METHODOLOGY APPLICATION

APPLICATION NO: VA001

APPLICATION TITLE: Pre-Paid Electricity Meter

INDUSTRY: Manufacturing

VALUE METHODOLOGY APPLIED: Value Analysis

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INTRODUCTION

This case study explains the Value Engineering (VE) approach of reducing manufacturing cost of a Pre-Paid Electricity Meter required in the Utility Industry.

The objective reflects a requirement of having the manufacturing cost reduced by 20% to be able to compete against competitors with similar products.

This case study will show the VM & VA processes applied:

PROCESS EXPLAINED

Initially the team obtained a good understanding of the problem by applying some of the Value Management processes that included the listing of Issues and Concerns and the Objective Matrix.

Thereafter the more traditional Value Engineering / Analysis technique of Function / Cost Analysis was utilised to identify the potential opportunities within the existing design.

The Purpose Statement and Objective provided the team with the required scope. Establish an action plan which will reduce the current manufacturing cost of the "Product XY" by 20%, before the end of January 2XXX, whilst adhering to Client specifications and SABS xxxx.

From there a list of issues and concerns (perceived or real) identified the areas that could have had an impact on extra cost.

Typical Issues and concerns are listed below:

-Limitation of face design
-Lack of information of market needs
-Cost driven
-Adaptability to other models
-Universality versus cost
-Selling functions/features
-Ease of installation
-Ease of maintenance

OBJECTIVE MATRIX

Results to achieve	Results to prevent
- Reduce dimension of product (BS XXXX) - Ease of installation & maintenance - Ease of manufacturing - Split meter options - Maintain aesthetic appearance - Active/passive concept/seal-ability - Tamper detect option - External lever - Visual display - New patent - Reduce power consumption - Reduce chances of fraud - Customer acceptance of product - Increased sales (50%) - IP suitable rating for external mounting	- Pre-mature sale - Change in perception of quality - Reduction in specifications related to reliability, safety & performance - Excessive capital expenditure - Recall of product (non-sufficient testing) - Reduction in quality
Available resources	**Constraints**
- Current technology (product) - Capital - Production capacity can be expanded - R & D facilities - Suppliers - Siemens - Purchasing activity/power - Marketing/selling - Financial - Overseas product manufacturing - Strong leadership/teams - Knowledge & experience	- Limited manpower - R & D - Skills - No: of people - New look/ideas - Marketing/sales - Limited testing facilities - Service centres not established - Time (design/field testing) - Long lead times (parts) - Component cost

The team realised that the data obtained through the VM session would highlight the bigger picture of the problem but would not assist in analysing the actual technical design.

Therefore the product was physically inspected / disassembled and each component was analysed against functionality performed.

The following functions have been identified within this product.

FUNCTIONAL REQUIREMENTS

-Display Information
-Control Credit
-Interrupt Power
-Prevent Tampering
-Ensure Safety
-Locate Components
-Protect Components
-Measure Energy
-Withstand Surge
-Facilitate Mounting
-Optimise Maintenance

From there a Function / Cost Analysis were applied: (only few examples below)

Code:	Function	Code:	Element	Unit Cost	Qty per Unit	Cost Per Assembly	Potential Cost Savings
1.00	Display Information:	1.01	Membrane	R 5.90	1	R 5.90	Yes
		1.02	LCD & Driver	R 14.20	1	R 14.20	
		1.03	LED's	R 3.40	3	R 10.20	Yes
		1.04	Labels	R 0.80	3	R 2.40	Yes
		1.05	Buzzer	R 1.00	1	R 1.00	Yes
		1.06	Switch Indicator - PCB	R 3.00	1	R 3.00	
2.00	Control Credit	2.01	Micro Processor	R 20.60	1	R 20.60	
		2.02	Power Supply	R 10.80	1	R 10.80	Yes
		2.03	PC Board	R 10.00	1	R 10.00	Yes
		2.04	Key Pad	R 2.40	1	R 2.40	
3.00	Interrupt Power	3.01	Circuit Switch	R 21.00	1	R 21.00	Yes

Selecting the areas with potential improvements, the team then recommended solutions for further investigations.

Code:	Function	Code:	Element	Unit Cost	Qty per Unit	Cost Per Assembly	Potential Cost Savings	Code:	Recommendations	Potential Cost Saving	Actual Cost Saving
1.00	Display Information:	1.01	Membrane	R 5.90	1	R 5.90	Yes	1.01.1	Reduce size (depending not only on box size)	R 2.95	R 2.95
								1.01.2	Use silkscreen	R 0.00	
								1.01.3	Transparent front cover	R 0.00	
								1.01.4	Remove LDC window	R 0.00	
		1.02	LCD & Driver	R 14.20	1	R 14.20					
		1.03	LED's	R 3.40	6	R 10.20	Yes	1.03.1	Remove 2 LED's (green & yellow)	R 6.80	R 6.80
								1.03.2	Remove all the LED's	R 10.20	
		1.04	Labels	R 0.80	3	R 2.40	Yes	1.04.1	Reduce labels by moulded in info	R 0.50	R 0.50

CONCLUSION

The objective was achieved and the implementation of the action plans resulted in a more functional product and a major contract from a Utility Services Provider exceeding more than R50million.

Some of the interesting points were the improvements on elements that have been duplicated (redundancy). An example was the LED's (detailed function of the LED's was to *indicate status* of pre-paid electricity availability. Green indicated that the pre-paid meter is charged, Yellow for indicating that the pre-paid load is getting low and the Red for indicating that the meter has run out of electricity.

The solution was to utilise only the Red light to indicate that the pre-paid meter is getting low. (similar to a petrol indicator in a car).

From the Value Management session we also concluded that this product will not be sold via a supermarket and the instruction pamphlet (since this would be installed by contractors)

was not required and a better packaging solution was implemented to align with the “bulk” delivery and installation concept.