Healthcare Facilities and Medical Equipment Whole-of-Life Cost Modelling Tool supporting policy makers - a Swaziland experience

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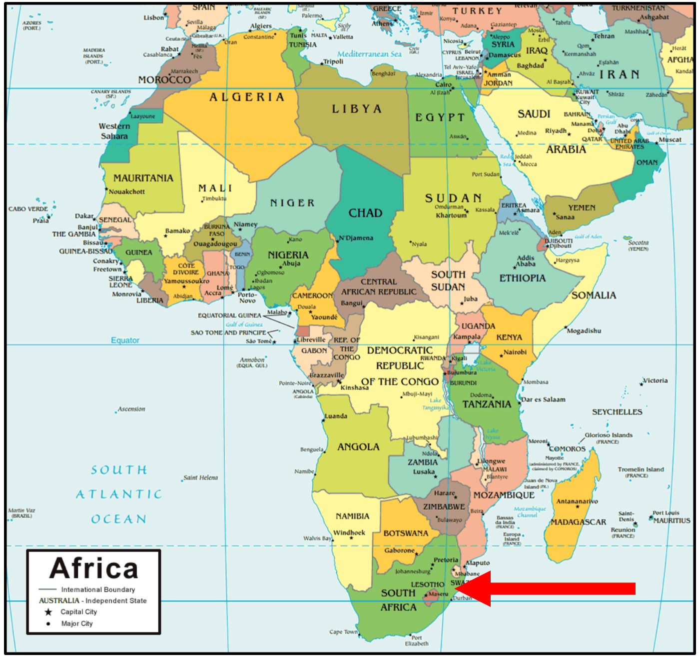
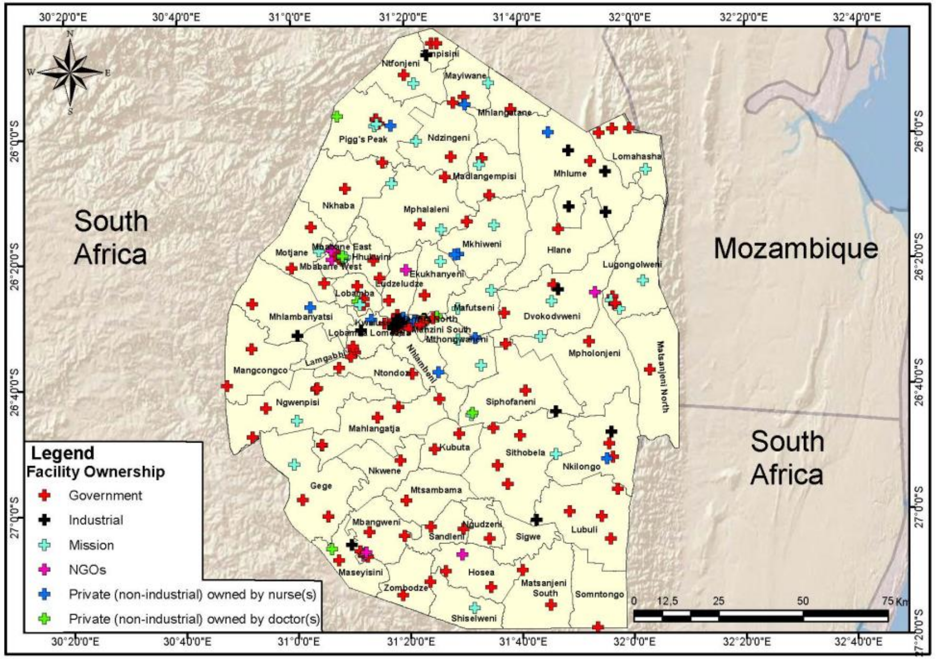
The Kingdom of eSwatini





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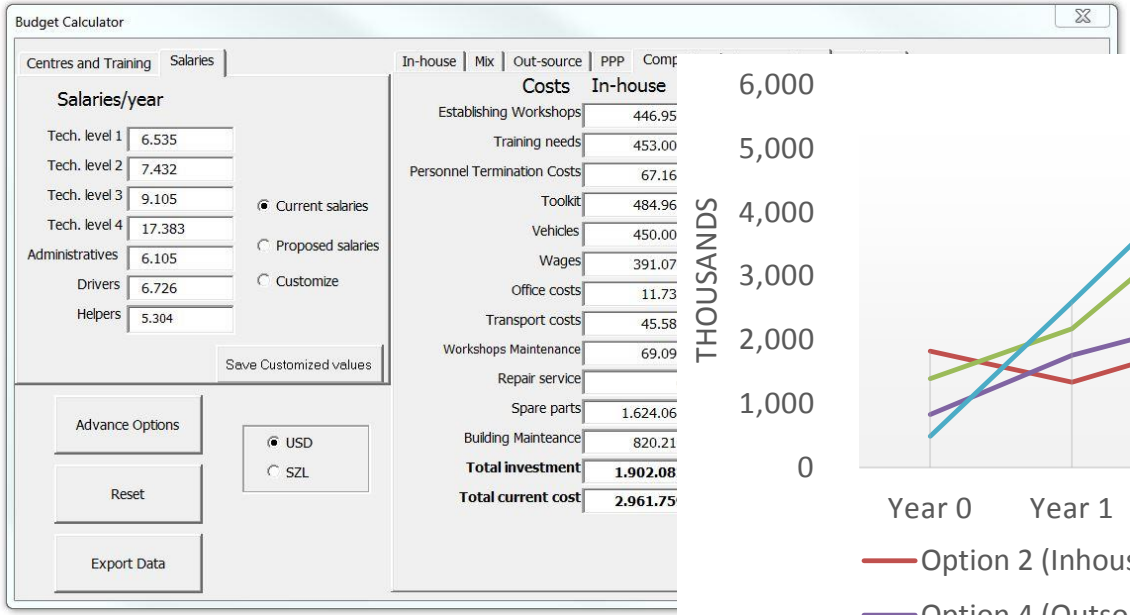
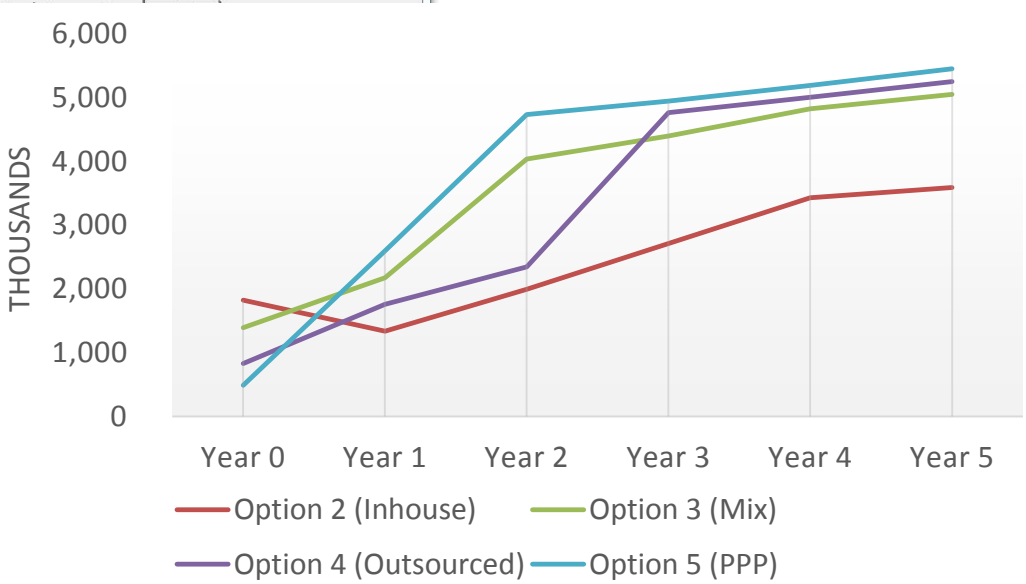
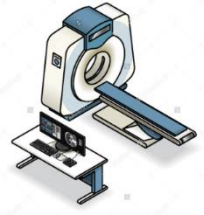


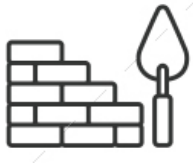


Maintenance Cost Centers

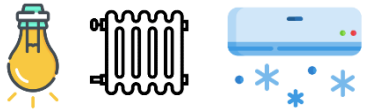
Buildings



Equipment

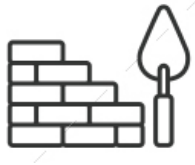


Infrastructure

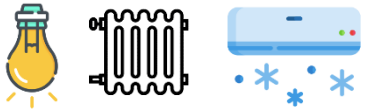


MEP + ICT

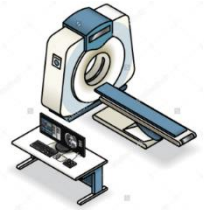
Maintenance Cost Centers



Infrastructure



MEP + ICT



Equipment

Maintenance Cost Main Questions

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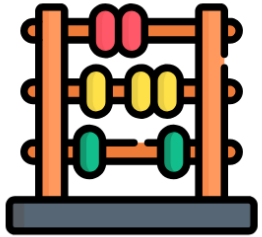


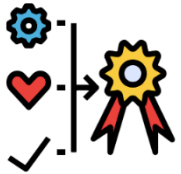
or

?

Maintenance Cost Calculation Options

% of

+



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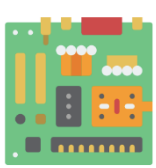

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What do we need to know?

Value of Assets

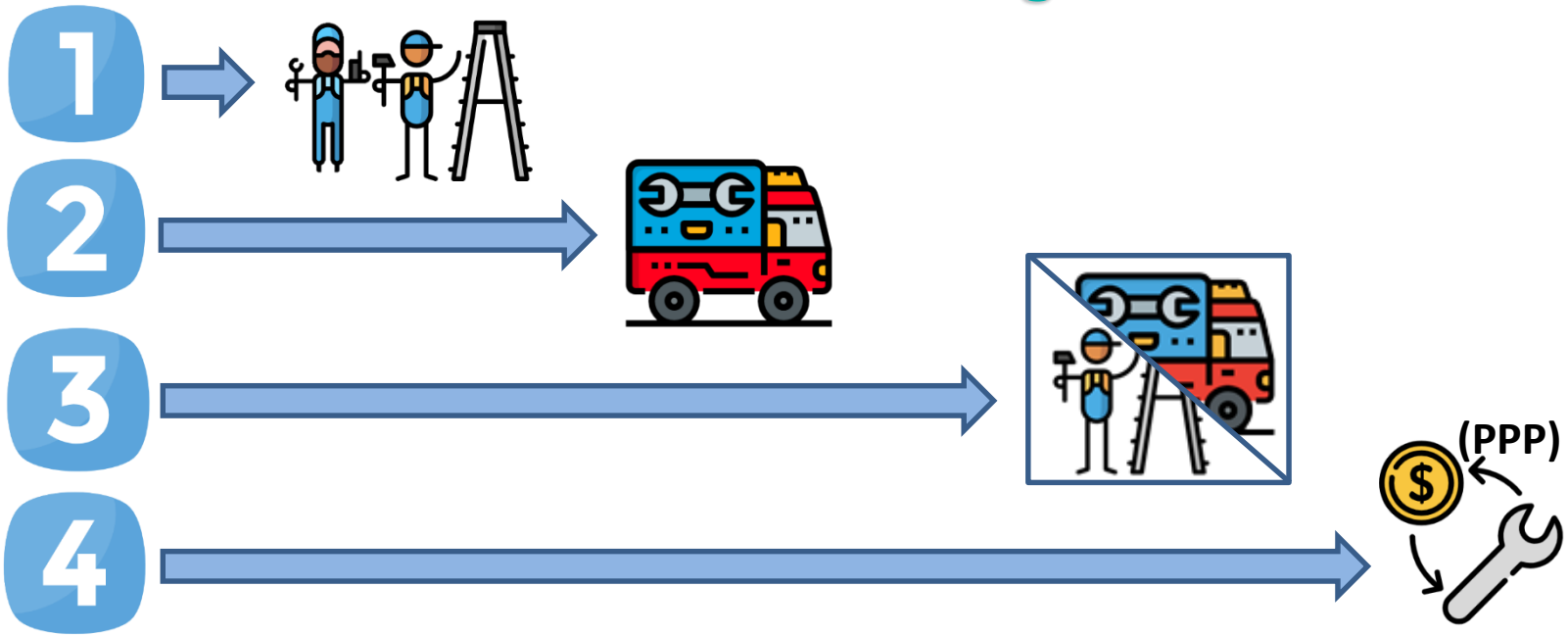
- Detailed Inventory of Assets
  - Qty
  - Purchase price
  - Date of Purchase
  - Condition of Assets
- Type of works required
  - Skills required
  - Training needed
  - Materials
  - Spare Parts

What to do if we don't have the procurement cost?

→ Use of Ratios
- $/m²
- $/bed

→ Use prev exp
- Building Cost Comp
- Typical Eq PM frecs
- Avg Spare Parts Prices
- Avg Work Efficiency
- others

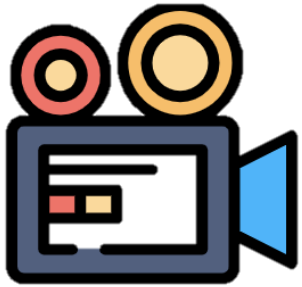
Options for Maintenance of Healthcare Infrastructure and Equipment in the Kingdom of eSwatini



Static Financial Analysis vs. Cashflows Analysis

$\% \simeq$

$\sum_1^n a^n \simeq$



Situation Analysis:
Infrastructure and Equipment Challenges

No Inventories for Facilities

185.000 m²

117 facilities

No specialized staff for building maintenance

No Policies

No renovation in buildings

Equipment Value:20 million USD

>50% equipment condemned / bad

No clear budget facility maintenance

Budget Equipment Maintenance

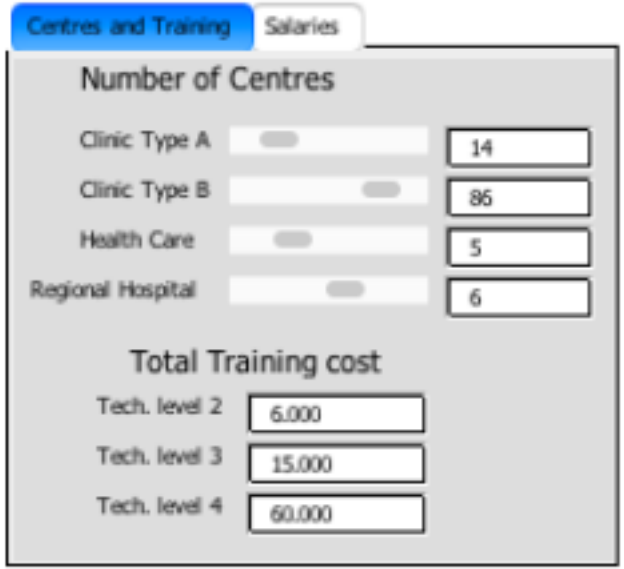
2.3 million USD

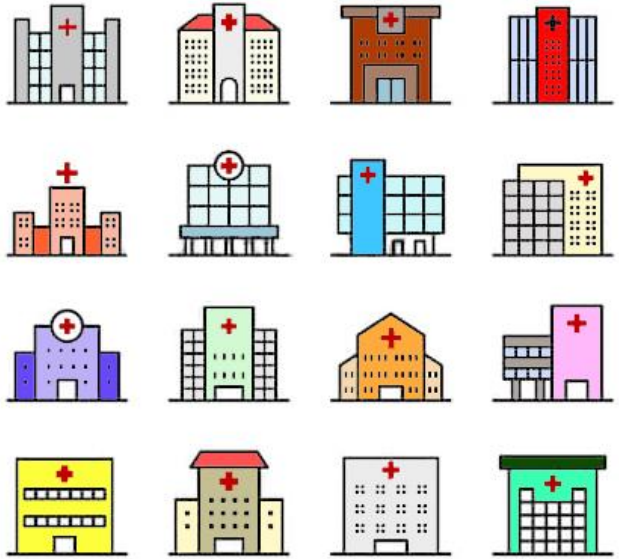
1 biomedical engineer

20 biomedical technicians

8 artisans

Variables and Parameters:
Number and Type (level) of Healthcare facilities





Variables and Parameters: Other Variables

Centres and Training | Salaries

Salaries

Tech. level 1	7,308
Tech. level 2	7,327
Tech. level 3	9,359
Tech. level 4	12,479
Administratives	6,000
Drivers	6,036
Helpers	5,478

(•) Current salaries
( ) Proposed salaries

Training costs

Tech. level 2	6,000
Tech. level 3	15,000
Tech. level 4	60,000

UserForm4

B.M. Benefit PPP	1	% of the total value of the facilities
B.M. Benefit out-source	25	% of the cost
Repair service benefit PPP	3	% of the total value of the equipment
Currency	13,46	SZL/USD
Gasoline price	0,88	USD

Workers

Working hours/Day	8	(•) Proposed values
Working days/year	245	
Efficiency	70	% ( ) Customize

Validate data | Reset | Close

Results obtained with our tool

Comparison Table Between Options

Budget Calculator

Centres and Training | Salaries

Salaries/year

Tech. level 1	6.535
Tech. level 2	7.432
Tech. level 3	9.105
Tech. level 4	17.383
Administratives	6.105
Drivers	6.726
Helpers	5.304

(•) Current salaries
( ) Proposed salaries
( ) Customize

Save Customized values

Advance Options

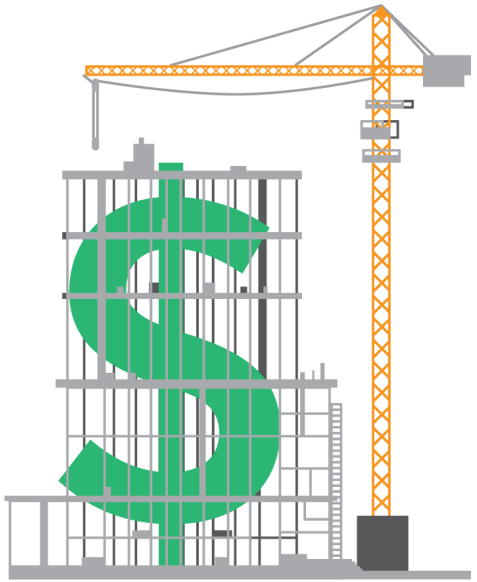
Reset

Export Data

(•) USD
( ) SZL

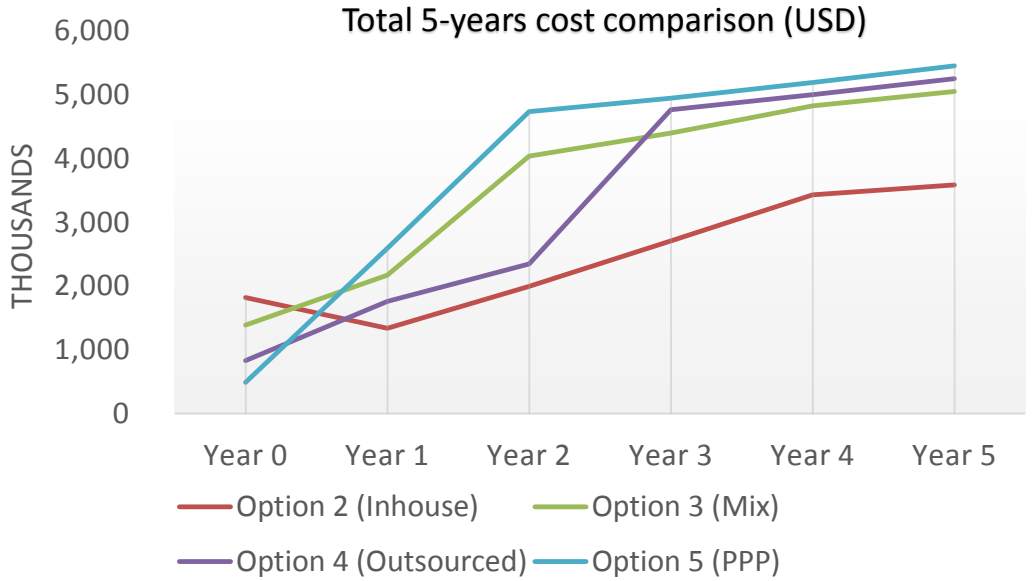
In-house | Mix | Out-source | PPP | Comparison between options | Cash Flow

Costs	In-house	Mix	Out-source	PPP
Establishing Workshops	446.956	317.574	58.810	20.000
Training needs	453.000	198.000	165.000	75.000
Personnel Termination Costs	67.164	67.164	230.916	230.916
Toolkit	484.962	417.314	258.225	49.899
Vehicles	450.000	300.000	150.000	100.000
Wages	391.070	274.359	128.516	92.923
Office costs	11.735	9.425	5.020	4.675
Transport costs	45.583	38.290	2.917	1.094
Workshops Maintenance	69.096	51.744	23.352	8.495
Repair service	0	1.246.077	2.021.932	2.294.197
Spare parts	1.624.065	1.095.130	1.063.550	0
Building Mainteance	820.210	923.964	1.025.263	2.078.006
Total investment	**1.902.082**	**1.300.052**	**862.951**	**475.815**
Total current cost	**2.961.759**	**3.638.989**	**4.270.550**	**4.479.390**



Source: Meirovich Consulting

Five years total cost comparison for different maintenance options



Source: Author's own Analysis

Preliminary Conclusions

- The tool allowed to compare the cash flows required to do maintenance over a period of five years including infrastructure and equipment.
- While the static analysis would not allow a clear understanding of the differences between different implementation approached our tools makes it evident
- The cheapest option was in our case to do full in-house maintenance while the most expensive one is the PPP.
- Our results ONLY apply to the initial hypothesis considered for OUR case. Different results may be obtained with different starting conditions

Final Conclusion

- The use of **simulation tools** allow a better understanding on the real costs underlying the maintenance of any healthcare facility
- Today, developing or implementing a simulation tool is at everybody's hands, and therefore simulation tools like the one presented today should be considered **mandatory** before deciding any major investment plan.

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You may contact me for any comments or questions you may have

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