An Integrated Solution for Large Scale Industry Problems

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1. Introduction

According to UNEP (United Nations Environment Program) survey report, all Industries in Asia have the same problems. Those are efficiency and optimization problems [1]. Generally, large scale industries have tools to solve their problems. Control system and automation are basic requirements in large scale industries. Some large scales industries have departments in charge in them with specific functionalities. These departments perform some tasks to achieve their objectives that are supporting the root or the enterprise objectives. In some industries, production process problems are identified as engineering problems such as measuring, data monitoring, automation, etc. Usually, the problems can be solved by occupied some control equipments at each department level. These solutions, only help in reducing engineering tasks and contribute not significant benefits in global scope of production efficiency. Other industries have identified the problems as supervisory problems which can be solved by integrating the control system from each department and monitoring production performance. However, the solution can not reach the problem in enterprise level. Such problems in enterprise level i.e. lack of management awareness, limited knowledge, limited information, and lack of financial power, lack of policies, legislation, and enforcement; are significant to be solved. We offer extended technical solution which is integrating all the control system as tools to create suggestions to the supervisory and the enterprise level base on analytical procedure as directive to determine the solution.

In this paper we identified problems of large scale industries as challenges, and opportunity of advanced conceptual solution to solve the problems. We performed assessment how to find the solution for large scale industry problems, and give some case example and recommendations.

The rest of the paper is arranged as follow, Section 2 describes challenge and opportunity of engineering, technology and management in large scale industries. Section 3 describes framework of Enterprise Extended Integrated Technology Solutions (EXiTS) as a solution which is integrating all the control system as tools to
creating some suggestion to the supervisory and the enterprise level base on analytical
procedure as directive to determine the solution. Section 4 discusses case studies from
many large scale industries as method to comprehend some barriers in large scale
industries. Concluding remarks is given in Section 5.

2. Large Scale Industries and their Problems

Classification of large and small scale industries refers to size of a company in
terms of the number of employees and sometimes the annual turnover. Depending on
the country and the industry, a small-scale company employs between 250 and 1,500
people. Anything above that is a large-scale company. Any company exceeding these
limits is a large-scale one. Those are, for example, multinationals with production
facilities in many countries, or big retail chains, such as Wal-Mart. In 2008, there
were only 18,000 large companies in the United States, according to the U.S. Office
of Advocacy [4], [5], [6]. Large-scale industry generally requires heavy capital
investment in plants and machinery serves a large and diverse market including other
manufacturing industries, has a complex industrial organization and frequently a
skilled specialized [5], [6].

2.1. Challenges

A challenge is a certain situation that identified as problem which is stimulating to
do an activity as solution. The large scale industry properties are containing large
labor, large system with modern technology, many subsystems supporting production
process, etc. The large scale industry is related to large scale problems. There are
many problem should be identified as challenges.

We recognized the problem in large scale industries and classified into three
clusters, the challenges in engineering, technology, and management. The identified
challenges of each cluster are listed below.

- Engineering:
  Engineering aspects covers all technical aspects related to how production process
  and sustainability of the industry to meet the goal. The followings are challenges in
  engineering.
    - Distributed production sites
      Generally, large scale industries have large area. Each subsystem locates in
      separated area which creates many difficulties to perform data acquisition,
      data monitoring, and control tasks.
    - Limitation of supporting resources
      Resources limitation is not only the problem of itself. Since the resources
      support the production process on the core of the business. They also
      contribute other problems. Overproduction of supporting resources indicates
      sub optimum and inefficiency.
    - Data validation
Generally data monitoring is performed manually by human operator. Each operator has different performance that cause different data quality.

- **Data measuring availability**
  Large scale Industry has many devices that should be measured to monitor production process performance. Data measurement number limitation is causing only few device monitored correctly, but many others is not monitored correctly.

- **Process control monitoring**
  Process control monitoring (PCM) monitors the process stability. It is including data and process monitoring to ensure the running process run as well as objective function. Each device of all process should be monitored its performance to ensure the whole device performance are detected whether it need to be maintained or not.

- **Different art of technology**
  Large scale industry has large area and many devices to be controlled. Generally, some parts are developed by many vendors. Each vendor has specific control devices art of technology. These differ technologies contribute problems on device communication standard protocol.

- **Technology**
  Planning and utilizing of sophisticated technology are crucial keys for large scale industries. Missing in planning and inconsistency in utilizing a certain technology contribute the industries fail to meet the goal. The following problems encountered in daily activities of large scale industries are challenges for advanced solutions.

  - **Lack of data acquisition**
    The data acquisition procedure needs special knowledge of data acquisition technology to improve it to be useful information as solution variable.

  - **Data integration**
    Data integration is a technology to integrate and to collaborate with many data measurements. Some industries have integrated the data measurement. However, special knowledge in data integration is needed to utilize useful information in controlling production process.

  - **Lack of Information Technology**
    Data measurement and integration will generate useful information if they are processed correctly based on statistical, data acquisition and information processing procedures. Inappropriate procedure or process will result information without significant meaning for estimating, controlling, and evaluating the production process performance.

  - **Lack of communication technology**
    Integration and collaboration of measured data from the distributed sites need knowledge on data communication technology to configure sophisticated data communication protocol and network structure.

- **Management**
Management plays important roles in planning, employing, and controlling all resources of the industry. The roles ensure success of mission of the industry to meet the vision. However, lacks of such components or skills in managements are detected as the challenges.

- **Human relationship**
  Lack of sense of human relationship in communication among human resources, contributes in emerging of gap among engineer, supervisor and enterprise. Cultural differences also contribute in lack of personal relationship. While one’s background differ with others, the communication will be difficult to be built. Another barrier is personal position within company organization. Each level has differs community. So, it is difficult to communicate crossing differ community. The barrier is when the policy should be socialized to differ level and community, it will be refusing from others. Since social communication is very crucial in achieving the objective, management must be having a policy in developing good human relationships.

- **Engineering and Technology awareness**
  Routine activities cause less of time to enrich engineering and technology ability. These causes less of pretension or these could be rejection to implement new technology. An understanding of technology will replace human work than help human work also cause this refusal.

- **Optimization and efficiency awareness**
  Optimization is a product of management policy. A policy implements some instruments of optimization such as data monitoring and validation including data processing as information technology to achieve efficiency on human resource performance and production supporting resource utilization.

- **Process production planning**
  Planning and simulation awareness before deciding a policy on process production are an instrument to measure how efficient the policy is. It is needed to ensure that we know number of resource to be used and the revenue to be accepted.

- **Lack of financing**
  Generally, level of management think to achieve high revenue is by input-output analysis which comparing the number of resource to be used and the number of revenue to be accepted. This analysis is not quiet wrong, but it is producing insignificant the number of revenue. An implementation of optimization instrument is needed to calculate holistic resources to achieve an efficiency of production process. An efficiency mean to optimize the number of supporting production resources, time of work, human resource, etc. It needs a logic financing policy to support the optimization effort.

- **Asynchronous objective**
  Each department on large scale industry has an operating objective refer to the root or enterprise objective. It means that each sub objective should be synchronous and supporting to the enterprise objective. The barrier is each sub system or department has partial objective that is occasionally asynchronous with the root objective. Sometime it is causing overproduction in some subsystem and it is assumed as achievement than barrier.

- **Knowledge and information awareness**
It covers limited information and (technical) knowledge at company level and facilitating organizations, but also a limited access to and availability of knowledge and information. Company information on energy and resources is crucial because only then the improvements after implementation of options can be measured, and management is more likely to continue with resource and energy efficiency if quantitative data on savings are available.

- Lack of policy and legislation and enforcement
  While companies hold the key to reducing their energy consumption, government policy certainly has a big influence. Limited policies, poor enforcement and conflicting economic and environmental policies were identified as challenge.

### 2.2. Opportunity

Beside the challenge, we observed that the large scale industries have opportunity to solve their problems and survive to achieve their final objective. Opportunity is a possibility due to a favorable combination of circumstances.

- **Technical opportunities:**
  Since the engineering and technological are related to the technical aspect in industrial fields, we use terminology of technical in context with opportunity in this section include engineering and technological opportunities. Availabilities, advancements, and current progresses of engineering methods and technologies are the opportunity of us to solve the challenges mentioned above.
  - Distributed electronic data acquisition system and information technology.
    Availability of engineering facilities such as measurement and monitoring system, data acquisition and communication system, and information technology allow in coping the problems of distributed production sites.
  - Method of resource planning
    We have knowledge about planning of resources in industry. By occupying the knowledge in planning of production and utilizing of supporting resources we can overcome the problem of supporting resource limitation.
  - Standard validation method
    Deterioration of manual data validity can be coped by utilizing standard data validation method. By occupying standard technology for data acquisition system, captured data can be processed, analyzed, and validated using standard methods.
  - Data measuring availability
    Utilizing transducer, almost all physical variables in industry can be converted to electric variables. Modern measurement systems are realized due to availability the transducer. Therefore, in the modern era, availability of data in large scale industry is a function of availability of transducer and measurement systems.
  - Advanced control engineering
    Availability of measurement system provided feedback information that is useful for control purpose. Some advanced techniques incorporating with traditional process control method (fuzzy control schemes, neural network, etc.) can be occupied in solving the problems in monitoring stability of the process.
  - Multi-technology bridge system
Difficulties faced by large scale industries that caused diversity of vendor can be solved by utilizing a multi-technology bride system.

- Advancement of electronic device and circuit technologies
  Advancement of fields of electronic devices and circuits support development of integrated industrial instrumentation amplifier, analog to digital converter, etc. The availability of the system is opportunity to cope the challenge of the technological needs in data acquisition.

- Information technology
  Advancement of information technology make possible to cope the challenge in data integration, data processing and assessment, control purpose, and production performance evaluation.

Managerial opportunities:
We can develop an integral approach involves social and technical aspects to acknowledge the challenges in management. Novel concepts and formula in management can be derived to synergize the action to meet the final objective with optimum efforts and minimal side effects.

- Humanity and cultural approaches
  We can use humanity and cultural approach to solve problems around human relationship among human resources of large scale industries.

- Sustained education and training program
  Placement of human resources based on his educational background and interest will result in significant improvement of awareness to achieve company goal. Education and training program in engineering, technology, and management can improve engineering and technology, knowledge and information, optimization and efficiency awareness, and process production planning of the employee.

- Finance planning program
  Utilizing appropriate finance planning based on priority of needs.

- Synergetic objective
  Although objective of each department is decided in the enterprise level, the objective must be determined by considering all strength and weakness of each department and synergetic of all departments to achieve efficiency. Policy on labor

- Green technology policy
  Utilizing advanced technology and knowledge in modern policy and law enforcement in developing new policy for optimal production under health, environment, and safety (HES) paradigm. Humanity and cultural approaches also play dominant roles in growing the awareness of consistence of policy and law enforcements to achieve the company objectives.

3. Enterprise Solution for Large Scale Industries

Today’s business competition forces organizations to make sure that they can rapidly meet the customer needs and make appropriate decisions on their resources. Many companies have implemented an Enterprise Resource Planning (ERP) system as a powerful alternative for an integrated information system to support speedy and accurate
transaction processing and decision support functions [1]. Moreover, they have implemented a packaged ERP solution for establishing an integrated backbone system rather than traditional system development. Example of an ERP system shows in Figure 1 (modified from literature [1]).

![Figure 1. ERP System](image)

ERP systems are packaged software designed for a client server environment (whether traditional or web-based), integrate the majority of a business’s process, process a large majority of an organization’s transactions, use an enterprise-wide database that typically stores each piece of data once, and allow access to the data in real time.

Implementation of this method in large scale industries has some advantages to industrial automation, i.e. eliminate the use of manual interfaces, costs reduction, optimize the information flow, improve the quality of the organization information (efficiency), optimize the decision process, eliminates redundancy of activities, reduce the time to market, reduce the lead-time, information security, and integration between modules. This solution can be obtained by follow Figure 2 (modified from [3]).

Recently, most of ERP application not included requirements of human intelligence included as one of alternative solution algorithm, and considering employee and society behavior to take decision. Therefore, we propose a new method to improve performance of large scale industries, called EXiTTS.

EXiTTS (Enterprise Extended Integrated Technology Solution) is the concept of building applications which are fully integrated, that can be used to automate many of the routine functions of running the company. In other word, we can define EXiTTS as solution that integrates all data and processes of the organization in a single system. Companies typically purchase these systems in an effort to consolidate their data and information flow into one system or database. In an environment that is currently not running EXiTTS systems, the data is decentralized into many smaller subsets of system, servers and/or databases. By having everything separate, it limits the amount of
integration and collaboration that can be done. Information technology functions such as disaster recovery system, data warehousing, backups and data updates must be done on each individual system, rather than one EXiT System. A tremendous amount of planning needs to be done prior to bringing this type of system in house, to ensure that it will really meet the business objectives of the company, while not forcing unwanted processes on departments that are not inclined to change the way they do business.

Figure 2. ERP Project Life Cycle

An important question that must be answered is why are companies spending millions of dollars on the purchase and deployment of these systems, and what problems are they trying to solve? Some will mention cost reduction, but that is not really an accurate description of why companies implement these systems. The primary reason companies look to deploy these systems is to gain better control of their data. It gives companies the ability to consolidate and integrate their data into one single corporate type system.

Obviously, if implemented correctly, installation of the systems can result in savings over the long term, after the system has been in production for several years. Some of the savings can be through, lower warehousing costs, lower cost of materials due to the consolidation of purchasing and better management of assets. The basic concept of technical and business information architectures, relates to architecture and type of information systems. Technical corresponds to the technical part of information strategy,
while business architecture relates to how information technology is used to improve business processes. This describes the purpose behind EXiT systems. They are created solely for the purpose of improving business processes.

EXiT systems include the ability to handle the following functions; manufacturing, logistics, distribution, inventory, shipping, invoicing, and accounting for a company. They can also aid in the control of many business activities, including; sales, marketing, delivery, billing, production, inventory management, quality management, and human resources management.

The integration of business processes optimizes functions across the enterprise (e.g., supply chain, finance, manufacturing/maintenance, human resources, etc.). As one call see from the illustration above, the common denominator in EXiT systems is the data. Prior to the advent of EXiT systems, each department had its own system that was not integrated with any others. Data was kept separately and information technology had to support each and every type of system. This was extremely difficult to manage and from a business process perspective, did not help the company become more efficient. EXiT software, among other things, combined the data of formerly disparate applications. It standardized and reduced the number of software specialties required within larger organizations. It enabled reporting that spanned multiple systems much easier. And it allowed for the development of higher level analysis functions enabling larger organizations to identify trends with in the organization and make appropriate adjustments more quickly.

EXiT is cross-functional and enterprise wide. All functional departments that are involved in operations or production are integrated in one system. In addition to manufacturing, warehousing, logistics, and Information Technology, this would include accounting, human resources, marketing, and strategic management.

To help further understanding what EXiT exactly does, it helps to understand why a company would introduce it. There are five basic reasons for introducing EXiT.

• Integrate financial information; there are too many sets of financial data within a company, which can be maintained by Finance, sales and other business units. EXiT creates a single version of the truth that cannot be questioned because everyone is using the same system.

• Integration of customer order information; by having all customer information in one software system, rather than scattered among disparate systems that cannot communicate with each other, companies can keep track of orders more easily, while at the same time, coordinate manufacturing, inventory and shipping among many different locations simultaneously.

• Standardize and speed up manufacturing processes; manufacturing companies will find multiple business units across the company that can actually make the same product, using different methods and computer systems. EXiT systems come equipped with standard methods for automating the manufacturing process. Standardizing those processes by using a single, integrated computer system, saves time and increased productivity.

• Reduce inventory; EXiT helps the manufacturing process flow more smoothly, and it improves visibility of the order fulfillment process inside the company. This in itself, can lead to reduced inventories of the materials used to make products (work-in-progress inventory), and it can help users better plan deliveries to customers,
reducing the finished good inventory at the warehouses and shipping docks. To dramatically improve the flow of the supply chain, one can also bring in supply chain software

- Standardize human resources information; especially, in companies with multiple business units, human resources may not have a unified, simple method for tracking employees’ time and communicating with them about benefits and services. EXITS fixes that and also integrates payroll and human resources processes and data.

In EXiTS model, resources of the large scale industries consist of management, engineering, technology, equipments, documents, and standards. Each resource is necessary in production process of the large scale industries to achieve company targets. Vision and mission of the company must be defined by management level as main objective. Employees do their tasks based on the defined objectives. The equipments that are utilized in production processes must be follow the specifications. All the defined and applied standard operation procedures (SOPs) must be obeyed by all resources, and they also must be well documented. The obedience is important to ensure that all production processes run as well as the planning, and to achieve better performances. Figure A.1 (Appendix) shows value chain model of EXiTS.

Production processes meet the objectives through the support functions. In the framework, the support functions are included business, research, and service functions. Business function performs by organizations in order to act their main function as business institutions in their own business cores. Research function is necessary to act in finding solution for challenge and other problems during the mission. Service function is delivered by the organization for all customers and social corporate responsibilities. Company objectives can be obtained by considering their identification, control and optimization.

**Requirement definition**

During this phase, the company implementing the EXiTS should clearly determine the objectives of EXiTS implementation, business process change strategy and its specific information requirements (e.g. production quantities at various temperature and pressure levels). We also should define enterprise level objectives, develop process team, develop document business processes and define data conversion requirements.

**Requirement analysis**

Current (as-is) and future (to-be) business processes should be documented. A dedicated project team should be developed and trained for EXiTS implementation. This method should be evaluated on the basis of information requirements of the company. A gap analysis should be performed between specific requirements of the refining industry and features available in the enterprise solution products and the best-fit product should be selected. Data conversion requirements should be analyzed. Readiness plan for senior and middle management should be developed.

**Functional design**

In functional design phase, information requirements should be mapped with the features of selected enterprise solution method.
Detail design

Technical architecture and interfaces of various applications with EXiTS should be designed, data transition strategy should be developed, functional and technical design of databases and applications should be finalized, and user learning plan should be developed.

Implementation

During implementation phase, interfaces between various applications should be developed, application forms & reports should be customized if required, data conversion programs should be developed, user guides and necessary reference material should be prepared, and applications and interfaces should be tested for all business scenarios in an integrated environment.

Utilization

In this phase, all users of the applications should be provided with adequate training. User acceptance testing must also be performed in this phase, involves applications setup and conversion of legacy systems data into the new system. This phase is the final phase in EXiTS. It should be assessed for its effectiveness, all errors appeared in live environment should be removed, legacy systems should be decommissioned, and future information requirements should be analyzed.

During implementation of EXiTS at large scale industries, few tasks are critical for making the project successful. These tasks include business requirements analysis, mapping business solution with company's requirements, business process re-engineering, development of interfaces with other applications, data conversion from legacy to new system, and user readiness.

Implementation of EXiTS concepts in a company result in some benefits. First, improvement of order fulfillment processes will be achieved. Without an integrated system, the process becomes very difficult to manage, as information is scattered among many different systems that can’t communicate with each other. EXiTS systems can keep track of orders more easily. They can also coordinate manufacturing, inventory and shipping among many different locations simultaneously. The EXiTS system essentially becomes the place where a customer can now live from the beginning of the sales process until delivery and ultimately invoicing.

Second, a company has standardization of manufacturing processes through EXiTS method. Manufacturing companies usually find out that multiple business units across the company, that might even make the same product, use all different types of methods and computer systems.

By having consolidated systems with standard methods for automating tasks, will speed up the steps of the manufacturing process. In turn, this should save time, increase productivity and ultimately reduce the amount of staff necessary to maintain these systems.

Third, reduction of inventory will be achieved. With separate systems, inventories needed to make products and/or fill orders will be almost impossible to keep up-to-date. This can hurt corporate financials and impact the ability of the company to fulfill orders in a timely fashion. EXiTS systems, implemented successfully, can lead to reduced
inventories of the materials used to make products (work-in-progress inventory), and should also help staff better plan deliveries to customers. This will have the impact of reducing the finished goods inventory at the warehouses and shipping docks.

*Fourth,* standardizing of human resources information. Without an integrated system departments within an organization will keep their own human resources records. This can lead to all sorts of chaos, particularly in companies with multiple business units. There might not even be a simple method for tracking employee’s time and communicating with them about benefits and services. An EXiTS system solves this problem.

*Fifth,* server and data consolidation. An effective EXiTS system should dramatically reduce the overhead of maintaining many differently physical and logical systems. Each management information system; typically requires its own infrastructure, which includes hardware and software. There are substantial maintenance costs required for upkeep of these systems. These includes information technology personal required to take care of the systems, database administrators that must take care of the database and coders responsible for making changes to the systems. With a single EXiTS system, there is just one system and infrastructure to maintain.

*Sixth,* integration of processes and people. Productivity can be reduced dramatically through more efficient processes that can be structured with one system. Best practices can be implemented across the enterprise more easily with one application, then with disparate systems. Because the integrated systems require more cooperation among departments, there could also be more resource sharing and teamwork across department and business units.

*Seventh,* enhanced financial management and corporate governance. Disparate systems lead to inaccurate financial reporting. Single integrated systems will provide more accurate information to finance people and empower them to make better corporate decisions. Corporate governance becomes easier to manage, as there is now a single system to work with. Auditors can feel more at ease, knowing there are integrated systems that provide more detailed and accurate corporate information.

### 4. Case Study

#### 4.1. Production Losses

Production losses can be proceeding from deterioration of machines health and quality of data communication system. Machines health status have strong related with the efficiency of production process, therefore, it’s important to collect data status and distributed it to right management levels. This procedure will called as housekeeping system in next conversation in this discussion. High quality and integrated communication system is important rule in order to running housekeeping system. Low quality housekeeping system will give low quality information which produces ambiguous data, difficulty in reading data, and error in interpreting data. Undelivered and wrong interpreted housekeeping data produces ineffective decision which contributes production losses. Figure 3 shows the housekeeping system that collecting data electronically from installed sensors [7]. Electronic measurements can then be converted to digital information that then can be used by microprocessors for feedback control, report generation, an environmental monitoring.
4.2. Asynchronous Objective
In large company comprise with many organizations which have differ objectives. Most of the problem is how to taking single objective for single right decision on the right time when executing company’s project roadmap. Specific performance metrics should be used to monitor progress and final result of project. The metrics used are determined and agreed upon all organizations include measure for thoroughness, quality, timing, and efficiency. Useful metrics are on right-schedule completion, satisfaction of customer, and satisfaction of internal process. Asynchronous objective often occur in large scale companies. It will affect the performance efficiency of the company. Synchronous objective for all organization promises good value on all those metrics, it means that organizations work in effective and efficient way.

4.3. Quality of Human Resources
Most problems in quality of human resources are contributed by knowledge divide between management and engineer about the single goals for all organization as a single company’s objective. Knowledge and learning process is installed as the gate between the conceptual knowledge-intensive work and the actual product development. Figure 4 show the phases and steps of knowledge and learning process. It aims to provide equilibrium of knowledge intensive project landscapes.
4.4. Investing in Efficiency with Integration and Virtualization

Common solution to deal with above huge problems made in complex ways and it sound needs more complex desktop work and take a time [8]. For large companies, it take more than one month to compile some information collected in order to produce a bulk of ready document that needed by manager to make the decision. Virtualization the desktop work can help to do processing and controlling data to ensure thoroughness and validity of collected data automatically. Information Technology (IT) enables the company to build desktop virtualization. Integration by using IT network play role to make all that work efficient. Streamlining the infrastructure help IT better serve the needs of business managers. It allows the company to respond to their need faster. This is solution known as e-factory or e-plant.

4.5. Smart Solution for Oil and Gas Companies

A company who have implemented smart oil field using ICT (information and Communication Technology) in order providing online well head telemetry supervision and control, real time monitoring of manned and unmanned remote location at centralizes places, real time data consolidation, recording and storage for the analysis for future evaluations, and real time key performance indicators management level for quick decision making. Implementation of smart field reduces the delay in decision making via online measurements of critical parameters.

To Convert an Oil Field to Smart Oil Field involves major contents in technology and Business terms as follows:
• Instrumentation on well head and Production, Storage and Transportation facilities for real time measurement.
• Automation and integration system to monitor, control the Production facilities of different location to stabilise the production, transportation process.
• Communication system such as WAN to build Hierarchical Automations system to provide corporate level consolidation of the multiple production, transportation and storage systems spread across Cities, States and Countries
• Applications to carry out production process optimisation such as pump optimisation and make optimum use of the energy
• Integration with scientific and business system for operational efficiency improvements, strategic decision making.

4.6. Advanced Dispatch Monitoring and Control System

One of the most important part of integrated solution is model based advanced dispatch real time control system which combines industry-leading Advanced Process Control (APC) capabilities with advanced enterprise information and integration technologies to dramatically reduce integration costs and optimize overall process performance. This system is process modeling tool for conceptual design, off-line simulation, closed loop optimization, and performance monitoring. APC is an enabling technology that provides a platform for further business improvement to realize greater benefits from the operation. The are several APC software suites available which help large scale industrial enterprises more effectively align operations and engineering departments with the business to optimize overall asset performance management:
• Assist in achieving optimal operation by accurately responding to real-time demands and limitations
• Optimize a process to maximize oil throughput and reduce energy consumption while meeting delivery commitments
• Improve process stability to allow for operation closer to target, constraint, and optimum values
• Provide real-time process requirements verification and formal real-time assessment to validate the financial benefits
• Decrease downtime through early indication of abnormal behavior
• Identify and resolve performance and optimization issues through faster responses and a shorter cycle time
• Improve repair and maintenance planning and prioritization

APC software suite is comprised of common process model tiered optimization and control solutions. Customer using these solutions obtains significant benefits by increasing process efficiency while maintaining emissions; reducing fuel consumption, and a number of other cost-impacting factors.

By reducing the cost and effort required to integrate existing automation systems into a unified enterprise model based control system and providing an object-based environment for APC application development, deployment, and reuse, proposed enterprise this system represents a major step forward for the automation industry.
During the design stage, the APC system is used as the process modeling and optimization tool for conceptual design, identification of process and control system problems, troubleshooting. The APC system can do the following tasks:
- Perform operational analyses off-line to forecast potential operating risks
- Perform process simulation to identify system deficiencies
- Evaluate process control strategy design

During the operation stage, online deployment of the APC system is used in the open-loop operator advisory system and/or in closed-loop, real-time optimization/APC applications to optimize the performance of the existing and new automation, information, production, and human assets. The APC helps with the following tasks:
- Optimization
- Increase production levels
- Reduce emissions
- Increase efficiency
- Improve profitability
- Provide process operating forecasts
- Provide an off-line process study
- Provide real-time process requirements verification and a formal real-time assessment to validate the financial benefits

Large Scale Company in Indonesia faces unique human resource problem, cause of differ culture backgrounds. Indonesia is comprises various cultures with each differ behavior. Heterogeneous employ backgrounds have to be handled with culture approach, psychology approach, and humanity approach. These approaches for encourage their social life quality in their community. As a result, the loyalty of the employ will increase, thereby the employ will do self improvement that will upgrade quality and productivity in their work. Whole terms to face above complete problems in Oil Field Company can be implemented as an integrated system including technology, business, and humanity aspects.

5. Concluding Remarks

Large scale industries’ problems can be solved by an integrated solution. We recognized the problems itself as challenge, and availability of technology, engineering methods, and management functions as opportunity to solve them. Technical opportunities can be optimized by humanity based management system. Technical aspects involved communication system for handling data exchange from all industrial components and process the data for decision making. Humanity aspects including human resources management systems can motivate human resources to improve their loyalties and improvement of productivities. EXiTS gives humanity approach based solutions to create appropriate environments and better more proper quality of jobs. The approach make more intellectual employee than just physical employee. Thus, Technical aspect could be used and implemented by the employee to achieve optimum productivities and efficiencies.
References:


Appendix A

VALUE-CHAIN MODEL
Enterprise Extended Integrated Technology Solution (EXiTS)

Figure A.1. Value Chain Model of EXiTS