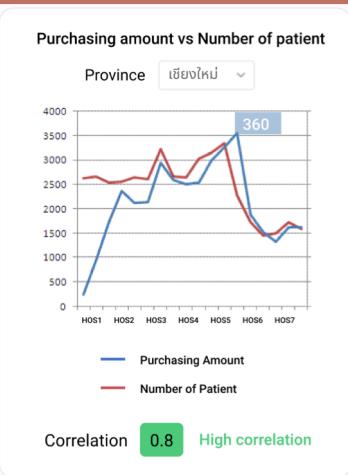
Corr ≥ 0.7 : High correlation

0.4 $>$ Corr > 0.7 : Moderate correlation

Corr ≤ 0.4 : Weak correlation



How to visual



Policy Maker Design : Normal Information



**What they
want to know**

Which drug has a high
unit price



What can answer

Sort the Unit Price



How to visual

Top 10 unit price

GPU ▾

Name ▾	Code ▾	Avg Unit Price ▾
Drug Name	111111	0.97

[Show more](#)

Policy Maker Design : Normal Information



**What they
want to know**

The ratio of drug
purchasing amount



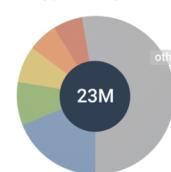
What can answer

Sort the Purchasing Quantity



How to visual

Drug purchasing amount



Name	Code	Unit Price	Amount
Drug Name	0101	1.42	5,000,000
Drug Name	0101	2	4,000,000
Drug Name	0101	3.26	3,000,000
Drug Name	0101	1	2,000,000
Drug Name	0101	0.22	1,000,000

Policy Maker Design : Normal Information



What they want to know

Drug purchasing quantity
and price based on region

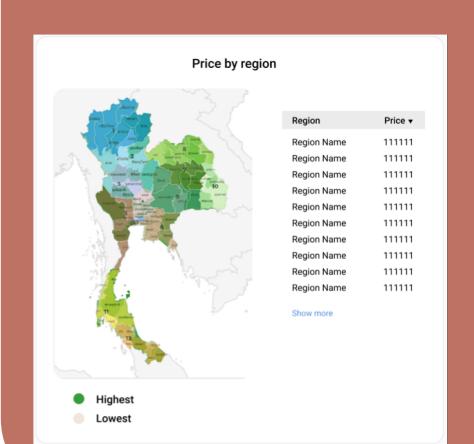


What can answer

Purchasing quantity and unit price



How to visual



Hospital User Design

What they want to know

Overall performance of drug purchasing



What can answer

Average PAC → calculated to find suggested purchasing price

If actual price > suggested, it would be categorized as a bad performance

How to visual



Hospital User Design

What they want to know

How much they can save if
using the suggested
purchasing price



What can answer

Compare the suggested
price and the actual price



How to visual

Original unit price	ABC... (Drug name)
2.0 THB	
Suggested unit price	
1.8 THB	
Purchasing amount	
100,000	Potential saving cost



WEBSITE IMPLEMENTATION



Implementation



Laravel



php



css



Bootstrap



Github



DEMO



EVALUATION

Evaluation



Target

- 1. Enough content?
- 2. Good design?
- 3. Practical to use?

Method

“Walkthrough”

Present and explain how it works + give survey

Evaluation

Content Feedback



May hard to understand **technical terms** in the website



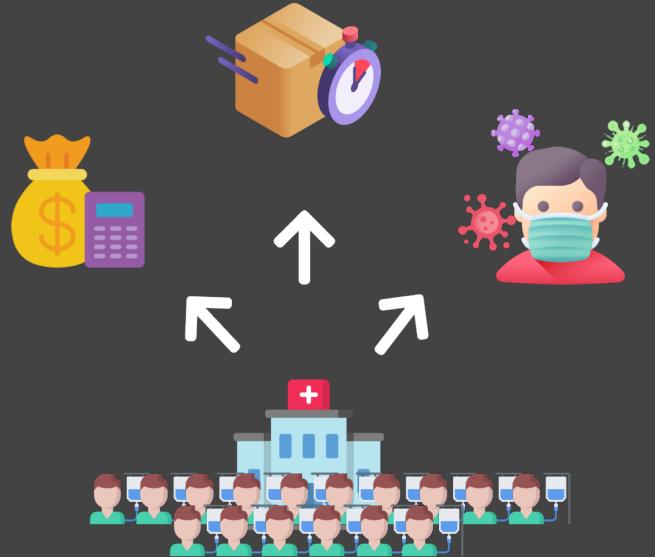
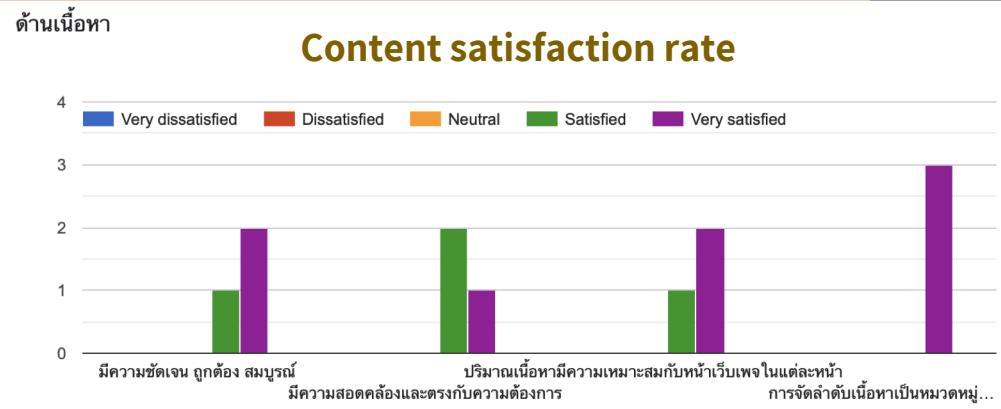
Tooltips or write the description below the graph

Cost Saving					
Total potential cost saving = 156,345,665 THB					
Show	5	entries	Search:		
GPU	Name	Number of Drug	Real Total Spending	Potential Saving Cost	Saving (%)
747145	paracetamol 500 mg tablet, 1 tablet	120	54,827,843	30,125,776	54.95

Add number of hospital in Cost Saving table

Evaluation

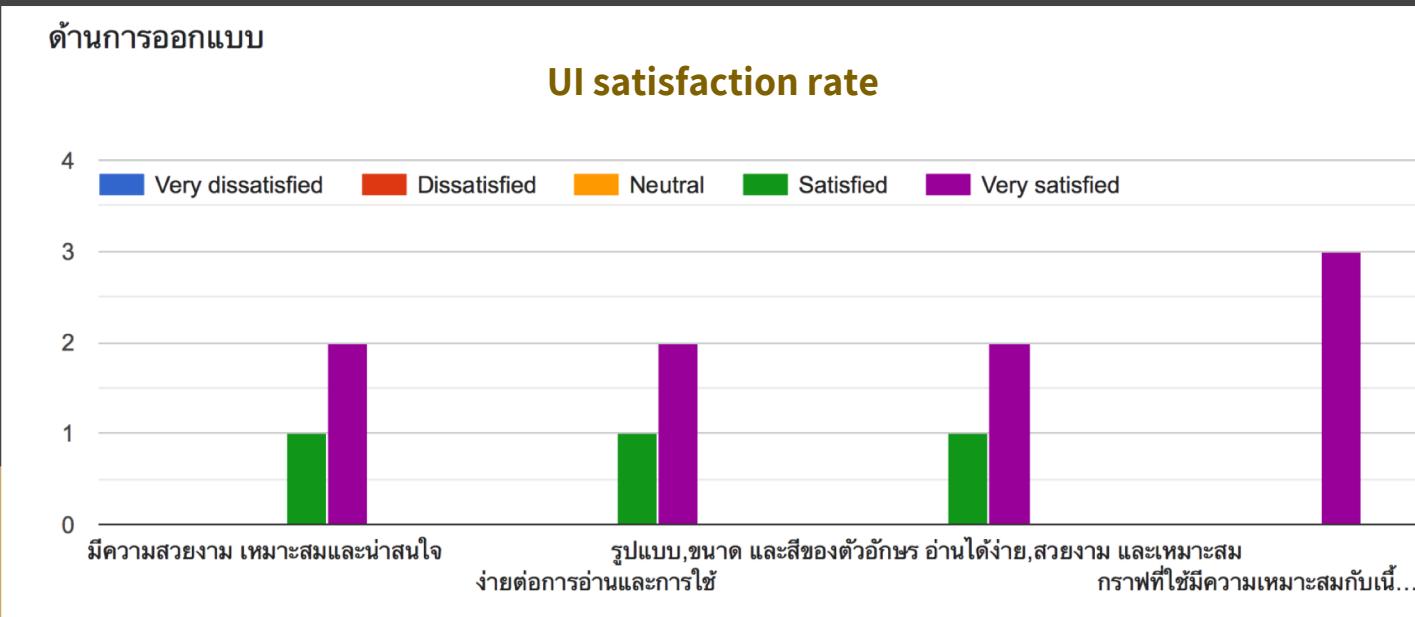
Content Feedback



Number of patients is not the only factor that related to purchasing quantity

Evaluation

UI Feedback

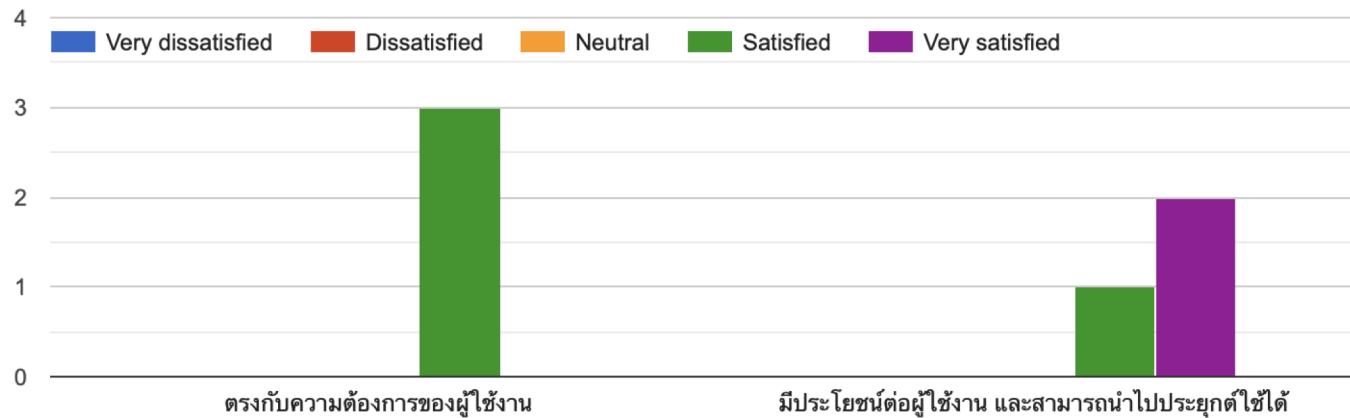


Evaluation

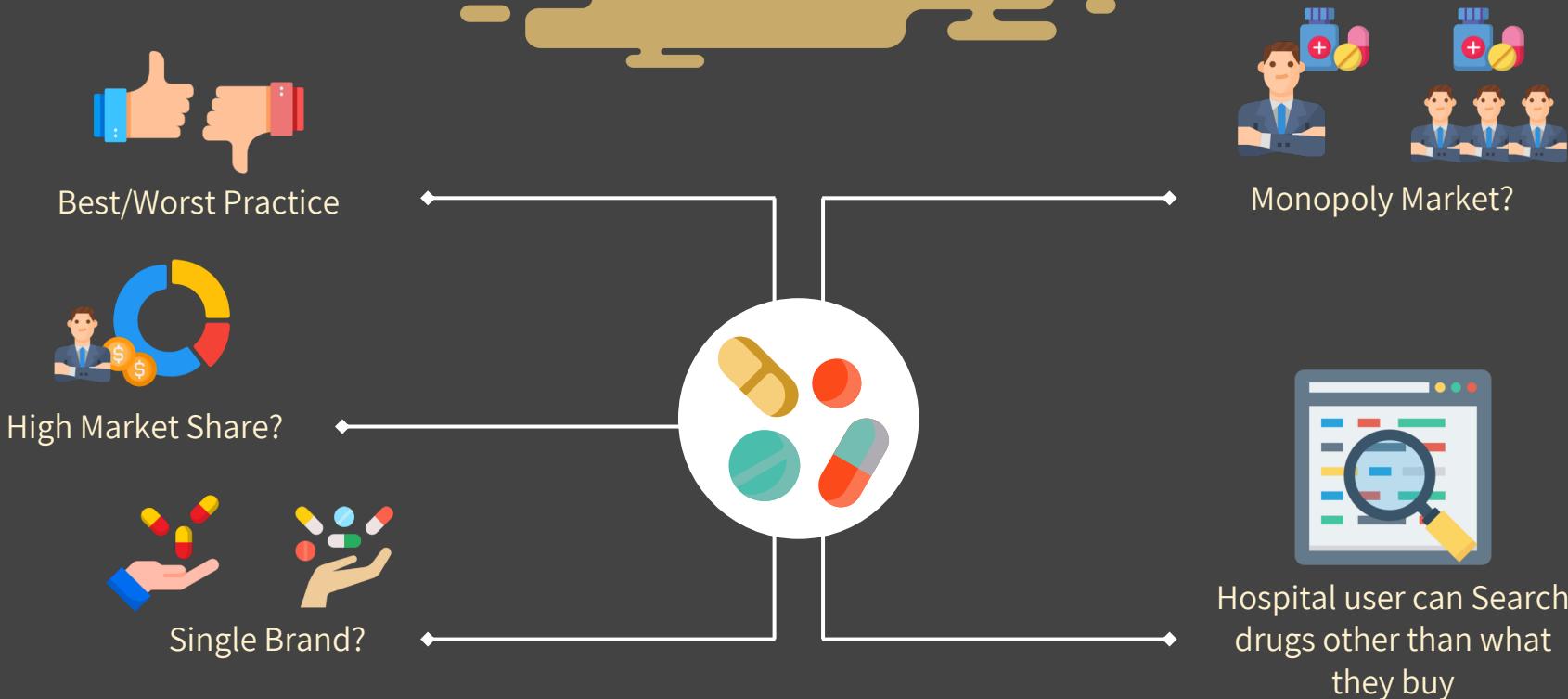
Practical Usage Feedback

ด้านประโยชน์และการนำไปใช้

Practical Usage satisfaction rate



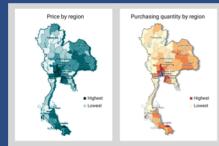
Future Work



Conclusion



Data Analytics



Data Visualization



Website Implementation



New System



Improving Purchasing Performance



Better Decision Making

Thank You

Q&A