

How to Improve Your Production: Part II

John Kyriazoglou




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John Kyriazoglou

How to Improve Your Production: Part II

Effectively managing your Production Function to
improve your Business Operations



How to Improve Your Production: Part II: Effectively managing your Production Function to improve your Business Operations

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Preface

This is the second part of the book ‘**How to Improve Your Production**’.

It contains examples of methodologies, policies, procedures, performance measures, audit programs and checklists that complement and enhance the contents of Part 1 of this book.

This part contains the following:

Appendix 1: Plant and Inventory Security Plan

Appendix 2: Production Staff Duties and Responsibilities

Appendix 3: Production Methodologies, Policies and Procedures

Appendix 4: How to develop an ERP System

Appendix 5: Quality Assurance Manual Example

Appendix 6: Production Management Review Procedure

Appendix 7: Quality Records Management Procedure

Appendix 8: Production Performance Goals and Measures

Appendix 9: BSC and TQM Frameworks

Appendix 10: Production Audit Programs and Checklists

Appendix 11: How to Develop Policies and Procedures

Appendix 12: Production Controls Checklist

Part 1 of this book, in summary, describes the main types of production controls, such as:

1. Production Policies and Procedures,
2. Production Management Duties and Responsibilities,
3. Manufacturing Process Controls,
4. Quality Management Controls,
5. Standardization Procedures,
6. Production Performance Management Controls, and
7. Production Performance Measures for several areas (innovation, inventory control, manufacturing, production cost, etc.).

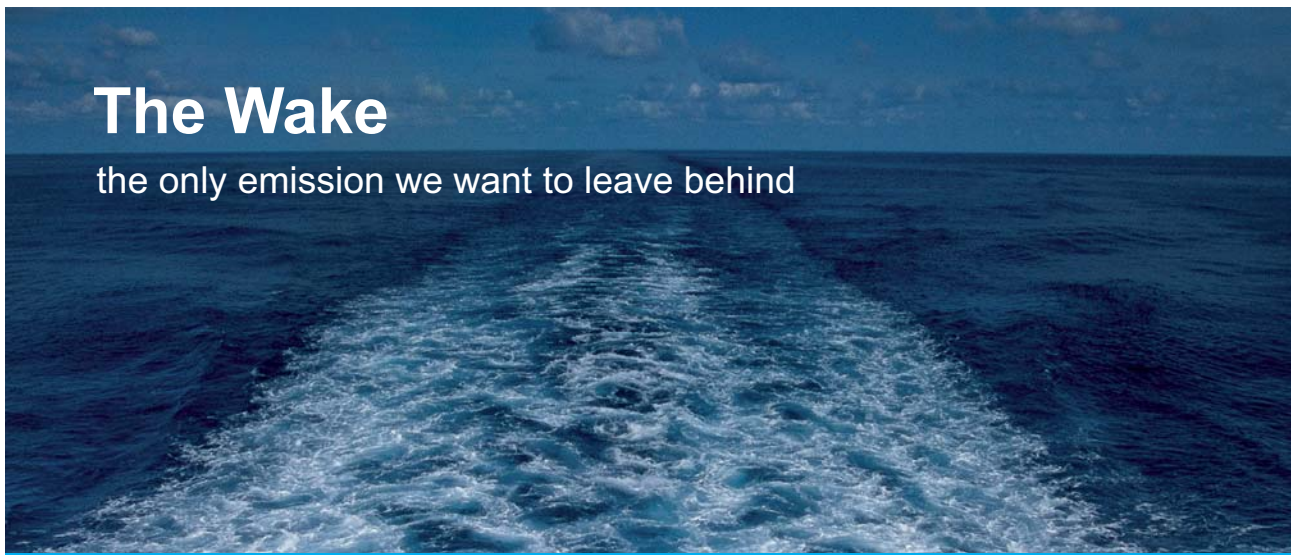
Appendix 1: Plant and Inventory Security Plan

This plan refers to 'Chapter 2: Production management controls' of Part 1 of this book.

An example of a Plant and Inventory Security plan consists of the following actions:

1. Evaluate the safety of your production plant and inventory storage facility and consider improving your systems to reduce loss. Your evaluation should examine what mechanisms exist in your company protect against a variety of threats: physical, electronic, cyber, and integration, in terms of:
 1. Monitoring and protecting the physical perimeter
 2. Identifying and controlling visitors
 3. Tracking movements of company personnel and assets
 4. Controlling access to company data and sensitive areas
 5. Quickly locating equipment, products, and other assets
 6. Improving crisis and emergency response time
 7. Preventing theft of assets and data
 8. Integrating systems for greater speed and efficiency
 9. Protecting networks and systems from cyber threats
 10. Policies, procedures, and education.
2. Ensure effective implementation of your corporate administrative procedures, such as: corporate governance policies and procedures like ethics program, risk management approach and procedure, personnel review and due diligence, segregation of duties, business data management files and data procedures, etc.
3. Enhance your corporate physical security: Hire and train guards, use dogs for external perimeter security, and install locks, cameras, video surveillance, and other security devices along with signs that announce their existence.
4. Limit the number of people who have access to your more expensive inventory items by storing them in a separate locked area.
5. Create an employee theft policy that must be signed by each employee explaining the consequences of legal action for offenders.

6. Implement IT policies and procedures to enhance your IT systems and infrastructure security, with practical and cost-effective mechanisms, such as: passwords, access controls, hardware security, data validation rules within application software, back up procedures, offsite data retention capabilities, security trapping mechanisms (honey net and other trapping facilities, special security trapping and diversion tools and techniques), etc.
7. Assure your corporate recovery mechanisms include: business continuity policy, IT recovery process, backup procedures, offsite storage and testing procedures, etc.
8. Test your security plan often by your own team and external experts, as your case requires.
9. Establish a business intelligence function to become more competitive in an ethical way.
10. Use corporate anti-espionage techniques to protect your valuable assets: designs, specifications, IT systems, data, patents, research findings, plants, etc¹.




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Appendix 2: Production Staff Duties and Responsibilities

These duties and responsibilities refer to 'Chapter 2: Production management controls' of Part 1 of this book.

Industrial engineer

This is the second crucial production-related management position for your company. The duties, role and responsibilities of a typical industrial engineer, in general terms, are:

1. Design layout of equipment, materials, and workspace to illustrate maximum production efficiency.
2. Plan and establish sequence of operations to fabricate and assemble parts or products and to promote efficient utilization.
3. Study operations sequence, material flow, functional statements, organization charts, and project information to determine production worker job functions and task responsibilities.
4. Support the production or manufacturing manager in their activities.
5. Communicate with management and user personnel to develop production and design standards.
6. Review production schedules, engineering specifications, orders, and related information to obtain knowledge of manufacturing methods, procedures, and activities.
7. Estimate production costs, cost saving methods, and the effects of product design changes on expenditures for management review, action, and control.
8. Coordinate and implement quality control objectives, activities, or procedures to resolve production problems, maximize product reliability, or minimize costs.
9. Analyze statistical data and product specifications to determine standards and establish quality and reliability objectives of finished product.
10. Implement methods and procedures for disposition of discrepant material and defective or damaged parts, and assess cost and responsibility².

Procurement/Purchasing Manager

This is the third crucial production-related management position for your company.

The duties, role and responsibilities of a typical procurement/purchasing manager, in general terms, are:

1. To manage, control and co-ordinate the operational activities of the procurement/purchasing function (department, unit, etc.) of your company.

2. To plan and develop procurement/purchasing systems and procedures to improve the operating quality of procurement/purchasing transactions and the efficiency of the department.
3. To supervise procurement/purchasing staff in accordance with company policies and procedures.
4. To hire, train, support and coach the employees of the procurement/purchasing function.

Production quality officer

This is the fourth crucial production-related management position for your company.

The duties, role and responsibilities of a typical production quality officer, in general terms, are:

1. To establish a production quality monitoring and improving methodology, documenting a set of steps for determining, investigating and resolving production quality issues, and maintaining quality data, by defining data quality audit procedures.
2. To analyze, develop, document and maintain production quality goals, standards, and processes.
3. To work with all business users, and the production team of your company, to identify, document and correct production quality issues.
4. To utilize data profiling, statistical and other data quality tools, to detect, uncover, and determine root causes and anomalies of quality in all your production systems.
5. To prepare a weekly, or as required, status report, highlighting accomplishments and progress on all issues and concerns that may relate to production quality issues.

Warehouse Manager

This is the fifth crucial production-related management position for your company.

The duties, role and responsibilities of a typical warehouse manager, in general terms, are:


1. To manage, control and co-ordinate the operational activities of the warehouse inventory function (department, unit, etc.) of your company.
2. To plan and developing warehouse inventory control systems and procedures to improve the operating quality of inventory and the efficiency of the warehouse department.
3. To supervise warehouse staff in accordance with company policies and procedures.
4. To hire, train, support, coach and review the performance of the employees of the warehouse function.

Health and Safety Officer

This is the sixth crucial production-related management position for your company.

The duties, role and responsibilities of a typical health and safety officer, in general terms, are:

1. To manage, control, co-ordinate, develop, implement and maintain an effective program and ensure compliance to satisfy the requirements of local health and safety legislation.
2. To develop systems to ensure all employees comply with all relevant legal safety requirements.
3. To identify safety training needs, organize and co-ordinate safety training courses and prepare training material where appropriate
4. To co-ordinate and ensure that all support documentation in respect of the health and safety program is received on time and in the correct format from all concerned parties.
5. To evaluate incident forms, surveys, audits to establish root causes and together with Supervisors and Managers concerned, formulate a plan of action to correct non-compliant production behavior or conditions.
6. To liaise with onsite contractors to ensure their compliance with Company safety regulations and adherence to health and safety standards.
7. To co-ordinate the approved emergency and evacuation exercises per year to ensure that all staff become familiar with these procedures.
8. To review and update Emergency Procedures as and when necessary³.



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Mechanical Engineer

The duties, role and responsibilities of a typical mechanical engineer, in general terms, are:

1. To design and implement cost-effective mechanical equipment modifications to help improve production safety, reliability and throughput.
2. To develop, test and evaluate theoretical designs.
3. To discuss and solve complex mechanical problems with manufacturing departments, sub-contractors, suppliers and customers.
4. To plan and design new production processes;
5. To make sure that products can be made again reliably and will perform consistently in specified operating environments.
6. To produce details of specifications and mechanical designs.
7. To recommend modifications following prototype test results.

Chemical Engineer

The duties, role and responsibilities of a typical health and safety officer, in general terms, are:

1. Designing plant, systems and equipment configuration so that they can be readily adapted to suit the product range and the chemical process technologies involved.
2. Designing, installing and commissioning new chemical production plants.
3. Monitoring developments and troubleshooting.
4. Working closely with process chemists and control engineers to ensure the chemical process plant is set up to provide maximum output levels and efficient running of the production facility.
5. Optimizing production by analyzing chemical processes, compiling studies and applying new technologies.

Marine Engineer

The duties, role and responsibilities of a typical marine engineer, in general terms, are:

1. Design and oversee testing, installation, and repair of marine apparatus and equipment.
2. Conduct analytical, environmental, operational, or performance studies in order to develop designs for products, such as marine engines, equipment, and structures.
3. Evaluate operation of marine equipment during acceptance testing and shakedown cruises.
4. Prepare, or direct the preparation of, product or system layouts and detailed drawings and schematics.
5. Analyze data in order to determine feasibility of proposals.

Appendix 3: Production Methodologies, Policies and Procedures

3.1 Methodologies

3.1.1 How to create your own business model

This methodology refers to 'Chapter 1: Defining your production function' of Part 1 of this book.

The business model expresses the logic of your business.

If you want to create your own business model to which your production must align, you must study and consider: Your market; Your products and services; Your customers; and Your resources.

One simple and practical approach I have used includes the study and analysis of the following components:

Component 1: The company (brand name, reputation, history);

Component 2: The customer (consumer, citizen, patients, etc.);

Component 3: The products you want to make or distribute;

Component 4: The service you want to provide;

Component 5: The market to which you want to sell;

Component 6: The experience (knowledge, skills) of the company founders, investors, major stakeholders; and

Component 7: The resources (funds, human, systems, data, etc.) required to do all these at a cost benefit level.

All these can then be put in a pictorial diagram or flowchart, usually in a single page.

For another approach, see: <http://startupowl.com/resources/before-you-start/business-model/>

For a much more sophisticated approach, see: http://www.businessmodelgeneration.com/downloads/businessmodelgeneration_preview.pdf

3.1.2 Performance Methodology

This methodology refers to 'Chapter 6: Performance goals and measures' of Part 1 of this book.

This methodology consists of the following steps:

Step 1. Connect your production mission and goals: This is achieved by crafting and communicating your production goals, mission and vision with the mission, vision, beliefs, core values and goals that shape the culture and the philosophy of your company.

Step 2. Ensure your production strategy and structure: This is achieved by ensuring that all activities below are completed. These are:

- a) collecting and understanding customer demands, as customer requirements and expectations drive and show the way your company responds with products and services to local, national, and global market opportunities,
- b) Formulating and implementing your production strategy,
- c) Allocating production resources, and
- d) Ensuring that all production systems are operated successfully.



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Step 3. Create Production Management Control Systems that measure Efficiency, Quality, Innovation and Responsiveness to customers: This is achieved by:

- a) Establishing specific production objectives,
- b) Setting desired expected levels of production performance (targets) and
- c) Designing specific production performance measures to record performance, for each performance perspective (customer, financial, internal process, and innovation and growth).

Step 4. Manage Production Performance: This is achieved by:

- a) Establishing specific production performance data collection mechanisms to monitor specific performance measures, per each perspective (customer, financial, internal process, and innovation and growth),
- b) Analysing these production performance data, and
- c) Taking the required actions to improve production performance, change strategy, amend objectives, re-set targets, etc⁴.

Step 5. Use the Corporate Business Dashboard System: Ensure that your **Business Dashboard system**¹⁷ (17. For more information and examples, see: (1) Victoria Hetherington, Victoria (2009): Dashboard Demystified: What is a Dashboard?, and (2) <http://dashboardspy.com/>) includes all production performance data so that you can have instant visual and reporting information of all your performance data.

Step 6. Link Production to your Business Management Reporting Procedure: You should make sure that your production performance data are included in the following **Business Management Reporting Procedure**. This procedure is needed to manage the data collection, analysis, production and distribution of management reports of your company such as: Weekly financial reports, cash flow reports, budget vs. actual reports, departmental performance reports, interim financial statements, payroll, personnel issues, safety and health issues, production issues, customer problems, security incidents, compliance issues, etc. These procedures should be based on a set of national and international (such as: U.N., E.U., OECD, etc.) government standards and guidelines, such as: Financial Accounting Reporting Standards, Auditing Standards, Employment, Health and Pension Laws, Insurance Regulations, Tax and Customs Code, Corporate Performance Management System, Board Executive Guidelines, etc. The specific forms and reports that must be designed and used by each organization to execute these procedures may be: Standard financial statements, standard cash flow reports, standard budget reports, standard performance reports, production reports, etc.

Step 7. Improve Production Performance: This final step is achieved by:

- a) Analysing these production performance data, and
- b) Taking the required actions to improve production and quality performance, change production strategy, amend production objectives, re-set targets, etc.

3.2 Policies

These policies refer to 'Chapter 3: Production policies and procedures' of Part 1 of this book.

3.2.1 Health and Safety Policy

This is a crucial policy in establishing and running your production operation as it concerns the health and safety aspects of the most critical resources of your business enterprise: your people. It belongs to both the Processing and Resources components of your company's Production System (see IPORS Model in chapter 1).

A typical example of such a policy is:

'The XXXAB Company (a fictitious business enterprise) will make proper provision for the health, safety and welfare at work of our employees and others who may be affected by the company's activities. We aim to achieve this by executing the following actions:

- Action 1: Adopt an effective health and safety management system;
- Action 2: Allocate clear accountabilities to support its implementation;
- Action 3: Provide suitable resources to meet its commitments;
- Action 4: Maintain consultation and dialogue with employees on any unresolved implementation issues;
- Action 5: Comply with relevant legal requirements and industry standards;
- Action 6: Assess work activities to eliminate hazards and minimize risks;
- Action 7: Set production objectives and targets, and prepare action plans to maintain compliance and support performance improvement;
- Action 8: Provide suitable training to develop appropriate competencies and skills for all employees;
- Action 9: Specify standards for the selection and management of maintenance contractors;
- Action 10: Review production performance, investigate incidents and implement lessons learned;
- Action 11: Arrange for periodic audit of the production management system and production policies and procedures, and provide access to competent professional advice; and
- Action 12: Work with regulators and industry bodies to implement relevant legal requirements and trade standards related to production.

This policy will be complemented by specific detail procedures which will be developed to execute all the actions specified in this policy.'

3.2.2. Environment Management Policy

This is also another crucial policy in establishing and running your production operation as it concerns the environment in which we all live. It belongs to all components of your company's Production System (see IPORS Model in chapter 1).

A typical example of such a policy is:

'The XXXAB Company (a fictitious business enterprise) will make proper provision to protect the environment by executing the following actions:

Action 1: Design and implement an environmental management system to set environmental objectives and targets that support this policy

Action 2: Integrate all relevant environmental considerations into the company's production processes;

Action 3: Meet fully or surpass all environmental legislation, regulations, and other applicable requirements;

Action 4: Improve on a continuous basis the company's environmental performance consistent with defined goals;

Action 5: Ensure that the environmental impacts and risks of company activities are identified, assessed and managed;

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- Action 6: Advocate socially responsible laws and regulations and, where appropriate, market-based and voluntary approaches for achieving environmental objectives;
- Action 7: Encourage meaningful communication, consultation and collaboration with all employees, customers, contractors and the public related to the company's production operations and its impact on the environment;
- Action 8: Act as an environmentally responsible neighbor in the communities in which the company operates production facilities;
- Action 9: Act promptly and responsibly to correct incidents or conditions that endanger the environment and inform those who may be affected;
- Action 10: Achieve ongoing improvements in eco-efficiency through reductions in wastes and emissions;
- Action 11: Develop new production practices which represent solutions to environmental problems on a cost-benefit way; and
- Action 12 4: Develop and implement a performance assurance process to endure compliance with this policy and the company's environmental management system.

This policy will be complemented by specific detail procedures which will be developed to execute all the actions specified in this policy.'

3.2.3 Fire Safety and Evacuation plan

Having a set of guidelines and a specific to your own business plan is considered an absolute necessity if you establish and operate a production facility and you want to avoid great damages, human injuries, potential litigations and claims, and in many cases total disaster.

Your **plan** must show how you have:

1. A clear passageway to all escape routes; clearly marked escape routes that are as short and direct as possible;
2. Enough exits and routes for all people to escape;
3. Emergency doors that open easily;
4. Emergency lighting where needed;
5. Training for all employees to know and use the escape routes;
6. A safe meeting point for staff;
7. An evacuation leader and team members who ensure that evacuation, when it happens, is concluded effectively.

An example of Evacuation Guidelines posted on the wall of the production facility and offices is presented next.

‘Evacuation Guidelines for Company XXXAB (a fictitious enterprise).

Employees must:

1. Prepare and evacuate the building by way of the nearest emergency exit. Walk; do not run. Do not use elevators.
2. Close but do not lock all doors as you leave.
3. Before exiting through any closed door, check for heat and the presence of fire behind the door by feeling the door with the back of your hand. If the door feels very warm or hot to the touch, advise everyone to proceed to another exit.
4. In the event you are unable to exit the building:
 - a) Remain calm; do not panic
 - b) Remain low; crawl if necessary.
 - c) Place a cloth, wet if possible, over your mouth to serve as a filter
 - d) Signal for help from a window. Use a towel, clothing, sign etc.
5. Upon exiting the building and proceeding to the assembly area, remain at least 20 feet away from the building walls and overhangs. Do not block any driveways, as Fire Department personnel will need access to these areas. Employees are requested to report to their assigned assembly areas as defined by your Fire Evacuation Plan.
6. Stay clear of the building until your appointed fire monitor has advised you to re-enter the building/area.
7. Assist visitors during alarm/emergency situations. Visitors may not be aware of exits/alternative exits and the procedures that should be taken during alarm situations. Employees should calmly inform visitors of the proper actions to be taken and assist them with the evacuation⁵⁷.

3.3 Procedures

3.3.1 Purchasing Procedure

This procedure refers to ‘Chapter 3: Production policies and procedures’ of Part 1 of this book.

This is also another crucial policy in establishing and running your production operation as it concerns getting inputs and resources necessary for your production. It belongs to both Input and Resources components of your company’s Production System (see IPORS Model in chapter 1).

This procedure is crucial as it mitigates if not minimizes altogether the occurrence of any potential cases of purchasing fraud in your business enterprise. The steps of this procedure are described next.

Step 1: Purchasing Forms Design

Several forms must be designed and used by each organization to execute purchasing. These include, as an example:

1. New Vendor Notification,
2. Vendor Survey Form,
3. Purchase Requisition,
4. Purchase Order,
5. Purchase Order Log,
6. Purchase Order Follow-Up, and
7. Receiving and Inspection Report.

Step 2: Purchase Requisition

1. Triggering: A purchase requisition is triggered by the corporate procurement committee or other executive committee for purchasing, completing a purchase requisition form and sending it to the organizational function charged with this role.
2. Specifications: Attached to this document there should also be exact specifications for raw materials, parts, equipment, sub-assemblies, hardware, user needs and requirements for application systems, designs and drawings for computer rooms and, in general, specific requirements for the item, product or service to be purchased.

An advertisement for SKF. It features a woman with long dark hair smiling in the foreground. In the background, a large white wind turbine is visible against a blue sky. The text 'Brain power' is written in large white letters on the left. On the right, there is a block of text about wind energy and SKF's role. At the bottom left, there is a call to action to visit the SKF website. The SKF logo is in the bottom right corner.

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3. Suppliers: Further to this, a list of previous suppliers should be noted as well as any new ones with their full details (company names, addresses, phone numbers, e-mails, contact persons, previous purchased item details, etc.).
4. Authority: The purchase requisition should be signed by the authorized officers (signatories) and ratified by a supervising body (procurement committee, purchasing steering committee, CEO, etc.).

Step 3: Market Research

1. Objective: The objective of this step is to research the market, both local and international, and get at least three complete proposals for the items requested.
2. Proposals: Proposals are obtained from the vendors suggested by the requesting party as well as other vendors known or identified during the research process.
3. RFI: If there is a need for information only (RFI) then the obtained vendor information is returned to the requester, and the procurement process is terminated.
4. Contents of proposals: In the cases where proposals are requested from the specific vendor, these proposals should contain the following parts: Technical specifications, Commercial issues, Legal aspects, and Evaluation criteria

Step 4: Proposal Evaluation

1. Receive proposals: When all the proposals are received they are forwarded to the evaluation committee for evaluation. The vendor proposals for consumables or other items that do not require specific technical assessment are not reviewed by this committee but they are ordered to the pre-selected vendor on the basis of the lowest price for the approved technical and other quality specifications.
2. Evaluation procedure: In the case of a major vendor proposal evaluation the procedure is the following:
 - a) The technical evaluation is completed first
 - b) The financial evaluation is completed next and only if the technical evaluation results in one or more potential vendors
 - c) The final evaluation and selection of vendor is a combination of both technical and financial evaluations, depending on the weighting of each part.

Step 5: Expenditure Approval

1. Approval: Following the evaluation of the proposals and before placing a purchase order with the selected vendor the expenditure must be approved by the appropriate corporate management levels. This approval could be obtained on the basis of an approved budget, or of a user department approved budget, etc.

2. Management controls: Management controls must be appropriately exercised to ensure that the system or services ordered are in alignment with the strategic objectives of the corporate entity which it serves, and also that the required funds are available at the time needed for vendor payment. If there is no problem what-so-ever, the expenditures for obtaining the parts, equipment, system or services are approved and noted on specific documentation (as per corporate approvals standards or procedures).

Step 6: Placement of Purchase Order

1. Place order: After the expenditures have been reviewed and approved a written order is placed with the approved vendor.
2. Contract: For parts, raw materials, systems and services of large values or of strategic importance to the corporation or organization, a contract is signed between the two parties (organization and vendor).

Step 7: Final Delivery

1. Delivery: Once the purchase order has been placed and a contract has been agreed and signed with the vendor organization a final time schedule for the delivery of the goods and services ordered is forwarded to the authorized official (e.g. the manager) for management control purposes.
2. Receipt control: This official will follow all steps of this process to ensure that all items and services are delivered as per the terms and conditions of the purchase order, the vendor proposal and the signed contract. This official is supported also by specific corporate and staff and the acceptance committee for projects or systems which are to be implemented by the external vendor.
3. Vendor payment: If all the previous steps have been executed fully and there are no outstanding issues of any consequence to be resolved, then the vendor is given the approval to issue the final invoice. This final invoice should be settled on the basis of a final review by a member of the executive board of the organization to ensure that all ordered goods, systems and services have been delivered, as per the purchase order, the corporate needs, the vendor proposed, the signed contract, and the identified results (In case of computerized applications) to the organization. A copy of this invoice should be kept for management purposes.

3.4 Maintenance Contract

This contract refers to 'Chapter 4: Manufacturing Process controls' of Part 1 of this book.

This contract should have clauses that specify:

1. Description of goods and services delivered
2. Specifications
3. Time and place of delivery (including any timetables)
4. Penalties for delays/defaults
5. Acceptance tests
6. Price, terms of payment and cost of living for increases
7. Duration of contract, termination and renewal terms
8. Warranties
9. Protection against copyright/patents infringement
10. Licensing and transfer rights
11. Limitation of the supplier's liability
12. Confidentiality/information disclosure protection
13. Security terms and conditions (also for remote access)
14. Escrow account requirements for source safe-keeping
15. 'Do not hire each other's personnel' clause

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16. Insurance (professional liability, civic damages)
17. Tax liability
18. Rights to new ideas/inventions
19. Disputes settlement procedure and force majeure terms/conditions
20. Law applicable clause.

3.5 Business Continuity Plan (BCP)

This plan refers to 'Chapter 3: Production policies and procedures' of Part 1 of this book.

The events leading up to the use of the contingency plan would be classified as a major catastrophe of production facilities. Generally, local problems of a temporary nature are not covered by a BCP, with the possible extension of a lengthy full-scale black out of electrical power.

A business continuity plan should, as a minimum, contain the following:

1. Management overview and summary of costs required.
2. Risks Covered: A detailed statement of the production-manufacturing risks covered, such as rain, fire, storm, earth-quake, disease, flood, hurricane, terrorism, utility outage, etc.
3. Critical production systems and critical IT applications covering production processes of the company.
4. Production physical security aspects and needs.
5. Contractual arrangements (including any vendor support) for production systems and facility.
6. Invocation conditions (especially in terms of time).
7. Contingency procedures (including production and other critical personnel, data suppliers).
8. Key production and IT personnel and required training plans and management structure.
9. Internal company conditions and resources required (Legal, IT management, Users, Building facilities, Administration, Accounting, Security).
10. External resources required (Insurers, Vendors, Alternate business processing personnel, Telecommunications, Public authorities).
11. Testing strategy of this plan.
12. Restoration procedures (back to primary production site).
13. Insurance (especially to cover any cost of moving data, and equipment and operating in an alternative site).
14. Maintenance procedure of this plan.

Appendix 4: How to develop an ERP System

This methodology refers to 'Chapter 4: Manufacturing process controls' of Part 1 of this book.

In general, all IT application systems should be developed on the basis of a standard system development life cycle methodology. Likewise, developing ERP systems for use in production and manufacturing processes in companies can follow the same methodology.

I have used the following methodology in ERP consulting in a variety of assignments. This is usually made up of the following phases:

Phase A: ERP SYSTEM PLANNING

The activities of this phase:

1. Determine the feasibility of whether the ERP application project should start or not, and
2. Produce a high level overview document of the project which relates to the ERP application system project requirements and scope.

Phase B: ERP SYSTEM DEFINITION

The activities of this phase:

1. Define 'what', 'when', 'who', and 'how' the ERP application project will be carried out,
2. Expand on the high-level ERP project outline,
3. Provide a specific and detailed ERP project definition,
4. Prepare and issue an RFP to pre-selected vendors,
5. Select an ERP project development team, and
6. Appoint an IT Project Manager.

Phase C: ERP SYSTEM ANALYSIS

The activities of this phase:

1. Enable the ERP development team to understand and document the user's needs for the ERP system,
2. Document in detail the scope, business objectives and requirements of the ERP system,
3. Emphasize what the ERP system is to do, and
4. Include analysis of what data needs should be replicated to the corporate data warehouse.

Phase D: ERP SYSTEM DESIGN

The activities of this phase:

1. Describe how the proposed ERP system is to be built,
2. Document the ERP system design and the technical requirements required for the system to operate in and the tools used in building the system, and
3. Describe movement of data between operational ERP databases and the data warehouse.

Phase E: ERP SYSTEM CONSTRUCTION

The activities of this phase:

1. Deal with the ERP development, unit testing and integration testing of the system modules, screens and reports and data replication to the data warehouse if required, and
2. Develop and complete the user procedures and user documentation for the ERP implementation phase.

Phase F: ERP SYSTEM IMPLEMENTATION

The activities of this phase:

1. Prepare the production environment for the ERP system implementation and production data loading, and
2. Carry out the implementation of the ERP developed system through user acceptance testing to full production and warehouse population.

Appendix 5: Quality Assurance Manual Example

This refers to 'Chapter 5: Standardization and quality management procedures' of Part 1 of this book.

This quality assurance manual will contain the following sections, as an example:

1. Objective

The objective of this manual is to clearly define the policy, rules, guidelines, procedures and responsibilities of a total quality assurance system for the products produced and services offered by Company 'XXA' (a fictitious entity).

2. Quality Policy: Declarative statements of what quality means for the company and how it should be implemented in the production system.

An example of a typical quality policy is described next.

'Company 'XYZ' implements a quality management system according to well-accepted international standards that cover the whole range of the activities of the company.



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The main quality elements of the company are:

1. Install a continuous improvement program for quality.
2. Observe the quality procedures on a continuous basis in order to ensure their exact implementation and continuous improvement.
3. Enable employee participation in all aspects of quality
4. Respond as quickly as possible to operational and customer service problems.
5. Improve personnel satisfaction with continuous enhancement of their skills.
6. Monitor customer needs by various tools for the creation and provision of new products and services.
7. Provide the required leadership and support to quality.

Quality Management Policy – Example
<p>Company 'XYZ' implements a quality management system according to well-accepted international standards that cover the whole range of the activities of the company.</p> <p>The main quality elements of the company are:</p> <ol style="list-style-type: none"> 1. Install a continuous improvement program for quality. 2. Observe the quality procedures on a continuous basis in order to ensure their exact implementation and continuous improvement. 3. Enable employee participation in all aspects of quality 4. Respond as quickly as possible to operational and customer service problems. 5. Improve personnel satisfaction with continuous enhancement of their skills. 6. Monitor customer needs by various tools for the creation and provision of new products and services. 7. Provide the required leadership and support to quality.

3. **Authority for Quality Implementation:** Instructions on how quality is to be implemented.
Example: 'The CEO of the company authorizes the policies and procedures contained in this Quality Assurance Manual. This authority is delegated to the Quality Assurance Manager to establish, document and administer the necessary guidelines, requirements and controls to effectively implement the quality for this company.'
4. **Organizational Structure:** A diagram of the organizational structure of the company.
5. **Quality Responsibilities:** Detail guidelines regarding quality issues in each corporate function of the company, such as: Human Resources, Accounting, Marketing, Sales, Engineering, Purchasing, Materials Management, Production, Quality Control, Receiving, In-Process Inspection, Material Review, Quality Control Audit, Corrective and Preventive Action, Customer Support, etc. Examples follow.

First Example-Sales Quality Responsibility: An example of the first quality guideline would be:

‘All sales staff should ensure the correct interpretation of customer needs and specifications, whether verbal or written. The sales order is the strong foundation for the complex chain of events leading up to shipment of a finished quality product.’

Second Example-Engineering Quality Responsibility: An example of the first quality guidelines would be:

‘All engineering staff should ensure that all drawings and specifications of products are of an acceptable quality for production or manufacturing purposes.’

Third Example-Purchasing Quality Responsibility: An example of the first two quality guidelines would be:

Guideline 1 ‘The Purchasing Department prepares all purchasing documents. The documents clearly and completely describe ordered products and services. They include precise identification of the products and services, reference applicable standards and state quality requirements.’

Guideline 2 ‘Quality performance of all suppliers and subcontractors is reviewed and monitored continuously. Those suppliers and subcontractors showing inadequate or questionable performance are asked to develop and implement corrective actions. If they refuse or decline to improve they are discontinued.’

Fourth Example-Production Quality Responsibility: An example of the first two quality guidelines would be:

Guideline 1 ‘It is the first and most important responsibility of the production management personnel to coordinate all efforts in manufacturing a part or a product to all applicable engineering and quality specifications, standards and customer requirements.’

Guideline 2 ‘When a specific manufacturing process requires an inspection, the Quality Department is to be notified.’

Fifth Example-Quality Control Responsibility: An example of the first quality guideline would be:

‘The Quality Control Manager is responsible for planning, developing, initiating, coordinating, implementing and maintaining the most effective, practical and cost efficient procedures for optimum quality assurance and control.’

6. Forms: Examples of all quality-related forms.

Appendix 6: Production Management Review Procedure

This refers to 'Chapter 7: Conclusion and final recommendations' of Part 1 of this book.

Objective: To establish a procedure for the management review of production functions at Company 'XXX (a fictitious entity)'.

Management Responsibility: The CEO, Vice President of Production or other designated officer of the company (hereby called the Management Officer) will schedule the review of the quality system and other maintenance and engineering (e.g. calibration) activities to ensure their continued suitability and effectiveness, and to introduce changes or improvements to the production system.

Procedure

Step 1: Customer Data Collection. Customer Service of the company will keep records of all customer feedback and complaints, on both products and support provided to customers.

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Step 2: Supplier Data Collection. Sales Support or Purchasing Department of the company will keep records of all supplier customer feedback and complaints, on both products and support provided to the company.

Step 3: Employee Data Collection. Employee information on any quality and production problems and issues will be collected by all departments and reported daily to the company quality department.

Step 4: First Review. The Management Officer will review the quality system and the production system based on his observations and all the information and detail facts gathered from above steps (1, 2 and 3).

Step 5: Second Review. The Management Officer will review results of audits, production and quality process performance and service conformity.

Step 6: Third Review: The Management Officer will review status of corrective and preventive actions, changes that could affect the quality and production management system, and recommendations for improvements.

Step 7: Fourth Review: The Management Officer will review any decisions and actions related to improvement of the effectiveness of the quality and production management systems and their processes.

Step 8: Fifth Review. The Management Officer will review any improvement of service related to customer requirements, expectations and needs.

Step 9: Sixth Review. The Management Officer will review any resources needed, action items, strategic improvement goals, continuous operational improvement plans and both long and short term business goals.

Step 10: Seventh Review. The Management Officer will review verify compliance to the company Quality Manual, and the ISO standards specification obtained previously.

Business Review Records: All findings and evaluations will be recorded and maintained in accordance to procedure x.x.x. 'Control of Business and Quality Records'.

Applicability: This procedure applies to any and all management reviews of the production related activities (e.g., manufacturing, quality, etc.) of the company.

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Appendix 7: Quality Records Management Procedure

This refers to 'Chapter 5: Standardization and quality management procedures' of Part 1 of this book.

Objective: To establish a procedure for the methods used to control, maintain, archive and retain quality records at Company 'XXX (a fictitious entity)'.

Management Responsibility: The CEO, Vice President of Production or other designated quality officer of the company (hereby called the Quality Management (QM) Officer) will ensure the full and effective compliance to this procedure.

Procedure

Step 1: Records Retention Schedule. The QM Officer, with the support of all company departments, will establish and maintain the records retention schedule for all quality type records of the company.

Step 2: Records Indexing System. The QM Officer, with the support of all company departments, will establish the records indexing system for all quality records of the company. This may include indexing by production system, assembly line or process, purchase order, product, part number, supplier, customer, etc., to suit company purposes.

Step 3: Records Identification. The QM Officer will identify and index all quality records in accordance to the records indexing system (see step 2).

Step 4: Records Filing. All quality records will be collected in storage boxes or racks or other suitable filing system. All files will be controlled and maintained by the QM Officer and the Quality department of the company.

Step 5: Records Retention. All records are maintained for a prescribed time according to the applicable record retention schedule. As a minimum guideline, records that verify the integrity of the company are kept for a minimum of ten years or as national rules dictate.

Step 6: Records Storage. All records are maintained and stored in a manner to preclude deterioration. This means that their location should always be safe and protected against climatic and other conditions that might damage or destroy these records.

Step 7: Records Availability. All records shall be readily available for review by the designated company staff, customers or regulatory and other state authorities. This will be governed by any laws, privacy and other confidentiality regulations and protective measures.

Step 8: Inspection Records. Inspection records are maintained within the company quality department for all active production systems, equipment, parts, etc. Observations and data shall be recorded at the time they are made and be properly identifiable.

Step 9: Records Destruction. Records should be treated as valuable company assets. Thus, for any destruction of these records, written management authorization must be obtained and this destruction should be recorded in a destruction log.

Step 10: Backup of Records. Electronic records, with the assistance and support or under the technical guidance of the IT department of the company shall be backed-up weekly to prevent data loss. All electronic data required to be saved will also have a paper back-up. All backups will be taken twice. One set will remain at a safe location (e.g. fire-safety vault) within the company. A second set will be taken off to a safe storage facility outside the company (e.g. bank vault or safety deposit box).

Applicability: This procedure applies to all activities (e.g., production, sales, customer support, manufacturing, quality, etc.) of the company.

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Appendix 8: Production Performance Goals and Measures

8.1 Production Performance Goals

These refer to 'Chapter 6: Performance goals and measures' of Part 1 of this book.

8.1.1 Divisional Performance Goals.

This is the first activity in **corporate performance goals** setting. Divisional goals state corporate managers' expectations for each division concerning performance on such dimensions as efficiency, quality, innovation, and responsiveness to customers. Generally corporate managers set challenging divisional goals to encourage divisional managers to create more effective strategies and structures in the future.

For example the business goals for a large manufacturing division with many plants and products could be:

1. Increase market share in each of our markets
2. Improve customer satisfaction
3. Improve company profitability
4. Increase company sales in products 'x', 'y' and 'z'



5. Create better products and services.
6. Ensure that Production Policies and Procedures are used
7. Monitor the use of Purchasing Procedures
8. Ensure that Inventory Control Procedures are followed
9. Review and improve the Quality Management System
10. Comply with Health and Safety procedures at all times.

8.1.2 Departmental Goals.

This is the second activity in **corporate performance goals** setting. **Corporate performance goals** control, at the functional and individual levels, is a continuation of control at the divisional level. The same four building blocks of competitive advantage (efficiency, quality, innovation, and responsiveness to customers) act as the goals against which functional performance is evaluated. In the sales function, for example, goals related to efficiency (such as cost of sales), quality (such as number of returns), and customer responsiveness (such as the time needed to respond to customer needs) can be established for the whole function.

For example the business objectives for a production unit producing one or more products could be:

1. Increase customer base by 3% in each year for the next 4 years,
2. Decrease of production costs by 5% in each of the next 4 years,
3. Increase revenues by 5% in each of the next 4 years.

8.1.3 Individual Goals.

This is the third activity in **corporate performance goals** setting. Finally, departmental (functional) managers establish performance goals that individual employees are expected to achieve to allow the function to achieve its goals. Sales personnel, for example, can be given specific goals (related to functional goals), which they in turn are required to achieve. Functions and individuals are then evaluated on the basis of achieving or not achieving their performance goals, and compensation is commonly pegged to achievement. The achievement of these goals is a sign that the company's strategy is working and meeting organizational objectives.

For example the individual performance measures for each person in the production function could be set on the basis of:

1. Number of new products developed,
2. Production rate,
3. % of new services developed,
4. Time spent on customer problem resolution,
5. % of errors in data entry operations, etc.

8.2 Production Performance Measures

These refer to 'Chapter 6: Performance goals and measures' of Part 1 of this book.

8.2.1 Area 1: Inventory Control Performance Measures

1. Inventory holding costs
2. Inventory ordering costs
3. Inventory shortage costs
4. Inventory on hand

8.2.2 Area 2: Manufacturing Performance Measures

1. Production rate (number of units completed per unit of time)
2. Workforce level (number of workers needed for production)
3. Production cycle time (setup time, processing time, queue time, wait time, idle time)

8.2.3 Area 3: Production Cost Performance Measures

1. Basic production costs: These are direct and indirect labor costs (regular payroll, overtime, etc.) and other fixed and variable costs incurred in producing a set of given products in a specific time period.

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2. Overhead costs: These are training, hiring, laying off and other employee costs, rental costs for equipment, buildings and other production systems, etc.
3. Inventory holding costs: These are costs associated with inventory, such as: storing, insurance, taxes, spoilage, obsolescence, etc.
4. Backordering costs: These are expediting costs, loss of revenues resulting from backordering.

8.2.4 Area 4: Service Productivity Performance Measures:

1. Productivity ('outputs' divided by 'inputs')
2. Throughput time (average time for a (product) unit to move through the system)
3. Efficiency ('actual output' divided by 'standard output')
4. Customer satisfaction index (number of complaints, survey, etc.)

Productivity examples:

- a) Restaurant: customers per labor hour.
- b) Retailing: sales per square feet.
- c) Paper mill: tons of paper per cord of wood).

8.2.5 Area 5: Supply Chain Performance Measures:

1. Inventory turnover ('cost of goods sold' divided by 'average aggregate inventory value')
2. Average aggregate inventory value ('total value of all items held in inventory' (raw materials, work-in-progress, finished goods, distribution inventory) valued at cost
3. Weeks of supply index ('average aggregate inventory value' divided by the 'cost of goods sold' and multiplied by '52 weeks')

8.2.6 Area 6: Quality Performance Measures:

1. Appraisal costs (the sum of all costs of materials and supplies inspection, laboratory and reliability testing, and other tasks to ensure that the product or process is acceptable)
2. Internal failure costs (the sum of all costs of defects incurred within the system: scrap, repair, rework, downtime, etc.)
3. External failure costs (the sum of all costs of defects that pass through the system: customer warranty replacements, customer complaints, transportation losses, product liability, out-of-warranty repairs and replacements)
4. Prevention costs (the sum of all costs to prevent defects: quality training, reliability consulting, pilot production runs, system and product development, corrective actions cost, etc.)

8.2.7 Area 7: Innovation Performance Measures:

1. Number of ideas
2. Number of new products
3. Number of patents
4. Sales from new products

Appendix 9: BSC and TQM Frameworks

These refer to 'Chapter 6: Performance goals and measures' of Part 1 of this book.

9.1 BSC Framework

According to the **Balanced Scorecard (BSC) model**, corporate managers have traditionally relied on financial measures of performance such as profit and return on investment to evaluate organizational performance. But financial information, though important, is not enough by itself. If managers are to obtain a true picture of organization performance, financial information must be supplemented with performance measures that indicate how well an organization has been achieving the four building blocks of competitive advantage – efficiency, quality, innovation and responsiveness to customers.

This is so because financial results simply inform strategic managers about the results of decisions they have already taken; the other measures balance this picture of performance by informing managers about how accurately the organization has in place the building blocks that drive the future performance and obtains a competitive advantage⁶.



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Four general perspectives have been proposed by the Balanced Scorecard model by Kaplan and Norton, the founders of this approach:

1. Financial Perspective,
2. Customer Perspective,
3. Internal process Perspective, and
4. Innovation & Learning Perspective.

The financial perspective examines if the company's implementation and execution of its strategy are contributing to the bottom-line (financial) improvement of the company. It represents the long-term strategic objectives of the organization and thus it incorporates the tangible outcomes of the strategy in traditional financial terms.

The customer perspective defines the value proposition that the organization will apply to satisfy customers and thus generate more sales to the most desired (i.e. the most profitable) customer groups.

The internal process perspective is concerned with the processes that create and deliver the customer value proposition. It focuses on all the activities and key processes required in order for the company to excel at providing the value expected by the customers both productively and efficiently.

The Innovation & Learning Perspective is the foundation of any strategy and focuses on the intangible assets of an organization, mainly on the internal skills and capabilities that are required to support the value-creating internal processes. The Innovation and Learning Perspective is concerned with the jobs (human capital), the systems (information capital), and the climate (organization capital) of the enterprise.

BSC Examples

The following example is based on the Balanced Scorecard Model and they describes the strategic controls for a Bank and a Manufacturer, for the four classical BSC perspectives, as defined by Kaplan & Norton: Financial, Customer, Internal Process and Innovation & Learning⁷.

A Balanced Scorecard Example for a Manufacturer

FINANCIAL Perspective	
<i>Strategic Objectives</i>	<i>Performance Measures</i>
Increase business	Return on Capital Employed, Cash Flow, Return on Investment
CUSTOMER Perspective	
<i>Strategic Objectives</i>	<i>Performance Measures</i>
Add new customers	Market Share
INTERNAL PROCESS Perspective	
<i>Strategic Objectives</i>	<i>Performance Measures</i>
Manufacturing excellence	Safety Incident Index
INNOVATION & LEARNING Perspective	
<i>Strategic Objectives</i>	<i>Performance Measures</i>
Add new services	% Revenue from New Services

9.2 TQM Framework

Total Quality Management (TQM) (BPMF Control 1) is a management approach that originated in the 1950's and has steadily become more popular since the early 1980s. Total Quality is a description of the culture, attitude and organization of a company that strives to provide customers with products and services that satisfy their needs.

Total Quality Management (TQM) is based on the theories⁸ of Deming, Juran and Feigenbaum since the 1980s.

To be successful in implementing TQM, according to Deming, an organization must concentrate on the eight key elements, such:

1. Ethics,
2. Integrity,
3. Trust,
4. Training,
5. Teamwork,
6. Leadership,
7. Communication and
8. Recognition.

Appendix 10: Audit Programs and Checklists

These refer to 'Chapter 7: Conclusion and final recommendations' of Part 1 of this book.

Purpose of the Production Audit Programs and Checklists

The purpose of the following audit programs and checklists is to help you examine, ensure and improve the policies, procedures and other controls you may have established or will establish for your production function.

10.1 Production Function Audit Program

10.1.1 Supply Chain Management. Review and assess the following:

- Cost effectiveness (whether the process enhances collaboration, communication, and timeliness across the value chain from demand to supply side)
- Efficiencies of product delivery activities
- Supplier/Vendor relationships, particularly in pricing and delivery specifications
- Supply chain performance
- Key production process improvements due to excellent supply chain

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10.1.2 Inventory Management: Review and assess the following:

- Inventory on-hand by location
- Inventory movements (recording and reporting)
- Purchasing procedures to assure cost effective product acquisition while maintaining appropriate levels of stock
- Inventory handling procedures to minimize losses from damage, theft, etc.
- Inventory carrying costs
- Inventory liquidation strategies for excess and overstocks
- Execution of best practices on taking physical inventory

10.1.3 Production Performance: Review and assess the following:

- Implementation and use of technology to drive production performance improvements (includes automated picking systems, bar code utilization and RFID utilization)
- Production policies and procedures to assure customer service objectives and business objectives are both being met effectively
- Production performance metrics
- Production staff alignment to current production volumes and stock velocities
- Training and coaching of production staff
- Implementation of best practices to improve customer service

10.2 Purchasing Controls Checklist

1. Does the organization have corporate controls to protect against fraud, waste, abuse and mismanagement in the use of all purchasing and contracting mechanisms?
2. Does your company have systems that ensure compliance with all regulatory and policy requirements of both your company and the state/government?
3. Does your company have a positive, supportive attitude towards integrity, ethics education and training in procurement and contracts?
4. Does your company monitor the reliability and confidentiality of data used in all purchasing and contracting decisions?
5. Are the criteria such as objectivity, fairness, etc., known to all bidders and to the market (well publicized) and are these assured in the competitive review and selection of a contractor?
6. Are checklists used to ensure that your purchasing and contract files are complete and accurate?
7. Does your company have a system that integrates procurement/contracts with asset management systems and financial management?
8. Does your company complete closeouts of contracts in a timely and appropriate manner?

10.3 Inventory Controls Checklist

1. Does your company have business operating controls to protect against fraud, waste, abuse and mismanagement in the use of all inventory items?

Consider:

- Model for measuring inventory performance,
 - Monitoring critical inventory reorder levels
 - Monitoring slow moving items
 - Recording and escorting visitors to inventory areas
 - Ensuring adequate funds in the budget process
 - Selecting ethical employees for inventory control
 - Training employees in modern control issues
 - Planning for taking annual physical inventory physical counts
 - Protecting inventory items in safe storage bins and locations.
2. Does your company balance actual physical inventory to what is recorded in the computerized inventory control system (at least annually)?
 3. Does your company ensure that double or under counting of physical inventory items is not taking place?



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4. Does your company ensure that non-existent inventory is not counted?
5. Are all inventory receipts (movements in) and shipments (movements out) recorded in the computerized inventory control system immediately (i.e., when they take place)?
6. Are movements of inventory items monitored and reported daily by the appropriate level of your management?
7. Are the storerooms locked after regular operating hours?
8. Do security control procedures protect all storerooms and inventory areas in the most effective way (e.g., camera system, access control system, security guard visit after hours, etc.)?
9. Are destructions and returns of all damaged inventory items authorized, recorded, and reported to your management?
10. Are inventory suppliers adequately monitored to ensure delivery of critical raw materials, supplies and parts?

10.4 Quality Management Controls Checklist

1. Does your company have quality inspection, assurance and error correction policies and procedures?
2. Does the quality system have complete and accurate records for identifying errors, conducting inspections and doing corrections?
3. Are the customers of your company contacted on a regular basis (every year or three, etc.) regarding the quality of goods and services provided?
4. Does your company involve all staff in quality?
5. Is your quality system linked to the benefits and rewards system of the organization?
6. Is the quality system supported by your board and management?
7. Are quality responsibilities and accountabilities assigned to all levels of your management?
8. Are all your staff trained on quality issues?
9. Is the quality management system linked to the performance system of your company?
10. Are performance measures designed to collect detail data on the critical issues of quality?

Appendix 11: How to Develop Policies and Procedures

This refers to 'Chapter 3: Production policies and procedures' of Part 1 of this book.

This appendix contains one method to help you learn how to develop production policies and procedures for your company.

Questionnaire for Policies and Procedures Development

To start, consider the following key questions:

1. What is to be done (manufactured, produced, assembled, etc.)?
2. What is needed to do the job? (What raw materials, other inputs, resources, technologies, facilities, etc.)?
3. Why does it need to be done at all (strategic reasons, etc.)?
4. Is the production process well defined (documented, tested, etc.)?
5. Are there alternative production processes (Is there a better way?)
6. Who is to do the job? (List every function, person, department or supplier involved)
7. Who is to receive the end results? (Product, customer, advertising, brochure, sales, etc.)
8. Where is it to be done (location, plant, country, etc.)?
9. When is it to be done (time elements and periods involved in the production process)?

Appendix 12: Production Controls Checklist

This refers to 'Chapter 7: Conclusion and final recommendations' of Part 1 of this book.

A. Define Your Production

1. Define your Production System
2. Define your Business Model
3. Ensure your business model relates to and manages:
 - 3.1. Customers
 - 3.2. Personnel
 - 3.3. Property
 - 3.4. Production
 - 3.5. Performance
4. Link your Production System to your Business Operating Model
5. Ensure your production system consists of:
 - 5.1. Input (I)
 - 5.2. Processing (P)
 - 5.3. Output (O)
 - 5.4. Resources (R)
 - 5.5. Storage (S)
6. Ensure your production system is supported by effective business controls (governance, IT, ethics, risk, etc.)

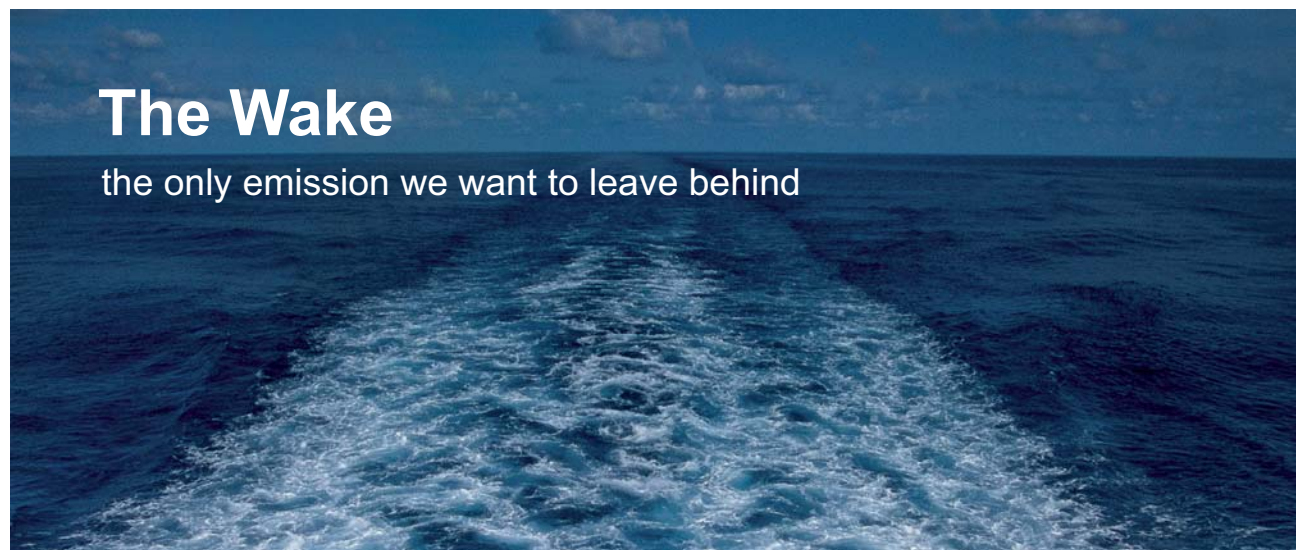
B. Production management controls

1. Establish your production function
 - 1.1. Mission and goals
 - 1.2. Strategy and structure
 - 1.3. Budget.
2. Implement a production and manufacturing records system
3. Secure your plant and inventory.
 - 3.1. Procedures, resources and equipment
 - 3.2. Employee theft policy
 - 3.3. Testing your plant and inventory security plan
4. Design and implement your production system
5. Establish your purchasing function

6. Appoint production-related senior staff
 - 6.1. Production Manager
 - 6.2. Industrial Engineer
 - 6.3. Procurement/Purchasing Manager
 - 6.4. Production Quality Officer
 - 6.5. Warehouse Manager
 - 6.6. Health and Safety Officer

C. Production Policies and Procedures

1. Contents of Production Policies and Procedures Manual:
 - 1.1. Purchasing/Procurement
 - 1.2. Supply chain management
 - 1.3. Freight management
 - 1.4. Inventory management
 - 1.5. Business continuity and Emergency management
 - 1.6. Manufacturing of new products
 - 1.7. Standardization
 - 1.8. Quality Management Procedures
 - 1.9. Receiving and Returns
 - 1.9. Health, Safety and Environment



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- 1.10. Performance management and measurement
- 1.11. Repairs and Customer support
- 2. Production Policies and Procedures comply with:
 - 2.1. National laws and regulations,
 - 2.2. International (U.N., E.U., OECD, etc.) guidelines
 - 2.3. Specific-industry codes and standards
- 3. Crucial production policies and procedures are:
 - 3.1. Health and Safety Policy
 - 3.2. Environment Management Policy
 - 3.3. Fire Safety and Evacuation plan
 - 3.4. Purchasing Procedure
 - 3.5. Evacuation Guidelines

D. Manufacturing Process Controls

- 1. Production-Manufacturing Action Plan
- 2. Production-Manufacturing Support Controls
 - 2.1. Master Production Schedule (MPS)
 - 2.2. Material Requirements Planning (MRP) Process
 - 2.3. Bill of Materials (BOM) File
 - 2.4. Preventive maintenance program
 - 2.5. Materials and vendors contingency list
 - 2.6. Equipment Operational Description File
 - 2.7. Production Systems and Equipment Maintenance Contract
 - 2.8. Maintenance Log
- 3. Inventory Management System
 - 3.1. Inventory Control Procedures
 - 3.2. Inventory Master Records (IMR) File
 - 3.3. Inventory Transactions File
 - 3.4. Inventory Forms
- 4. Computerized Production Information Systems
 - 4.1. Material Requirements Planning (MRP) System
 - 4.2. Cost Accounting (CA) System
 - 4.3. Production Planning and Control (PPC) System
 - 4.4. Computer Integrated Manufacturing (CIM) System
 - 4.5. Enterprise Resource Planning (ERP) System
- 5. Production-Compliance Records management

E. Standardization and Quality Management

1. Definition of Standardization
2. Standardization Procedures
 - 2.1. Standardization of input
 - 2.2. Standardization of processing
 - 2.3. Standardization of output
 - 2.4. Standardization of resources
 - 2.5. Standardization of storage
3. Standardization Methodology
4. **Definition of Quality**
5. Quality Management Policy
6. Quality Management Procedures
7. Main Responsibilities for Quality
 - 7.1. Production quality officer
 - 7.2. CEO
 - 7.3. Other Staff

F. Performance Management Controls

1. Performance Management Approach
 - 1.1. Corporate Performance Goals
 - 1.2. Divisional Performance Goals
 - 1.3. Departmental Goals
 - 1.4. Individual Goals
2. Production Performance Measures
 - 2.1. Inventory Control
 - 2.2. Manufacturing
 - 2.3. Production Cost
 - 2.4. Service Productivity
 - 2.5. Supply Chain
 - 2.6. Quality
 - 2.7. Innovation.
3. Managing and Measuring Production Performance
 - 3.1. Performance Framework
 - 3.2. Performance Methodology
 - 3.3. Corporate Business Dashboard System
 - 3.4. Production Management Reporting Procedure

13 Endnotes

1. See also:
<http://www.dhs.gov/chemical-facility-anti-terrorism-standards>
2. Institute of Industrial Engineers
<http://www.iienet2.org/Default.aspx>
3. For more details, see: (1) Institution of Occupational Safety and Health Web:
<http://www.iosh.co.uk/>, (2) British Occupational Hygiene Society Web:
<http://www.bohs.org/>, and (3) Professional Organisations in Occupational Safety and Health, Web:
<http://www.poosh.org/>
4. See Business Performance Measurement article by Vince Kellen, at:
<http://www.kellen.net/bpm.htm> and <http://www.orau.gov/pbm/handbook/1-1.pdf>
5. For more details, see:
 - 1) <http://www.iit.edu/~safety/other/safetymanual.pdf>
 - 2) <https://www.gov.uk/workplace-fire-safety-your-responsibilities/fire-safety-and-evacuation-plans>
 - 3) <http://www.safeworkaustralia.gov.au>
 - 4) <http://www.osha.gov/Publications/osa3088.pdf>
6. For more details see: (1) Kaplan, R.S. and Norton, D.P. (1996): The Balanced Scorecard: Translating Strategy into Action. Harvard Business School Press., (2) Marr, B. (2010): 'What is a modern Balanced Scorecard?', Management Case Study, The Advanced Performance Institute (www.ap-institute.com), and (3) Marr, Bernard (2010): Balanced Scorecards for the Public Sector. Ark Group. London).
7. For more on BSC case studies, related performance management white papers and other resources, see: (1) Balanced Scorecard Examples & Success Stories: www.balancedscorecard.org, (2) www.ap-institute.com, and (3) Marr, Bernard (2006): Strategic Performance Management. Butterworth Heinemann, Oxford).
8. For more details see (1) Deming, W.E. (1982): Quality, Productivity, and Competitive Position, MIT Center for Advanced Engineering, Cambridge Mass., USA., (2) Evans, R.J. and Lindsay, M.W. (2002): The management and control of quality. South-Western, U.S.A., (3) Feigenbaum, Armand Vallin (1961): Total Quality Control, McGraw-Hill, and (4) www.juran.com).

14 About the Author

John Kyriazoglou obtained a B.A. (Honours) from the University of Toronto, Canada, also earning a Scholastic award for Academic Excellence in Computer Science. John has worked in Canada, several European countries (England, Switzerland, Luxembourg, Greece, etc.) and other countries for over 35 years, in various management and technical roles (e.g.: Chairman of various corporate committees, Senior IT manager, Managing Director of IT Services company, Senior Group Internal Audit Manager, IT auditor and business management consultant), in a variety of clients and projects, in both the private and the public sectors. He has published several books and articles in professional publications, has served in numerous scientific committees and is a member of several professional and cultural associations.

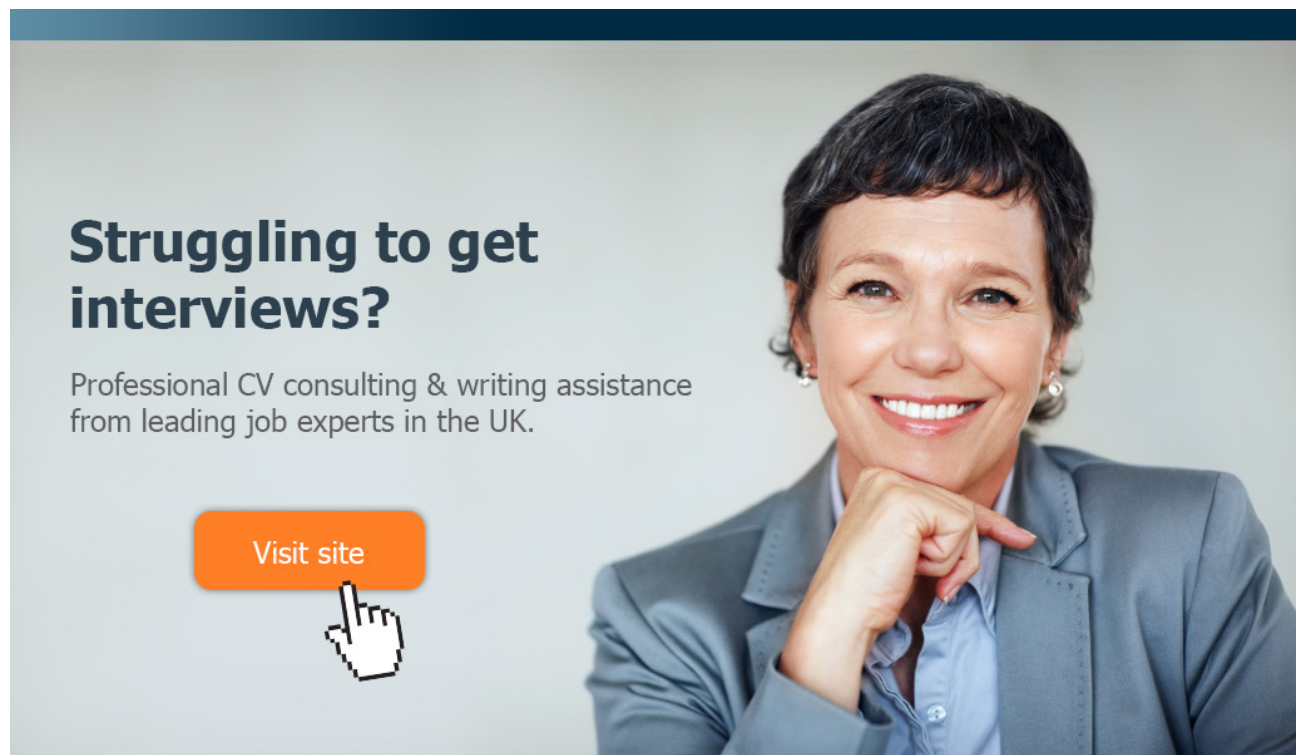
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- 2) Printed Book: Business Management Controls: A Guide,
Publisher: www.itgovernance.co.uk.
- 3) Printed Book: Business Management Controls: Toolkit,
Publisher: www.itgovernance.co.uk.
- 4) 'Corporate Strategic and Operational Controls' (2012).
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Publisher: www.theiic.org
- 5) 'IT Strategic and Operational Controls,' (2010).
<http://www.itgovernance.co.uk/products/3066>

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