

Inventory Control Approach through Application of ERP Package in Steel Industry

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Abstract - Enterprise Resource Planning, or ERP, is about sharing information within the organization which generates, accesses, and relies on information to get the job done, whether that information is customer data, inventory details, job information, or financial statistics. Among departments such as finance, marketing, sales, customer service, and more, it can be a challenge to keep information accurate and up-to-date when each party is working its bulk with its data. The latest Enterprise Resource Planning modules are naturally interconnected and quickly spread across the world of data transfer, their use is better not only for active organizations and leads to similar growth. Since the latest ERP packages contain different modules, they serve as an advantage to the growth of any major.

The purpose of the study is to use the leading ERP Practices in the form of the latest SAP package namely SAP S4 HANA which will address the needs and requirements of the organization. The best part of this ERP solution is that it can find solutions for all companies with dedicated modules such as Production Planning Module, Material Management Module, Financial Module, Human Resources Module, Account Module, Sales and Marketing, Procurement Management, Customer Module, Consumer Module Production etc. Communication created as a result of communication between all steel industry departments thereby reduces asset seizures, excessive financial burden, duplicate backups ordered, Use of immature goods with the same product value, Efforts required to complete the process according to their performance, efforts to simplify order from adoption its to the end.

My research of the SAP S4 HANA application in the steel industry in the production planning module emphasizes mainly on various aspects such as asset management, an inexpensive system by entering the right information at the right time in the most advanced ERP Package. SAP S4 HANA with new ideas discussed with professionals and the team I work with to support the organization meet the needs of an effective way to work with competent staff.

Key Words: Enterprise resource planning, Material requirement planning, manufacturing resource planning, Systems application and products (SAP), Master data management etc.

1. INTRODUCTION:

Enterprise Resource Planning (ERP) systems are at the forefront of these company-wide IT solutions these days.

Despite the difficulties in implementation, in large multinational corporations ERP systems have actually become the leading standard replacement for legacy solutions installed in each business unit separately (Shanks, 2000, quoted in Schlichter & Kraemmergaard, 2010). ERP systems have been in use for at least 20 years, however the implementation of the system is so complex that it comes with high costs and high failure rates. Despite the technical difficulties of ERP systems implementation is often accompanied by changes in business processes and organizational changes. The results of the project influence the daily work of the whole project. An example of the expected changes is the introduction of new operating procedures and the transformation of the daily responsibilities of employees. Issues such as resistance to change arise and need to be addressed. All of these factors summarize the complexity and are important for the future of a company project that represents many challenges for its project managers.

Business service planning uses multi-module software to improve the business performance of the internal process.

ERP packages were mainly targeted at the manufacturing industry and mainly included the planning and management activities of a core business.

Since its inception by the Gartner group they are pioneers of the ERP concept and have officially started practicing it in the early 90s.

1.1.1 Inventory Control Packages: -

ERP modules were previously known as Asset Management Packages in the Early 60s Containing only the performance of list control packages and are restricted to storage and local assets.

1960s Asset Management Packages

1970s Material Requirements Planning (MRP)

1980s Manufacturing Resources Planning (MRP II)

1990s Enterprise Resource Planning

Extended ERP of the 2000s

Table 1: - Overview of ERP emergence

Inventory Management and Control is a combination of information technology and business processes, business processes for maintaining the right level of stock in a warehouse. Inventory management functions include,

- Identifying innovation requirements.
- Target setting.
- Provide filling strategies and options.
- Monitor the use of the item.
- Aligning the inventory balance.
- Reporting the establishment status.

1.1.2 Material Requirement Planning (MRP) (1970): - MRP I uses software applications to plan production processes and produce work schedules and raw materials procurement. Editing can be done as

- Design of a production system.
- Current levels of innovation.
- Lottery rating process for each job.

1.1.3 Production Resource Planning (MRP II) (1980s): - MRP II uses software applications. Applications to coordinate production processes. Processes ranging from product planning, component procurement, asset management to product distribution.

1.1.4 Enterprise Resource Planning (ERP) (1990s): - uses multi-module system software. Software to improve the performance of internal business processes. ERP systems typically integrate business operations into all functional departments. Departments including,

- Product planning.
- Buying parts.
- Asset management.
- Product distribution, fulfillment, order tracking.

ERP software programs can install application modules to support,

- Sales.
- Finance.
- Finance.
- Human Resources.

At this point in the history of ERP, large companies used it. Most small and medium businesses are excluded due to high

previous costs. Higher reasons for implementing ERP include Improved Business Performance by directing business principles, Simple employee functions can be identified by avoiding repetitive tasks to be performed by them, Ensuring compliance with technical information and other official guidelines. Integrated System Behavior is recognizable and that is why a fruitful change of the asset system becomes apparent over time. In addition, the increase in profits is seen over time and may provide a competitive edge for the organization.

1.2. History of SAP and ERP: -

A brief history of SAP and ERP can be reviewed with the literature provided later. Can be

we have seen that SAP has a large portfolio of applications. If we stick to the core business plan planning products, we can summarize the company's history in six important versions, approximately a maximum of ten.

1.2.1. SAP R / 1: - SAP was established by a number of former IBM employees in the early 1970s. Their first system was called RF (real-time funds), and later renamed R / 1.

It provides a fixed 'shelf solution' solution and also in those days when many companies built their own applications from SAPs, when their plans were to build a software product that only worked for many small companies. to stop.

In SAP R / 1 the following major benefits were observed at the time: -

(A) Real-time: In-app information is available throughout the app in real-time. Suppose in the previous case the stock status was not disclosed to the store manager by the sales desk.

(B) Integrated: The same data is distributed across all operating systems of the system reducing the need for unwanted data entry. Therefore, there is now no need to submit a summary of each separate department at the end of the day.

Real-time integration can be considered in production. Consumables are converted into finished products and sold and shipped to the customer. The program involves many departments; purchasing, storage, manufacturing, finance, sales etc. If we look at only part of this; to receive the supplies from the supplier, two operations must take place previously.

3.0 Methodology

3.1 Identification of Key Performance Indicator (KPI):

The main criteria for efficient operation of any production unit lies in the achievement of the key performance indicators (KPI) which are specific to the production and can't be overlooked for a business/production firm to be

fruitful in the long run.while considering it is taken into account that in order to reduce the operating cost,inventory burden,pipeline inventories,energy consumption,too much documentation prior to finalizing an purchase order,outsourcing of latest techninal things as and when required makes a production unit to be open to the new market and solutions to the basic as well as advanced needs may be catered.The production planning consists of continual improvement in the production set ups with due respect to address the strategic planning of the organization which is going to check its goal in the near term future.A system set up may be for short duration of production planning but may require a huge homework prior to its implementation and operation.There are rounds of discussions in order to comply with all the norms of the opearting aspects for a firm to produce a material of scope and of saleable value.

The main driving aspect for a Production firm is to make a product cost effective,low capital infusion,less workforce involved,real time data presentation,easy to communicate with teammates for the quick decisions regarding a strategic planning,continous research & development in the opeartional philosophy to practice a best in class techniques for producing the product as compared with its competitors.

The old legacy system of inventory control and even former SAP programmes of the organization have been termed to be a lagging for the organization in terms of not showing the real time data and thus may cause duplicity of materials and repitive ordering in the short term which makes a piled up load of inventory in the stores location and can add a unrealistic financial burden for the organization.

The different operational entities face the above stated problem and hence need to be addressed with a common solution in a way to decrease the capital infusion for the ERP solution and of latest solutions to the organizational needs.For such a reason the ERP mainly SAP S4 HANA is came into picture and can be implemented with the certain discussions and meeting with the colleagues and superiors.

The implementation of SAP in the organization is just like a campaigning for a perticular task which may need a short term of 3 months to as extended time as 2 to 3 years.For these tasks,the initial involvement of the teammates in the early stage is of great importance and the representation from each and every department is of top priority since later involvement of them may cause retardation of the implementation drive speed. An organization may be considered as a bunch of different flowers in a single vase and all there opeartions are interdependent and the loopholes in a single system may cause a lagging or failure of whole chain system and can't be reclaimed over time.A kick off of the ERP package just (as in case of SAP S4 HANA) needs to be done at same time in the whole organization and thus may gives a fruitful results as far their capital infusion is considered since at a time the complete team may get a quick response and the solution to the qurries raised by the teammates

about the implications in the Implementation of the same.The ontime or realtime corrections in the module is need for easy and fast implentation of the same.

A master list of the materials were made by the perticular department in order to distinguish and identify the exact materials being required by the system in order to run the unit with less stoppages & appreciated or elevated production.The material codes which are prepared are considered as to their symbolic picture in the short description and a long summary under the haeding of long description.

The materials procured are of major importance mainly to operate the system since these consumables and raw materials are mainly required by the production team to run the system in a lucid way.In order to procure the materials as listed in the table needs to be ascertain with the respective plant code and can't be considered in the central requirement order of the organization. A rigrous exercise is done to finalize the material and their bidders which are having completely acquainted with the best in class cost competitiveness,effective composition or servicebility in the service run.

3.2 KAIZEN(Change for betterment):- Inventory management is not a one time task as the stock needs to be replenished in a continual sucesion of time and thus the periodic replenishment was found to be done as far as production unit is concerned.After discussion with the teammates we have taken new purchase requisition type named "Piecemeal Requisition" under the heading of which all the consumables required for operation are fed having a non-proprietary background.

The main beenfit of it comprised of a having a distinction from a regular purchase requisition since we can make multiple entries of Purchase Requisition in either lumpsum or even in staggerd way.The versatality of it makes this heading a boon for the production module as with the competitive market scenario one may get a huge choice of vendors among the best-in-class service or material providers.

3.3 Old Legacy System:-

The material of requirement is procured according to the needs of the system wrt the technical specifications received at the end of the department. It's a huge and lengthy process to procure a material since the theme of procurement includes a chain of operations and follow up as it is a offline task and Procurement needs calling of Budgetary offers, Budget Approval, Financial Approval etc. and hence it needs too much of authorization from the hierarchy of the management and can alter wrt time as the reliability of a particular item or material needs to be judged with the time as well. After getting the authorization one need float the same in offline and get the revised delivery schedule. Now the material of our scope may be getting invoiced and ready

to dispatch from the remote point and as & when it reaches the Plant premises it gets entered in the logging registers of the Material Gates of the plant and it is communicated to the respective department so that it can be get stored to a particular place i.e., it's a duty of the indenting department again to assign a store location. The final consumption/use of said material is secured with erection or project department which when required will approach to the store and transfer the same to the site afterwards.

This lethargic way of the procurement of material requires too much time, engagement of manpower and hence make a project erection or execution of the operational task slow and tedious. The slow procurement speed leads to flaws in the system with overburdened inventory, more capital cost investment for the procurement, too much involvement of trained personals etc thus depleting allocated funds in a nuisance way.

Since such an example is only for one section of the organization and same common materials are to be procured by them as well, so it laden a burden of Inventory at each store location and hence needs a huge space for their storage. There is no proper coordination between each department and it adds to the overall inefficient utilization of available material. It makes the duplicity of each material throughout the organization and at the end of the financial year it is seen that too much inventory is going to handled and thus increasing the overall store cost.

An organization is having an age-old legacy system in which they are procuring the required items for construction of the project through maintaining a typical list of same according to the Material particular, billing identification, invoice no with particular Quantity and Specific indent no of a Particular Department as for example given in table below.

8	Lubrication oil VG 320	E1.1.3.25	150 litres	BF HRS-09009998	25.04.2019
9	Hydraulic VG 46	E1.1.3.12	500 litres	BF HRS-095566565	25.04.2019

Table 1 Material Requisition pattern prior implementation of SAP S4 HANA ERP

Earlier as shown in table above a regime of inventory gets managed by going through the deep details such as Material description, Billing ID, Quantity, Indent No., Date of Indent etc. and the whole exercise was done just to procure a single item and it gets duplicated in many parts of the organization and hence makes a overburdened inventory in a long duration. It includes the basic list of consumables and spares like the Bearing, Plummer Block, Adaptorsleeve, Fluid Coupling, Oilseals, Gear Coupling, Welding Rods, Lubrication as well as the Hydraulic Oil and their ordered quantity wrt the requirement raised by the department. However there consumption is during the operation of the system is going to happen in regular interval still some of the distinct spares were observed to be left in different department as an inventory burden. It was also a matter of great concern that the material were not having the unique material code for the whole organization which yields in duplicacy of the same and hence repetitive ordering.

Table below shows the inventory at Blast furnace and other departments

S.No	Material	BILLING ID	QTY	INDENT NO	Date of indent
1	Bearing 22227 CCK	E1.1.3.18	900 pc	BF PBC-1000107	25.04.2019
2	Plummer block SN518	E1.1.3.24	40 pc	BF BBC-1002008	25.04.2019
3	Adaptor Sleeve H318	E1.1.3.14	80 Pc	BF HRS-0900065	25.04.2019
4	fluid coupling T12-05	E1.1.3.21	10 Pc	BF HRS-090087	25.04.2019
5	Oil Seals 30-20-10(OD-ID-THK)	E1.1.3.20	450 Pc	BF HRS-0900098	25.04.2019
6	Gear coupling FGC- 25	E1.1.3.13	20 Pc	BF HRS-0987676	25.04.2019
7	E7018 type 3.15 mm Welding Rod	E1.1.3.23	3400 Boxes	BF HRS-0976876	25.04.2019

S. No	Material Description	BILLING ID	QTY procured	INDENT NO.(Blast Furnace)	Inventory as on date	Other Department (indented same material)	Respective Quantity
1	Bearing 22227 CCK	E1.1.3.18	900 pc	BF PBC-1000107	25.04.2019	Coke Oven	300 pc
2	Plummer block SN518	E1.1.3.24	40 pc	BF BBC-1002008	25.04.2019	Sinter Plant	20 pc
3	Adaptor Sleeve H318	E1.1.3.14	80 Pc	BF HRS-0900065	25.04.2019	Sinter Plant	85 Pc
4	fluid coupling T12-05	E1.1.3.21	10 Pc	BF HRS-090087	25.04.2019	Coke Oven	50 Pc
5	Oil Seals 30-20-10(OD-ID-THK)	E1.1.3.20	450 Pc	BF HRS-0900098	25.04.2019	Coke Oven	350 Pc
6	Gear coupling FGC- 25	E1.1.3.13	20 Pc	BF HRS-0987676	25.04.2019	Coke Oven	30 Pc
7	E7018 type	E1.1.3.23	3400 Boxe	BF HRS-	25.04.2019	Coke Oven	5700 Boxes

	3.15 mm Welding Rod		s	0976876			
8	Lubrication oil VG 320	E1.1.3.25	150 litres	BF HRS-09009998	25.04.2019	Steel Melting Shop	270 litres
9	Hydraulic VG 46	E1.1.3.12	500 litres	BF HRS-095566565	25.04.2019	Steel Melting Shop	400 litres

Table 2 Material requisition pattern of Blast Furnace and other departments

The above table shows the mismanaged inventory which could be layed in the stores of Coke oven,Sinter and Steel melting shop hence it makes a overburden of inventories at different department,since it is reamined unused at the end of the year which could cost to the organization.

3.4 Solution to the old legacy System: -

In order to cater the needs of the system i.e., to improvise the ordering of Budgetary offers, the Technical offers, the final invoicing, the receival of final product at the shop floor or at the erection sites a rigid solution is needed by organization and hence after a lot of brain storming sessions the organization have taken a step to implement the best-in-class ERP packages in the system to streamline the operations of the plant with less man, machine and resources use. A constrained study of various ERP packages available are studied by a team of Core members for SAP implementation and after huge discussions it is realized that the best suited ERP package is SAP with a latest version named "SAP S4 HANA". Since its adaptability and user friendliness makes it best suited for our organization with distinct departments. The SAP S/4HANA implementation is done at the Organization having an understanding which simplifications and enhancements are available and which we like to implement. Each simplification or enhancement has its own unique impact on the process, data etc.

Hence a comparison needs to be made with the prior condition of the organization where there was no SAP or ERP implemented in the firm and the present situation where the implementation of SAP S4 HANA is completed.

Table 3 An array of Spares & Consumables kept at different locations of the plant

S.N	Material Description (added in MDM) with material Code	QTY procured	Other Department(in dented same materia l)	Respective Quantity	Total Quantity available for use for the Whole Plant	Transaction code for checking the Status
1	Bearing 22227 CCK(15000870)	900 pc	Coke Oven	300 pc	1200 pc	MMBE
2	Plummer block SN518 (15000875)	40 pc	Sinter Plant	20 pc	60 pc	MMBE
3	Adaptor Sleeve H318 (15000520)	80 Pc	Sinter Plant	85 Pc	165pc	MMBE
4	fluid coupling T12-05 (15000870)	10 Pc	Coke Oven	50 Pc	60 pc	MMBE
5	Oil Seals 30-20-10(OD-ID-THK) (15000820)	450 Pc	Coke Oven	350 Pc	800 pc	MMBE
6	Gear coupling FGC- 25 (15000785)	20 Pc	Coke Oven	30 Pc	50 pc	MMBE
7	E7018 type 3.15 mm Welding Rod (15005800)	3400 Boxes	Coke Oven	5700 Boxes	9100 boxes	MMBE
8	Lubrication oil VG 320 (15003580)	150 litres	Steel Melting Shop	270 litres	420 litres	MMBE
9	Hydraulic VG 46 (15000870)	500 litres	Steel Melting Shop	400 litres	900 litres	MMBE

The above table shows that after SAP S4 HANA implementation with the use of unique material code and plant code, we can get the status of material stored at far distant place or at remote location as an inventory without going for fresh indents of the same which makes an effective utilization of available inventory.

The age old inventory systems maintained in the organization have the inventory blocks and a random distribution of the spares at each department makes them inevitable, grabs the useful space in the stores and also have a monetary loss to the organization. The proper utilization can be improved by neglecting such inventory control or rather say inventory hold practices and thus the real time data of the spares and consumables is required by each department as well as for the whole organization to make a real condition of spares and consumables available at a single location or in the whole organization.

This real time data of the inventory available at all the locations of the plant by means of a latest ERP package

makes a clear cut differentiation between the inventory hold conditions & real time inventory status as makes much use of the real time data hence there negligible chances of inventory to get piled up in the stores.

	Total inventory maintained (prior to ERP implementation)	Inventory cost I (prior ERP) in Rs	Total inventory maintained (just after ERP implementation)	Inventory cost II (immediate after implementation) in Rs	Total inventory maintained (after 1 Year of ERP implementation)	Inventory cost III (1 year after implementation) in Rs
Bearing 22227 CCK	900 pcs	7500	850 pcs	6900	755 pcs	5200
Plummer block SN518	560 pcs	5800	540 pcs	5400	370 pcs	2500
Adaptor Sleeve H318	370 pcs	6000	350 pcs	5500	245 pcs	3200
fluid coupling T12-05	450 pcs	5900	410 pcs	5650	310 pcs	2750
Oil Seals 30-20-10(OD-ID-THK)	800 pcs	5300	750 pcs	4350	555 pcs	2350
Gear coupling FGC-25	350 pcs	5000	310 pcs	4500	240 pcs	1800
E7018 type 3.15 mm welding rod	990 boxes	2100	890 boxes	1550	715 boxes	1100
Lubrication oil VG 320	980 litres	2500	810 litres	2250	550 litres	1100
Hydraulic VG 46	800 litres	3500	700 litres	2500	545 litres	900

Table 4 A comparison of Inventory maintained prior and after implementation of ERP

However the table shows the inventory data for the first year of the whole organization and the tables shown later will depict how the inventory costs will goes on decreasing with the time due to availability of real time data through the ERP package implementation.

Material	Inventory cost I (prior ERP) In Rs	Inventory cost II (immediate after implementation) in Rs	Inventory cost III (1 year after implementation) in Rs
Bearing 22227 CCK	7500	6900	5200
Plummer block SN518	5800	5400	2500
Adaptor Sleeve H318	6000	5500	3200
fluid coupling T12-05	5900	5650	2750

Oil Seals 30-20-10(OD-ID-THK)	5300	4350	2350
Gear coupling FGC-25	5000	4500	1800
E7018 type 3.15 mm welding rod	2100	1550	1100
Lubrication oil VG 320	2500	2250	1100
Hydraulic VG 46	3500	2500	900
Total	43600	38600	20900

Table 5 A Cost Comparison prior to ERP implementation and After ERP implementation

A simple comparison between the conditions prior to ERP implementation and after the implementation of ERP reveals that the inventory hold and its financial implications can be overcome by the implementation of latest ERP package of SAP S4 HANA as stated in below graph.

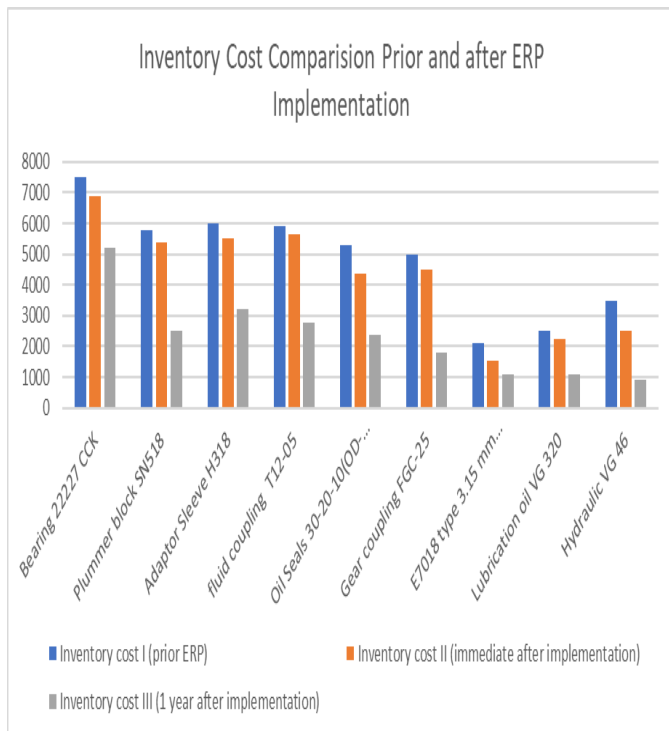


Figure 6 A graphical representation of decrease in Cost of inventory prior to ERP implementation & after implementation.

4.0 Results and Discussion: -

The needs of the steel industry must be met on the basis of prioritization, which means that the main emphasis is on the acquisition of the Company's Assets, Spaces and finances. Defining the needs and requirements of a firm is not just a one-time decision or a job that leads to a constant demand but is a set of choosing a suitable vendor among the same crowd. It must be a continuous or ongoing process, one that needs to be refined to reflect the changing needs of the organization. Ensuring proper accountability of resources highlights the importance of budget management. The organization should focus on adequate resources that are essential to the overall implementation of the ERP SAP S4 HANA. It also concludes that the internal resources of the organization and related departments should actively participate in the implementation process as they will become System Owners as soon as the implementation phase is completed. Defining Key Performance Index is one of the most important practice organizations recommended using the best ERP practice. Various advanced packages that provide the key to working in a competitive real world of business still require efforts to make certain changes in order to be easily accessible by nature.

SAP can however be called a cheap case where all the departments and remote or remote areas of the same organizations arrive in one place and are able to communicate and resolve the needs and demands of the system application in real time. Implementation. If the implementation of SAP is completed in a timely manner rather than the organization will receive benefits in terms of its performance, its real-time data analysis, rapid completion of rare items, long-term cost effectiveness and delivery. the best product for the external customer without compromising on its performance. The best integration between different departments due to real-time data availability may be the final capture of the system and the efficient use of available resources by ordering the heaviest of the same items over and over again. Shares can be saved that way as the same real-time data makes it easier to delete. The Inventory block can be called an organizational curse and may have aggressive issues with regard to local restrictions, finances and their decline over time.

The burden of inventory as it depends on tangible benefits to the organization as it reduces the financial burden and thus makes the organization more profitable in the throat cutting competition that requires refinement of each production, innovation and quality control parameters to meet customer demand.

A repetitive approach of PLAN-DO-CHECK-ACT in such conditions of inventory management makes it highly fruitful for the firm to excel among its competitors and continual improvement of inventory management through real time data analysis not makes the user to have a close control on consumption and management but also makes boosts up the moral of the team to create new ideas to have a check over

those funds draining paths which may ruin the business funds to get siphoned out to the hands of third party supplier or intermediate warehouses to hold such inventories for long since the organizations warehouse were found to be filled with unaccounted loads of inventory. Hence a concept of pipeline inventory can be successfully implemented in the organization by having a real time data of the warehouses in the whole organization and thus makes it again a profitable approach for the organization in the long run.

5. Conclusion and Scope of Future Work: -

Throughout the project work it was concluded that the implementation and operation of the latest SAP S4 HANA is said to be bearing fruit only through a partnership between a technology provider and a team of beneficiaries. The inventory management can be improved by successful real-time data analysis from the use of SAP S4 HANA and that by zero duplication of material. Remote access is important and the equipment can be easily used by each business. It is well known that the efficient use of this ERP package not only reduces the burden of innovation but also makes the organization less expensive and thus makes it more competitive in the long run.

My further studies and procedures will be in the SAP sector will focus more on the performance of highly developed ERP packages i.e. SAP packages will be implemented or updated in the steel company. My ongoing journey will be better in the future of industrialization 4.0 which will use the best SAP packages to make better use of existing inventory and thus reduce overall production costs and efficiency.

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