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# PURCHASING IN PCT

## A TALE OF TWO SOFTWARE SYSTEMS

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Assignment 1 - Written Report

Module: Introduction to Industry 4.0

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## Abstract

The process of purchasing forms the subject of this report. It is one of the four main processes in the company, and it is currently on course to achieve full integration within PCT's smart factory software: BitzList. Two main obstacles stand in its way, the duplication of work when manually inputting data into the accounting system SAGE200 and the lack of buy-in of the new system from a department in the company, forcing the procurement team to operate in both systems and therefore not being an efficient process. The report presents an introduction to the setup of the smart system, the benefits already existing for procurement and the recommendations for mitigating the issues.

## Introduction

PCT Group Sales LTD. is a manufacturing SME (Small Medium Enterprise) that produces lifting equipment - Hoists, cranes, jibs etc. The company's niche feature is providing turnkey solutions for the energy sectors, such as explosion proof equipment for use in potentially hazardous areas in Oil & Gas, de-contaminable and safe equipment for the nuclear sector and corrosion protection / use of corrosive resistant materials in the offshore industry.

The four main activities in PCT's work are: Sales, Design, Procurement and Manufacturing, as illustrated in Figure 1. Underpinning all these processes is their management.

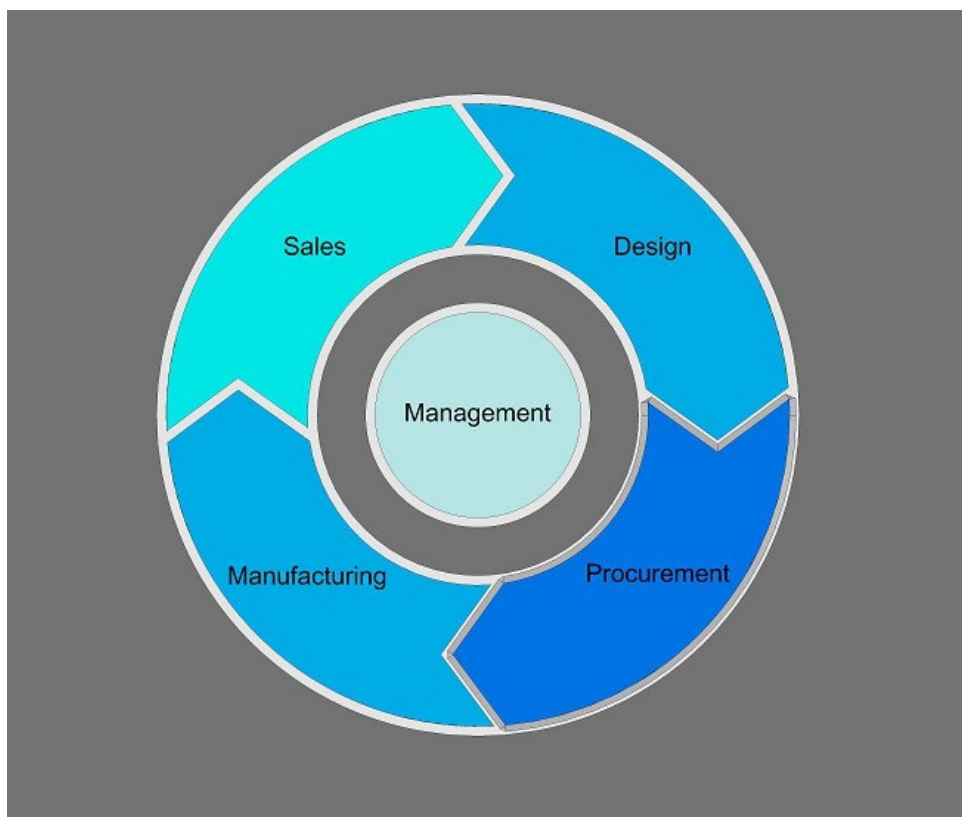


*Figure 1 - The four main departments in PCT*

This report will evaluate the purchasing process and its efficiency with respect to the current operation of the organisation.

The purchasing process is a complex one in PCT due to the variety of components to be purchased (Azadeh, Darivandi et al. 2012), the double work required to satisfy both the Material Requirements Planning System (MRP) and the SAGE200 commercial systems and the lack of automation in the overall process. (Rantala, Hilmola 2005) On the whole, purchasing is in the middle of the pack when it comes to its efficiency as a process in the company, ahead of the sales department but lagging behind design and manufacturing.

The Aim of the report is to explore possible mitigations to the issues above by employing various industry 4.0 technologies, processes and ideologies and the methodology for implementing such technologies will be explored below, within the body of the report, by analysing each source of inefficiency, and identifying the steps involved in moving the purchasing department fully into industry 4.0 territory.

## Background Research

Beginning with the year 2015, PCT has moved onto a new company wide system that is using Industry 4.0 technologies, processes and ideas like the Internet of Things (IoT) combined with data analytics, digitalization and being able to access and control the system remotely. (Kalsoom, Ahmed et al. 2021)(Gilchrist 2016, p.207) The MRP software was launched throughout the company called Bitzlist, which evolved into more than the initial application and became an almost complete business system (NMIS, Bittleston 2020) that integrated all aspects of the manufacturing process in the business from Sales, Design, Procurement and Manufacturing with the view of transforming PCT into a smart factory. As Gilchrist described it in chapter 14 of his book, the implementation of Industry 4.0 will lead to smart manufacturing with optimized supply chains through the reduction of costs and improvement of productivity and efficiency. (Gilchrist 2016, p.217)

For instance, the sales department has not taken the new system on board and only interacts with BitzList tangentially as a database for enquiring about past products and costings when quoting for new projects. This approach is consistent with the nature of the Business as an Original Equipment Manufacturer/Original Design Manufacturer (OEM/ODM).

At the same time, the design and manufacturing departments have made the transition to the automated MRP system and have been using the system in their day-to-day activities, after having received proper training and became capable of self-organization and self-control. (Azadeh, Darivandi et al. 2012)

By and large, the position of the organization regarding the profound and systemic change (Schwab 2016, p.11) brought about by the fourth industrial revolution is best exemplified by the purchasing department with the benefits it has seen in implementing industry 4.0 technologies and the shortfalls that still must be addressed to complete the technological transition.

## Benefits of Industry 4.0 in purchasing

The purchasing process has benefited greatly from the implementation of this system, as it has allowed it to become automated when it comes to raising enquiries and receiving goods, and semi-automated when raising Purchase Orders and adding supporting documents such as certifications. Figure 2 is a snapshot of the window seen by a member of the purchasing team, when interacting with BitzList.

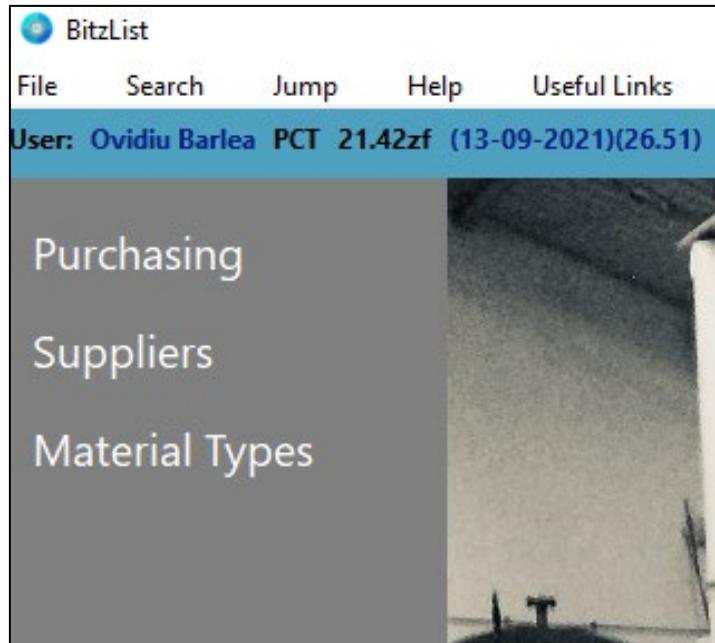


Figure 2- Procurement main screen - BitzList

The procurement team now have a very succinct and user-friendly system divided into three categories of tasks (Rantala, Hilmola 2005) which, once set up with all the suppliers and materials required, only needed to be monitored and updated once any new suppliers and materials have been identified.

Another key point is the exponential increase in communication between the design and procurement departments. Once any new projects are activated on the system, an alert message is sent to the Procurement operatives and to the Manufacturing department. The artificial intelligence also performs an in-depth check of stock levels, Work in Progress (WiP) and future demand trends and will adjust the quantities needed to be procured. This model, based on automatic data collection and processing, has allowed a greater control and overview of the material (Navon 2005)- which accounts for 40 to 50% of the total costs of the business.

In addition, it has allowed the procurement personnel to quickly send enquiries out to suppliers, as the MRP system can also generate and attach any technical information associated with the specific item to be purchased, therefore, increasing the efficiency of the interactions with the supply chain through connectivity and optimization – See Figure 3. This is the most important source of value (Kalsoom, Ahmed et al. 2021) for the procurement of goods for the company.

| BitzList                                                          |                |            |                             |                    |        |     |                  |     |
|-------------------------------------------------------------------|----------------|------------|-----------------------------|--------------------|--------|-----|------------------|-----|
| File Search Jump Help Useful Links                                |                |            |                             |                    |        |     |                  |     |
| < < Index Raise Enq Raise PO To GR To Certify All Quotations      |                |            |                             |                    |        |     |                  |     |
| Total Value = £1550.08 (12 entries - of which 5 not priced)       |                |            |                             |                    |        |     |                  |     |
| Clear Selects Select all visible GR (or revert) Print Material ID |                |            |                             |                    |        |     |                  |     |
| Batch#                                                            | Project(s)     | Ext.ref(s) | Matl.Desc                   | Supplier           | Enq/PO | r/q | Material         | Sel |
| D248/M1379                                                        | X0928+ <Min>   | PCT STOCK  | M1379 50mm x 40mm Brigh...  | BARCLAY & MATHI... |        | 40  | Bright Bar       | no  |
| D539/M3799                                                        | X1217          | BCF210414  | M3799 2.3/4" DIAM BRIGHT... | BARCLAY & MATHI... |        | 14  | Bright Bar       | no  |
| D308/M10765                                                       | X0934          | 125480     | M10765 160mm Diam x 360...  | BARCLAY & MATHI... |        | 8   | Black Bar - M... | no  |
| D795/M271                                                         | <ReOrder> +... |            | MCR90070-384-1000 70MM...   | BARCLAY & MATHI... |        | 3   | Black Bar        | no  |
| D304/M10767                                                       | X0934          | 125480     | M10767 125mm Diam x 320...  | BARCLAY & MATHI... |        | 8   | Black Bar - M... | no  |
| D777/M1720                                                        | X1400+ <Min>   | 132803     | M1720 20MM DIAM BRIGHT...   | BARCLAY & MATHI... |        | 7   | Bright Bar       | no  |
| D299/M10776                                                       | X0934          | 125480     | M10776 12MM DIAM BRIGH...   | BARCLAY & MATHI... |        | 8   | Bright Bar       | no  |
| D306/M10766                                                       | X0934          | 125480     | M10766 110mm Diam x 330 ... | BARCLAY & MATHI... |        | 8   | Black Bar - M... | no  |
| D310/M10761                                                       | X0934          | 125480     | M10761 200mm Diam x 395...  | BARCLAY & MATHI... |        | 4   | Black Bar - M... | no  |
| D797/M3745                                                        | <ReOrder> +... |            | S19B00H30 1/2" DIAM BRIG... | BARCLAY & MATHI... |        | 23  | Bright Bar       | no  |
| D537/M3800                                                        | X1217+ <Min>   | BCF210414  | M3800 55MM DIAM BRIGHT...   | BARCLAY & MATHI... |        | 14  | Bright Bar       | no  |
| D793/M256                                                         | <ReOrder> +... |            | MCR90040-384-3000 40MM...   | BARCLAY & MATHI... |        | 4   | Bright Bar       | no  |

Figure 3- Material to be purchased sorted by supplier - BitzList

However, some of the benefits of implementing automation in the procurement process – namely the increased efficiency and productivity - are negated by the need to input manually into SAGE200 – the accounting and cost control software - all the data that is generated automatically in BitzList.

### The Automation Ceiling

To continue the discussion on the two areas where improvement can still be made in the procurement process' journey to industry 4.0, they must first be identified and evaluated.

Firstly, the duplication of input is the largest consumer of resources and time. The purchasers must create a duplicate of each project that appears on Bitzlist, and manually input each line item (typically between 300 and 1000 material lines in projects) into SAGE200, in order to allow the financial team to have a view of the costs in a job relative to the selling point. The value of this operation relative to the effort and cost expended does not reflect a lean, kaizen approach to business (Nash, Poling 2008, p. 238) because it has been in place and running concurrently with the MRP system for the last 7 years. All in all, the solution is to allow for digital transformation, by enabling the systems to cooperate with each other. BitzList has already the capacity to communicate with other software and any shortfall could be overcome with programming (NMIS, Bittleston 2020). PCT has the rare and unique position to be the pilot company for which this software was developed initially, and such a solution which may be cost-prohibitive for others, would be available at a discounted price for the company.

Additionally, there is a category of materials that do not normally get ordered through the MRP system, namely, the electrical components. This is due to the lack of buy-in to the BitzList digital system from the electrical engineers. They raise requisitions on paper and bypass the new methodology entirely. In doing so, they add to the procurement team's workload, and, at the same time, they prevent the system from having 100% overview of the

production. A potential solution for this issue can be holding seminars and tutorials with the staff in question, emphasizing the value in switching to smart manufacturing and incentivizing the progress with appropriate rewards. (Nash, Poling 2008)

## Conclusion

Purchasing is currently at an 'industry 3.7' level in the organization, meaning it has started its journey towards the ultimate goal of digitization and efficiency by using all of the technologies available to the company, but it has not yet reached the 4.0 standard due to the lack of buy-in from all of the parties that have an input into the buying process and the absence of communication between the two software programs used in managing PCT, BitzList and SAGE200.

The recommendations for overcoming the challenges and becoming the most efficient system in the company are:

- invest in the linking up the two systems through the already existing programming capabilities of the BitzList team.
- Create educational programs for staff to bring them in line with the business direction towards digitalization and automation.

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