

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT

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RISK ANALYSIS OF EXCESS AND OBSOLETE INVENTORY IN A COMPUTER COMPANY: A CASE STUDY

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ABSTRACT

Risk Analysis is a systematic process of evaluating the potential risks that may be involved in a projected activity or undertaking. It is applied to projects, information technology, security issues and any action where risks may be analyzed on a quantitative and qualitative basis. Risk analysis is a component of risk management. This paper focuses on the risk analysis faced by a major computer company X. At X International Services, risk analysis was to be conducted because old inventory in terms of licenses was piling up, thus leading to blockage of funds. With Windows 10 being launched soon, company X wished to analyze the quantity of old inventory of licenses piled up, the cost of the licenses and the type of licenses. Besides, the company needed to assess the quantum of financial loss when some of these licenses would become excess and obsolete. Primary data regarding the inventory was obtained from the company itself. This data was massaged and run through a pivot table to generate a pivot chart. It was found that company X risks a write off of \$20M against inventory greater than 30 days. It further revealed that inventory greater than 365 days costs \$6.2M. It was concluded that most of the inventory is under the Work in Progress (WIP) category. Besides, following a robust return process for aging licenses and establishing inventory control mechanism would help the company in minimizing the inventory. Lastly, a piece part level forecast accuracy would also drastically reduce the inventory.*

KEYWORDS

excess and obsolete inventory, company X, risk analysis.

INTRODUCTION

Risk Analysis is a systematic process of evaluating the potential risks that may be involved in a projected activity or undertaking. Risk analysis is the review of the risks associated with a particular event or action. It is applied to projects, information technology, security issues and any action where risks may be analyzed on a quantitative and qualitative basis. Risk analysis is a component of risk management.

Risks are part of every IT project and business endeavour. As such, risk analysis should occur on a recurring basis and be updated to accommodate new potential threats. Strategic risk analysis minimizes future risk probability and damage. The risk management process involves a few key steps. First, potential threats are identified. For example, risks are associated with individuals using a computer either incorrectly or inappropriately, which creates security risks. Risks are also related to projects that are not completed in a timely manner, resulting in significant costs. Quantitative and/or qualitative risk analysis is applied to study identified risks. Quantitative risk analysis measures expected risk probability to forecast estimated financial losses from potential risks. Qualitative risk analysis does not use numbers but reviews threats, determines and establishes risk mitigation methods and solutions.

Why does obsolete inventory buildup? The root cause is uncertainty in both supply and demand. If one reduces the uncertainty, one can diminish one's exposure to obsolescence. Three tools can accomplish this: 1) sales and operations planning; 2) auto-replenishment systems; and 3) "ramp-up/ramp-down" discipline. If one is experiencing growth in obsolete inventory, missed forecasts, reduced earnings and increased backlogs, consider taking major action through sales and operations planning (S&OP). One of the key traps associated with demand planning is the optimistic view that new products or promotions will generate high sales. Many a company executive has been stranded with major amounts of excess inventory after ordering surplus materials/parts in anticipation of demand.

PROBLEM STATEMENT

At company X, risk analysis was to be conducted because old inventory in terms of licenses was piling up, thus leading to blockage of funds. With Windows 10 being launched in June 2015, Company X wished to analyze the quantity of old inventory of license which was piled up, the cost of the licenses and the type of licenses. Besides, it needed to assess the quantum of financial loss when some of these licenses would become excess and obsolete.

OBJECTIVE OF THE STUDY

To conduct an excess and obsolete risk analysis to assess the aging of licenses.

LIMITATIONS

The above project was limited to one company only, namely, company X. Other similar companies can be studied. Further, the study was limited to Windows Licenses Purchase and Inventory details carried out in the first quarter of the year. Other studies can be carried out on the hardware purchases such as CPUs, graphic cards and other hardware.

REVIEW OF LITERATURE

MacDiarmid (2003) notes that **risk analysis** must begin with risk identification. The potential adverse outcomes must be listed at the outset of the risk analysis process, and it is a good idea to include the marginal entries on the list. But how far does one go in carrying out a risk analysis? The answer is to go far enough to provide the decision-maker with as much assistance as possible, in the time and with the resources available. To accomplish this goal, risk analysis requires skillful judgement as well as scientific rigour. As MacDiarmid states, it is important to distinguish between risk assessment, risk management and risk communication. Risk analysis comprises all three of these elements. Risk management is the process of identifying and implementing measures which can be applied to reduce risk to an acceptable level and documenting the final import decision. Risk communication is the process by which the results of risk assessment and risk management are communicated to decision-makers and the public. Adequate risk communication is essential in explaining official policies to stakeholders. Stakeholders may be interested in the details of the risk analysis, as well as the overall results. Often the analysis process leads to important insights motivating the choice of a risk management alternative. When stakeholders understand these insights, they are better able to understand why the decision taken was a good one - even if it may involve some additional cost or risk to their interests.

Porras and Decker (2007) evaluated the excess and obsolete inventory in a mass production company. They reported that the phenomenon of slow-moving stock in case of parts for machinery and equipment, to some extent, allows one to assess the level of excess and obsolete inventory which mainly result from the necessity to maintain security stock. The ranges established for observing the movement of a storage item are established individually depending on the needs of an enterprise. An important issue is the possession of machinery stock since, depending on a type and age of the applied production equipment, it is possible to observe diverse movements of stocks. A common division of inventory analysis by the time when spare parts take up storage space in a warehouse, expressed in the number of days, distinguishes the following periods:

- 1 - 180 days,
- 181 - 360 days,
- 361 - 720 days,
- 721 - 1080 days,
- more than 1080 days.

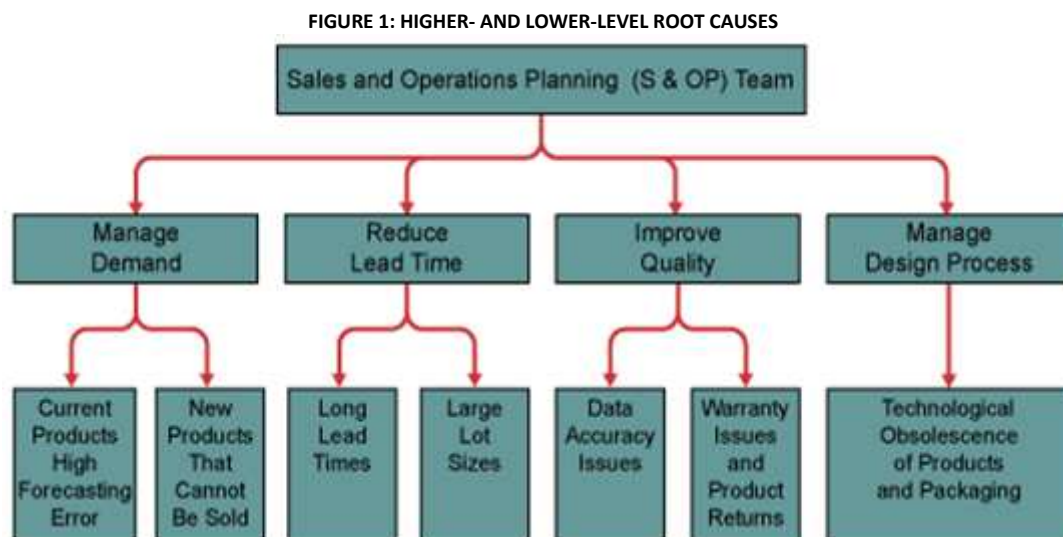
Excessively gathered stocks consist of both obsolete spare parts, which currently are not used in the production activity, and the ones which are excessively gathered, i.e. not adjusted to the level of use. A high level of spare parts inventory maintained in enterprises is frequently not justified economically since spare parts stocks corrode, date or get damaged but, most of all, freeze capital. They calculated that the main reasons of the occurrence of excess and obsolete inventory result from: – technological changes in technical equipment (27%), – changes in the production structure (42%), – ordering parts at the level exceeding the actual needs for providing service to technical objects (23%), – errors and mistakes in orders, resulting from differences in technical and construction parameters (8%). Excess and obsolete inventory gathered in an enterprise ought to be sold, scrapped or used as soon as possible. The appearance of this type of spare parts inventory generates unnecessary costs and freezes capital. It is assumed that for these parts there are no economic and technical grounds for the purposefulness of their storage in a warehouse.

Excess and obsolete spare parts inventory constitutes one of the key problems of production management. On the one hand, the enterprise, while aiming at the maintenance of continuity of production, must provide spare parts inventory for machinery, and, on the other, slow moving stock goods may lose usability and value.

Martin (2011) says that **excess and obsolete inventory write-offs** are chronic supply chain problems costing businesses billions of dollars each year. Unfortunately, improvement projects that are deployed to eliminate these problems often have a short-term focus. In other words, the current levels of excess and obsolete inventory are usually addressed, but not the root causes of the problem. Often such inventory is reduced by selling it below standard cost or donating it to charitable organizations. He reports that Lean Six Sigma methods have been shown to be very effective in finding and eliminating root causes, and thus preventing arbitrary year-end reductions in inventory investment.

HIGHER- AND LOWER-LEVEL ROOT CAUSES

An analysis of excess and obsolete inventory often shows that its major root causes are associated with long lead times, poor forecasting accuracy, quality problems or design obsolescence. However, according to Martin, these higher-level causes can be successively broken down into lower-level root causes as shown in the figure below.



As the figure suggests, from an inventory investment perspective, a long lead time may be caused, in part, by large lot sizes. The actual reasons for large lot sizes would have to be investigated by a Lean Six Sigma improvement team. The root causes of long lead times also could be due to complicated processes having numerous rework loops and non-value-adding operations as well as scheduling problems and/or late deliveries. Martin goes on to say that the second major cause of excess and obsolete inventory is poor demand management practices. Some lower-level root causes may include inaccurate historical demand data, a poor forecasting modeling methodology or other issues such as overly optimistic sales projections.

Pay (2010) reports that **obsolete inventory** is one of the largest components of inventory cost and often is larger and more costly than executives are willing to admit. Many suggest optimistically (and often sheepishly) that there is no such thing as obsolete inventory because it will sell someday. He has developed a new three-letter acronym for this to go along with JIT (Just in Time), RAW, WIP (Work in Progress) and FGI. It is "GSM" for "Glacially Slow Moving"! Studies related to inventory cost and inventory reduction prove that obsolete inventory does in fact exist, along with the warehouses, containers and trailers to hold it. Most companies are busy searching for ways to return, sell, give or throw away obsolete inventory, but the important question is not how to get rid of it, but how to avoid it in the first place.

RESEARCH METHODOLOGY

The research was conducted in two phases. The **first phase** included study of research papers and industry white papers to understand the risks associated with excess and obsolete inventory in general. The **second phase** was based on actually identifying the risk analysis of excess and obsolete inventory at the company. The data was provided by the company. It was massaged and analysed to generate the desired results.

Data regarding the aging of the licenses was given by the company in two parts. The first set of data consisted of all the information but it was not classified according to the age of the inventory. The second set of data had the aging details in it. However, it only consisted of data of age 31 days and above. To get the inventory aged between 0 to 30 days, the two data sets had to be compared.

Finally, the resultant data was put through a pivot table and a pivot chart was generated.

RESULTS

FIGURE 2: QUANTITY AND COST OF LICENSES CATEGORIZED AGE WISE
 (Short forms used are types of inventory identification given by the company)



Inventory Bucket	PRE_PROD	RAW	TO_RETURN	WIP	Grand Total
Inventory (K Units)	270	152	83	484	990
Royalty Cost (K\$)	\$18,839	\$9,438	\$695	\$36,487	\$65,459

License Group	BING	CHINA	PRO	SST	STF	WIN-DM	WIN-EM	Total
Inventory (K Units)	58	114	476	27	58	184	73	990
Royalty Cost (K\$)	\$348	\$ -	\$47,940	\$977	\$70	\$12,486	\$3,637	\$65,459

ANALYSIS

Average daily Digital Product Key (DPK) Inventory is ~1 Million units, adding to ~\$65 Million in cost, out of which inventory <30 days is ~\$45 Million in cost and inventory >31 days is ~\$20 Million in cost. Hence it was seen that the company risked a write-off of ~\$20 Million against inventory.

DISCUSSION

The above table shows the quantity and the cost of the licenses categorized into different age brackets. It can be seen that inventory greater than 30 days is \$20 Million in cost. It can also be noted that the inventory greater than 365 days is \$6.2 Million in cost. From the first table, it can be seen most of the inventory is under the Work in Progress (WIP) category.

CONCLUSIONS & RECOMMENDATIONS

It can be concluded that company X risks a write off of \$ 20M against inventory greater than 30 days. It further revealed that inventory greater than 365 days’ costs \$6.2 Million. Hence, it can be concluded that most of the inventory is under the WIP category. Moving the aging licenses from WIP Inventory to RAW inventory would increase the pool of available licenses thereby reducing further purchases.

Following a robust return process for aging licenses and establishing inventory control mechanism would help the company in minimizing the inventory. Lastly, a piece part level forecast accuracy would also drastically reduce the inventory.

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