KBM Machines Return on Investment Analysis.

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1 Executive Summary

This document sets out to quantify the Return on Investment (ROI) from implementing Business Central in KBM Machines Ltd. We expect the lifetime of the system to be at least 10 years.

By optimizing processes in the warehouse and shop-floor, by allowing for a profitability based commission structure, by requiring workers to register their time, by automating accounting processes, by achieving a more flexible manufacturing capacity, by automating the purchase function to follow a Just-in-Time approach, and much more, we expect the upside value of this project to be in excess of £14m.

The total life-time cost of the project is estimated to £130,000. This covers both initial implementation as well as license cost.

We have identified enough benefits to justify a ROI of 107X. We expect more hidden advantages and the true ROI might be higher.

2 Notes about the analysis

Purpose with document.
This analysis does not identify *all* advantages from the implementation. It only identifies enough to justify the decision to go ahead with the implementation beyond any reasonable doubt or not. In other words, we've stopped collecting advantages when the case is overwhelmingly in favour of an implementation of Business Central in KBM Machines.

Assumptions.
We expect company growth to roughly cancel out the weighted average cost of capital (WACC). Therefore, we have decided to not calculate the present value of future cash flows.

A well implemented ERP system should have a life time of at least 10 years – even 15-20 years if the company remains more or less in its current form for the next 15-20 year.

Benefits of saved time.
It is mentioned several times below, that a particular initiative can save an employee X number of hours. For example, it is mentioned, that we expect the accounting employees to save two hours per day. But one might wrongfully conclude that this is not a benefit to the company since we would have to pay the 2 employees for those two hours whether or not they are working. But that would be an incorrect conclusion. If an accounting employee can save 2 hours out of 8 per day, it means the company will be able to grow by 25% *without* having to employ an extra head. In other words, saved hours frees up capacity for company growth without a corresponding increase in cost.

3 Company Profile

KBM Machines is a UK based Make-to-Order/Make-to-Stock manufacturer of industrial measuring devices. Customer base is 60% UK based and 40% overseas. The company turns over £12m/year and has a company margin of 13%.

Employees:

- Design/RnD:	10
- Manufacturing:	22
- Warehouse:	8
- Sales:	10
- Purchasing:	4
- Finance/Accounting	4
- Management and Other	18
- **TOTAL**	**82**

4 Improved motivation/efficiency in manufacturing.

Requiring manufacturing staff to register 8 hours per day and being able to follow up on these registrations, will increase the motivation and efficiency of the manufacturing staff. They will be concerned with meeting their quota, and will come asking for more work, rather than waiting around for management to ask them to work. And if they try to get around this by registering too much time on a single job in order to meet their daily quota, management will be able to enquire as to why they've registered 7 hours on a job that should have only taken 2.

If we require the manufacturing staff to register minimum 8 hours per day and record the data for easy analysis and follow up, we expect an increase in efficiency of 1.5 hour per man per day.

Estimated Value:

Increase efficiency for each of our 22 manufacturing workers by 1.5 hours per day comes to a value of:

£15 x 1.5Hours x 22Employees x 250Days	=	£123,750/year.
Across 10 years	=	£1,237,500

5 Increased efficiency in manufacturing processes

Today, a significant amount of time is wasted putting out fires, on miscommunications and unnecessary wait time, all due to a lack of information and inefficient processes.

As part of the implementation, manufacturing workers will be expected to do one thing: Manufacture. Order prioritization will be done for them. Planning will be done for them. Materials will (almost) always be available when needed due to better purchasing processes and materials will have been brought to their workstation by a warehouse worker, allowing them to instantly start on a new job when they've finished the prior one.

Estimated Value:

Due to optimized processes, we expect efficiencies to increase by 1 hour for each of the 22 workers:

£15 x 1Hours x 22Employees x 250Days	=	£82,500/year.
Across 10 Years	=	£825,000

6 Increased efficiency/motivation due to KPI tracking in Warehouse.

With a system, that controls warehouse processes, it is possible to track the performance of each warehouse employee. Has James picked 10 or 1000 items today? Has James put-away 10 or 100 items today? How much has been received?

We expect an increase in motivation simply by tracking the performance of each worker amounting to 1 hour per day per employee.

Estimated Value:
Increasing efficiency for each of our 8 warehouse employees is expected to come to a value of:

£10.25 x 1Hours x 8Employees x 250Days	=	£20,500/year.
Across 10 Years	=	£205,000

7 Increased efficiency in warehouse due to better warehouse processes

Having a computerised system aid in performing warehouse activities, is expected to increase the efficiency in our warehouse. Efficiencies are expected for the following processes:

- Semi-Automated Receiving.
- Assisted Quality Assurance
- Automated Put-Away Instructions
- Automated Pick Tickets for both production and sale.
- Assisted Shipping.
- Using Handheld scanners
- Daily Cycle Counting to avoid closing the warehouse down to perform physical inventory counts.
- Optimized pick routes to reduce walk time.
- Pick for multiple sales orders and production orders in a single pick-trip to reduce walk-time.
- (The effects of moving to a floating bin system are described below)

All in all, we expect each warehouse worker to save 1 hour due to increased structure.

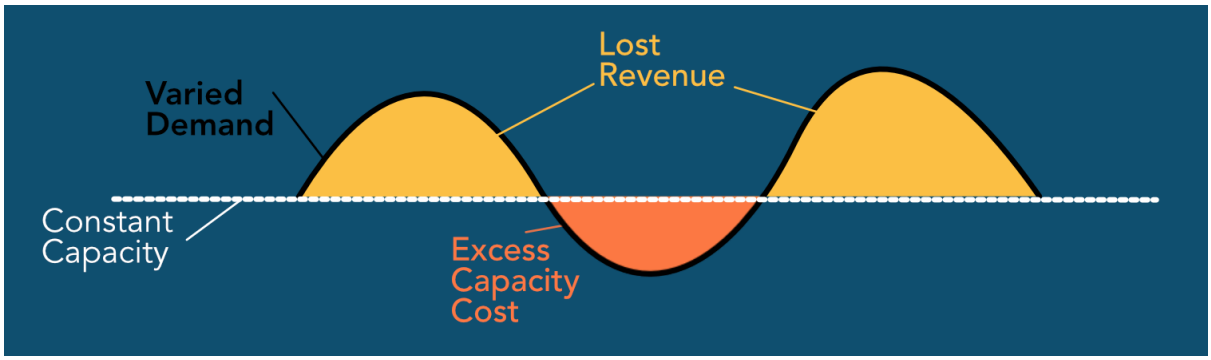
Estimated Value:
Increasing process efficiency for each of our 8 warehouse employees is expected to come to a value of:

£10.25 x 1Hours x 8Employees x 250Days =	=	£20,500/year.
Across 10 Years	=	£205,000

8 Increased Revenue and Reduced Capacity cost due to better demand/supply match.

Problem

As a make-to-order manufacturer, we are suffering from the costs of trying to match a fluctuating demand with a constant capacity.



If demand fluctuates, but capacity stays the same, we lose revenue in periods with peak demand and incur losses in times where capacity is higher than demand:

- Demand is *higher* than Capacity → Lost Revenue.
- Demand is *lower* than Capacity → Excess Capacity Cost.

Solution

How do we expect the new system to assist in matching capacity to a fluctuating demand? The solution is to use temp workers in the warehouse in peak times. In low demand times, we'll get rid of the temp warehouse staff and instead use part the manufacturing staff who will not be working at full capacity in manufacturing.

Using temp warehouse staff and manufacturing staff, however requires all warehouse activities to be easily carried out without any experience of how the warehouse is organised where different items are stored. This is achieved by allowing the ERP system to manage the warehouse activities, in particular relying on the system to keep track of where goods are stored rather than relying on experienced warehouse workers to keep this information in their heads. This means we will no longer rely on a warehouse staff knowing where the different items are stored in the warehouse. Instead we will be using temp warehouse staff in peak periods and allow the permanent manufacturing staff to help flex into the warehouse in low demand periods.

The GBP value of matching demand/supply with a flexible capacity

Now, what is the value, if we can perfectly match our capacity to the fluctuating demand? In other words, considering the above graphic, what is the value if we can capture the *Lost Revenue* and avoid the *Excess Capacity Cost*?

We estimate the relevant input-data as below:

- Hourly Labour Cost (Average warehouse/manufacturing): £13

- Hourly Sales Value: £60
- Company Profit Margin: 13%
- Profit per Hour (13% of £60): 7.8
- Capacity per month (Hours): 4800
- High demand months (Hours): 4000
- High demand months (Hours): 6000
- Yearly low demand months: 7
- Yearly high demand months: 5

Type	Demand (Hours)	Capacity (Hours)	Under/Over Capacity	Loss
Low Demand Months	4000	4800	Over capacity: 800H	800 x £13 = £10,400
Hight Demand Months	6000	4800	Under capacity: 1200H	1200 x £7.8 = £9,360

Estimated Value

Per year, this amounts to a loss of revenue and excess labour cost of:

7 months x £10,400= £72,800/year
5 months x £9,360= £46,800/year

Yearly loss: = £119,600
Across 10 years: = £1,960,000

9 Reductions in purchasing times.

In a semi-automated purchasing setup, the system will suggest you when to order more items based on replenishment parameters such as Reorder Level, Reorder Quantity, Lead Time and other parameters. It will also give you an overview showing you the status of each order line:

1) Acknowledged by the supplier.
2) Price/delivery date confirmed by supplier.
3) Tracking information received from supplier
4) Received from supplier.

This visibility overview will allow you to take action early in the supply chain and focus only on the exceptions. If, for example, a supplier has not acknowledged the receipt of the order 5 days after you have sent it, you might want to pick up the phone and call him. In other words, you only have to be concerned with those purchase lines that have exceeded a particular deadline, and can assume the rest of your purchase supply chain is on track and will be delivered as expected.

Once set up, the semi-automated purchasing and monitoring setup is expected to reduce the time our 4 purchasers spend on this activity by half.

Yearly savings:	£16.50 x 4Employees x 4Hours x 250Days	=	£66,000/year
Across 10 Years:		=	£660,000

10 Increased sale due to decreases in lead time and delays.

When components are available when needed, when it is clear who does what and when, we should see an improvement in lead times and a reduction in delays. This must be combined with the planning features available in the system – in particular the ability to plan a production in phases where each phase has a due date to be controlled against.

Estimated value:

It is difficult to accurately calculate the impact a reduction in lead time and delays will have on our sales. We have spoken to the sales department and agreed to the estimate as below:

15% Reduction in Leadtime =	2.5% improvement in yearly sales.
15% Improvement in delays=	2.5% improvement in yearly sales.
TOTAL=	5% improvement in yearly sales.

Based on a yearly turnover of 12m, this would mean an increase of £600,000 in yearly sales and with a company profit margin of 13%, this amounts to:

Yearly additional profit (12m x 5% x13%)	=	£78,000
Across 10 Years	=	£780,000

11 Obsolete inventory reduction.

When buying only what is needed, we will reduce the cost of obsolete inventory. In addition, when producing only what is needed, we will reduce obsolete finished inventory. We also reduce the inventory cost associated with holding obsolete stock for too long periods – stock that is taking up storage space but will never be used.
The effort to reduce obsolete inventory, must be considered in conjunction with the new "floating bin" system, which makes it far less likely for inventory to disappear at the back of some random shelf.

Again, it is difficult to accurately estimate the reduction of obsolete inventory, but a conservative guess is that with better planning, and a floating bin system and forecasting, we should be able to reduce yearly obsolete inventory by 60%. Currently we write off £50,000 worth of inventory per year.

Estimated yearly value:

Yearly value (60% of £50,000)	=	£30,000
Across 10 Years:	=	£300,000

12 Inventory reductions.

An automated purchasing system, combined with better manufacturing planning will allow for Just-in-Time purchasing, which will reduce inventories.

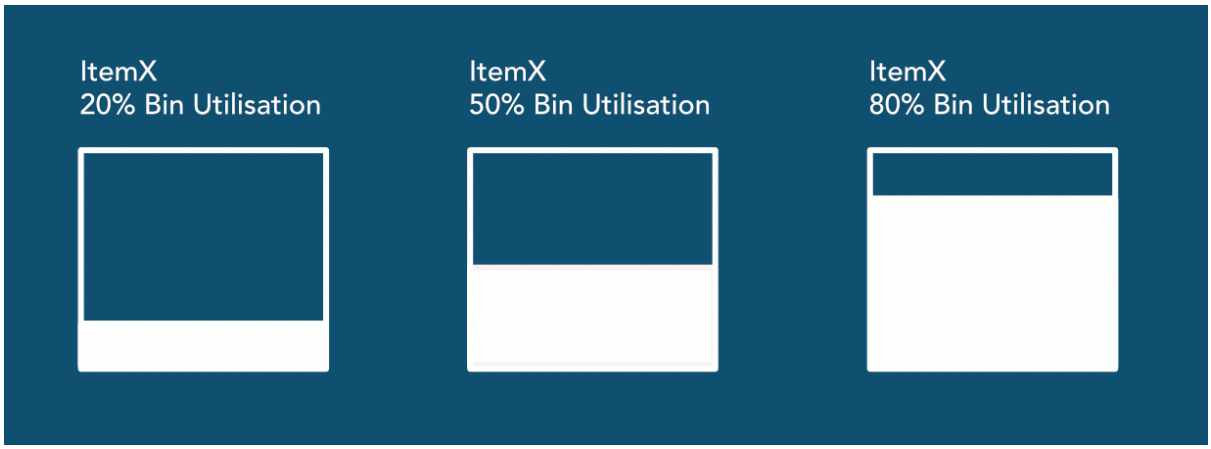
Our inventory value today is £2,2m and holding costs are estimated to, £250,000/year covering rent, rack depreciation, etc. Today, every component sits on the inventory shelves for an average of 4 months and we expect to be able to cut that in half.

Doubling inventory turnaround therefore has a value of:

Yearly savings (250,000/2):	=	£125,00
Across 10 Years:	=	£1,250,000

13 Increase bin cubic storage utilisation

Today, we have a designated bin for each item. 1 bin = 1 Item. For example, bin number 46A always holds ItemX and nothing else. When we have a lot of ItemX on stock, this bin is filled up, but when we are running low on ItemX, the physical space in the bin is practically empty. On average, this means the bin is only utilized 50% and so is the rest of all the bins in the warehouse. Ultimately, the warehouse cubic storage capacity is only utilized by 50% on any given day.



In practise this can be mitigated by storing other items in a partially empty bin. For example, if the afore mentioned bin 46A is low on ItemX, we might want to store a bit of ItemY in it. But then we have compromised our system of 1bin=1item. If we compromise this for all our items, we lose track of where our items are stored, leading to slow picking, delays and items disappearing in the warehouse eventually

turning into obsolete inventory. It also restricts us from bringing in temp warehouse staff as experience is needed to navigate the warehouse when picking and putting away.

We estimate, that introducing floating bins, where the bin content is tracked by a computer system so that multiple items can be stored in the same bin and the same item can be stored in multiple bins can increase the used cubic capacity from 70% to 90% - a 20% improvement. (The effect on Obsolete inventory and more efficient picking is captured elsewhere in this document).

Our holding cost is £250,000/year in rent, depreciation of racks, etc.

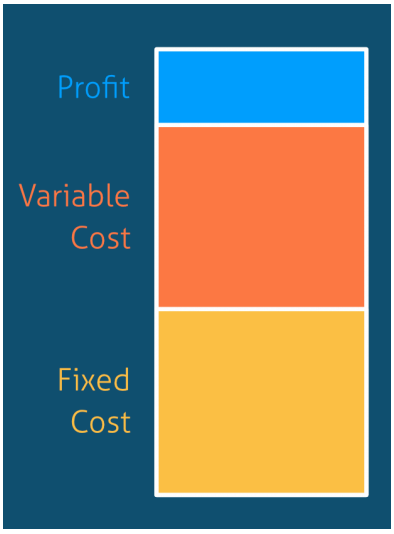
Yearly savings (£250,000 X 20%):	=	£50,000.
Across 10 Years:	=	£500,000

14 Profitability based Commission

A commission setup, based on profitability rather than sales value, allows sales reps to work autonomously and motivates them to *not* drop the sales price to below the company margin. But a profitability-based commission setup only works if we can capture the manufacturing cost correctly. The new system will allow for that. The new system will allow for profitability based commission.

Numbers

Yearly Revenue:	£12,000,000
Yearly Direct/Variable Cost:	£6,200,000
Yearly Fixed Costs:	£4,240,000
Company Profit	£1,560,000
Fixed Cost Contribution:	33% (4.2m/12m)



Estimated Value:

It is difficult to estimate the GBP value of a switch to a profitability based commission, but as sales personal is commissioned based on sales values today, they will be motivated to potentially drop the

sales price to below the company margin, effectively making the sale unprofitable but *still* be able to collect their commission!!! An extremely unhealthy situation for the company.

Basing the commission on the profit of the sale rather than the revenue is especially important for bespoke orders as this will motivate sale personnel to communicate with manufacturing to put together quotes that are easily carried out by manufacturing. If the order requires too much work in manufacturing, then labour cost will increase effectively lowering the margin and hence the commission for the sales rep. Therefore, the sales reps has a huge motivation to ensure the sale is profitable for the company.

Based on discussions with the head of sales, we're expecting that switching to a profitability-based commission system on average will improve each sale by 2%, so that products that before are sold at £100 today will be sold at £102 once the system is introduced. Or put in another way, instead of a 13% company margin, you now have a 15%.

Yearly Value (12m x 2%)	=	£240,000
Across 10 Years	=	£2,400,000

15 Accurate Profitability Analysis

When you collect actual manufacturing and R&D cost, you will know the true profitability of your manufactured products. You can then out-phase the less profitable products, and push the more profitable ones via different marketing channels and sales initiatives so that your business continuously moves towards servicing the most profitable market.

You will also be able to use this data to decide for which markets you should be developing new products. You might also want to look at the profitability of offering bespoke orders. Maybe offering bespoke orders is not good for business because it is too costly? Maybe it is very good for business? But without correct profitability analysis you will not know.

With profitability analysis, you can also more easily determine which customer segments are the most/least profitable and focus your marketing appropriately.

But all these decisions require the collection of accurate costing and hence profitability information.

Estimated Value:

Estimating the value, that this can have on both sales and margin is difficult to say, but based on talks with the head of sales we'll be setting the improvement to 2%, so that a company margin of 13% can be increased to 15%. We believe this to be realistic as some sales are significantly more profitable than others, but we lack the intel to really understand why and therefore move the company into more profitable markets.

Yearly Value (12m x 2%)	=	£240,000
Across 10 Years	=	£2,400,000

16 Optimize Accounting Processes.

The following finance processes are expected to improve as a result of the implementation.

Automatic VAT Calculations and Reporting.
Automatic Vendor Payment Suggestions.
Export Bank Payment File.
Automatic Up-to-date Project Profitability
Automatic Commission Calculations
Automatic integration to G/L from other modules.
Easy Expense Management.
Easy Bank Reconciliations.
Automatic Currency Adjustments.
Full multi-currency compliant.
Other Improved processes.
Fixed assets depreciation

Estimated Value:

We expect each of our accounting employee to save 2 hours per day.

Yearly value (£19 x 2Hours x 4Employees x 250Days)	=	£38,000
Across 10 Years	=	£380,000

17 Manual maintenance of data.

Today, the use of Excell sheets to manually manage various parts of the business is wide spread. We've spoken from to 4 different users and have agreed to estimate, that if this data was updated automatically and kept in one system, each of the staff categorized as "Management and Other" could save 1 hour per day.

Yearly value (£38 x 1Hours x 18Employees x 250Days)	=	£171,000
Across 10 Years	=	£1,710,000

18 Other areas worth considering but not included.

The purpose of this document is to conclude whether to go ahead with an ERP implementation or not. Therefore, in principal, as soon as we can observe more advantages than cost we do not need to identify any more advantages. Since this is the case, this analysis will include no more advantages although more could be identified.

Other areas worth exploring the benefits from:

- Integrations to other systems such as the CRM system *Microsoft Dynamics for Sales*, the business intelligence system *Microsoft Power BI*, and other Microsoft products such as *Microsoft Outlook*.
- Forecasting (start producing based on what you *expect* to sell)
- Easy BOM management.
- Easy and semi-automated serial and lot number tracking.
- Easier sales quoting and sales order entry .
- Monitoring the progress of a production order. When is each phase expected to finish? If it is delayed in phase 2 of 5, then we might need to take action to avoid delays.
- Increased employee satisfaction due to clear cut responsibilities.

19 Benefits, Estimated Value.

Total Benefits:	
- Improved motivation/efficiency in manufacturing.	£1,237,500
- Increased efficiency in manufacturing processes	£825,000
- Increased efficiency/motivation due to KPI tracking in Warehouse.	£205,000
- Increased efficiency in warehouse due to better warehouse processes	£205,000
- Increased Revenue and Reduced Capacity cost	£1,1960,000
- Reductions in purchasing times.	£660,000
- Increased sale due to decreases in lead time and delays.	£780,000
- Obsolete inventory reduction.	£300,000
- Inventory reductions.	£1,250,000
- Increase bin cubic storage utilisation	£500,000
- Profitability based Commission	£2,400,000
- Accurate Profitability Analysis	£2,400,000
- Optimize Accounting Processes.	£380,000
- Manual maintenance of data.	£1,710,000
TOTAL	**£14,048,500**

20 Cost of the Project

The bulk cost of the project, is made up of consulting services and monthly license cost. Based on the information provided as of now, we estimate project costs accordingly as below.

Fixed Cost Element	**£60,000**
(Unlimited Training, Unlimited Business Requirements, Unlimited iterations on each solution)	
Customizations	**£25,000**
18 Full Premium Users Licenses	**£33,804**

18 x £1,878 (One-time Purchase)

30 Team Member Licenses	**£8,040**
30 x £268 (One-time Purchase)	
Various Infrastructure:	**£5,000**
TOTAL	**£131,844**

21 Conclusion

This Return on Investment Analysis shows that it would be financially sensible to implement Business Central in KBM Machines.

Total Project Value	
Benefits:	£14,048,500
Cost:	£131,844
TOTAL Project Value:	**£13,916,656**

The estimated project cost is £130,000 whereas the benefits are estimated to at least 14m. That is a ROI of 107X. Spend £1 and get £107 back.

It might be, that if we spend more time, we could identify more benefits and hence conclude an even more attractive investment case.