HANDBOOK ON PRODUCTIVITY

50 Years Of The Asian Productivity Organization

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INTRODUCTION

Productivity is key to maintaining competitiveness, at both the organization and country levels, and in ensuring sustainable socio-economic development. The various productivity-enhancing tools, techniques, methods, and practices that have been developed and adopted over the years in the production and consumption of goods and services are essential to the dynamism of economies.

The target users and readers of this handbook are those just starting to understand the field of productivity. It is intended to provide an orientation and basic glossary on some fundamental concepts, principles, tools, and methodologies of productivity. It can serve as a primer for readers and stakeholders in the productivity movement.

In the application of productivity-enhancing concepts, tools, techniques, methods, and practices, there are many different terminologies and acronyms in use. This handbook is designed to give users a first glimpse into what is otherwise an elaborate field, discipline, or movement that influences production, consumption, and economic development of many countries.

DEFINITION OF PRODUCTIVITY

The concept of productivity has evolved over the years to represent more than an efficiency ratio. From cost and quality issues, its scope has expanded to embrace social concerns - such as job creation, job security, poverty alleviation, resource conservation, social responsibility - to business excellence, governance, and environmental protection (referred to as Green Productivity or GP by the APO). Today, other productivity concepts that have evolved include social productivity and knowledge productivity. There are several ways of understanding productivity, but there are at least two essential definitions often used and espoused by the APO.

Productivity is the relationship between the quantity of output (goods and services produced) and the quantity of input (i.e., resources such as labor, materials, machinery, and energy) that are used in production.

Productivity = Output/Input

Productivity is concerned with how efficiently goods and services are produced and the value created by the production process. If a product is made at the lowest cost with high quality and can be sold competitively in the market at a price higher than its cost of production, then its productivity level is considered high. The objective of productivity is to maximize output and minimize input.

Productivity = Efficiency + Effectiveness

The other element of the productivity equation is effectiveness. This relates to the attainment of the desired goals or outcomes set by the producer of a product or service. If the customers are highly satisfied in using the product or service, this could mean higher revenues and repeat orders for the product or service. It could also mean higher return on investments for investors and even a better image or reputation for the company or organization.

IMPACT OF PRODUCTIVITY

Productivity is an integrated concept, a combination of principles from various disciplines such as science, engineering, economics, finance, and psychology. Productivity improvements or enhancements are generally achieved through collaborative efforts that target specific issues affecting an organization. In short, achieving improved productivity involves a managed and systematic process; it does not happen by coincidence or accident. Improvements may be planned once at the end of a staged process, incrementally from step-wise initiatives, or in spurts through breakthroughs or innovations.

The Productivity Management Framework in Figure 1 is a good way of illustrating the cycle of managing productivity in an organization.

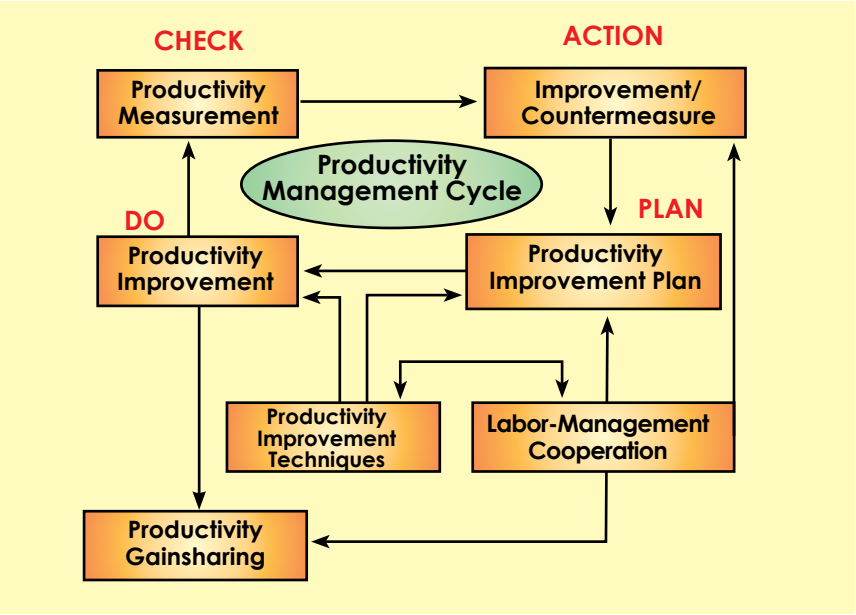

Figure 1. Productivity Management Framework

The framework starts with **CHECK,** assessing the organization's present condition or productivity level. After checking or assessing, the next step is **ACTION**. At this stage, the organization looks for countermeasures to remedy the problem or improve the present condition. The next step is **PLAN,** wherein the organization will determine what productivity improvement program or project it will implement. The final step is **DO**, when an organization starts to implement the planned productivity initiative or intervention. If the implemented program results in an increase in productivity level, the management may opt to share the gains of improvement through productivity gainsharing. After implementing any productivity improvement activity or intervention, the organization will again **CHECK** on the status of improvement. The cycle continues.

PRODUCTIVITY INITIATIVES

In this handbook, the productivity-improving or enhancing initiatives, which can be in the form of a basic principle, tool, technique, method, practice, guideline, model, or approach that had been espoused by the APO in the past years, are presented in a simplified framework to allow users a quick grasp of how they are used and how they fit into the larger picture of an organization's productivity goals. They may be grouped into the following four Ps, which represent areas of concern in any organization that is aspiring to achieve productivity improvements - people, product, policy, and process.

1. People-focused: When a productivity-enhancing initiative aims to directly raise the efficiency and effectiveness of a worker.
2. Product-focused: When a productivity-enhancing initiative aims to improve the quality and responsiveness of a product to consumer demand.
3. Process-focused: When a productivity-enhancing initiative aims to make the planning, design, production, and delivery of goods and services more efficient and effective.
4. Policy-focused: When a productivity-enhancing initiative aims to improve the overall environment for production and/or consumption of goods and services.

In many cases, the productivity initiatives can be designed and implemented with multiple goals, and are, therefore, cross-cutting in their applicability and impact. Figure 2 shows the productivity improvement framework adopted in this handbook.

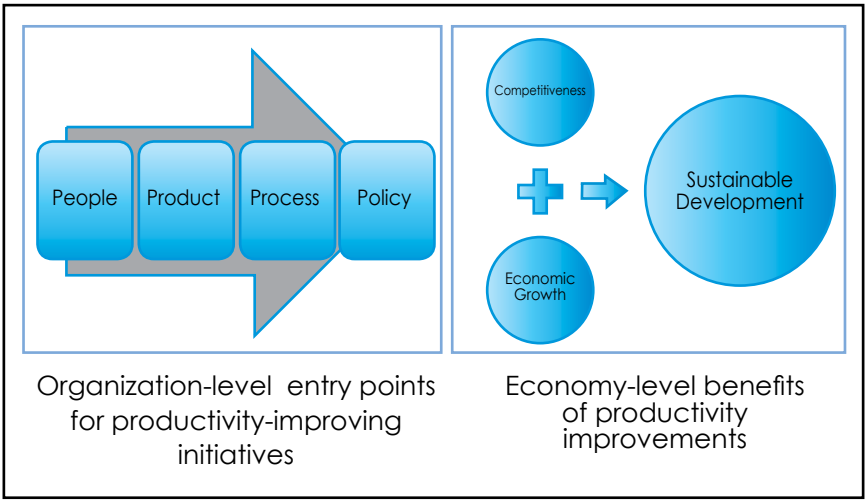

Figure 2. Productivity Improvement Framework

Table 1 summarizes the 31 common productivity-enhancing initiatives that are included in this handbook, first, classified according to their impact areas, and second, arranged alphabetically for easier reference. The initiatives with four stars indicate that they are cross-cutting in their applicability in an organization.

Table 1. List of Productivity-enhancing Initiatives Included in the Handbook

Productivity-enhancing Initiatives	Impact Area			
	Product	Process	People	Policy
Cross-cutting				
1. 5S/Good Housekeeping	★	★	★	★
2. 7 Wastes	★	★	★	★
3. Benchmarking	★	★	★	★
4. Green Productivity	★	★	★	★
5. Kaizen	★	★	★	★
6. Knowledge Management				
7. Quality Circles/Work Improvement Teams	★	★	★	
Product				
8. 3Rs: Reduce, Reuse, Recycle	★			
9. Customer Satisfaction Index	★			
10. Eco-design	★			
11. Hazard Analysis and Critical Control Points (HACCP)	★			
12. Niche Marketing	★			
13. Quality Management System	★			
14. Supply Chain Management	★			

Productivity-enhancing Initiatives	Impact Area			
	Product	Process	People	Policy
Process				
15. Business Process Reengineering		★		
16. Just-in-time Production System		★		
17. Preventive/Productive Maintenance		★		
18. Six Sigma		★		
People				
19. Employee Suggestion Schemes			★	
20. Lean (Toyota) Management System			★	
21. OHSAS 18000			★	
22. Social Accountability (SA) 8000			★	
23. Workplace Cooperation			★	
Policy				
24. Balanced Scorecard				★
25. Business Excellence Framework				★
26. Corporate Social Responsibility				★
27. Energy Conservation/ Management				★
28. Environmental Management System				★
29. Global Agricultural Practices (GAP)				★
30. ISO 9000 Quality Management System				★
31. National Quality Award				★

In the succeeding pages, basic definitions or descriptions and references or links to more information on the above terms are provided.

Cross-cutting Productivity Initiatives

1. 5S/Good Housekeeping

5S or Good Housekeeping involves the principle of waste elimination through workplace organization. Derived from the Japanese words *seiri, seiton, seiso, seiketsu*, and *shitsuke*, in English they can be roughly translated as *sort*, *set in order*, *clean*, *standardize*, and *sustain*. The cornerstone of 5S is that untidy, cluttered work areas are not productive. It is a core element of "lean thinking" and "visual workplace," which creates a fundamental platform for world-class manufacturing. 5S provides the foundation for all quality improvement programs.

Accessible from the Asian Productivity Organization. http://www.apo-tokyo.org.

2. 7 Wastes

A waste is an activity that does not add any value to the product or service. This is one of the ways in which organizations waste or lose money, as the customer certainly does not need it and will not pay for it. Taiichi Ohno, an engineer at Toyota, came up with seven categories of wastes, which cover all the ways in which manufacturing organizations waste money. These seven wastes (called *muda* in Japanese) are: waiting, transporting, processing, inventory, motions, defects/rework, and overproduction.

Accessible from the Asian Productivity Organization. http://www.apo-tokyo.org.

3. Benchmarking

Benchmarking is a business excellence tool for finding, adapting, and implementing leading practices to achieve superior performance and a powerful performance management tool that can

be used to generate both incremental change and wide-ranging strategic reforms. It is also a learning process in which information, knowledge, and experience about leading practices are shared through partnerships between organizations. It allows an organization to compare itself with others and, in the process, step back from itself and reflect.

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4. Green Productivity (GP)

GP is a strategy for ensuring environmental protection while making business profitable. It aims to enhance productivity while improving environmental performance of an organization through the application of appropriate productivity and environmental management tools, techniques, and technologies to reduce the environmental impact of an organization's activities, goods, and services.

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5. Kaizen

Kaizen, a Japanese word meaning "improvement" that calls for never-ending effort to improve and invites each and every person in an organization to take part, is known as the single-most important concept in Japanese management. It has been key to the competitive success of Japanese manufacturing industries. Problem-solving under the *Kaizen* concept is seen as a cross-functional, systematic, and collaborative approach. It is a strategy that puts every member of an organization, from top management down, continuously on the watch for improvement options. This is done using systematic reviews and auditing procedures, brainstorming, and group decision tools to see where improvement opportunities

may lie. All operations of an organization are subject to improvement, and the *Kaizen* approach is that nothing has improved sufficiently to stop improving it.

The *Kaizen* approach employs various tools such as 5S, quality control circles, total quality control, total preventive maintenance, just-in-time inventory, standard work, and automation, among others. These have all been useful in improving the three productivity dimensions of cost, quality, and speed. For example, the core concept of *Kaizen* is to eliminate *muri* (overload), *muda* (waste), and *mura* (inconsistency) from the worksite through efficient utilization of labor, materials, and equipment.

6. Knowledge Management (KM)

KM refers to a range of practices used by organizations to identify, create, capture, and distribute knowledge for reuse, awareness, and learning across the organization. KM programs are usually linked to organizational objectives and are intended to lead to the achievement of specific outcomes such as shared intelligence, improved performance, competitive advantage, and higher levels of innovation. The objective of KM is to make the best use of the knowledge assets available to an organization, turning them into a powerful driver for competitiveness. In the APO KM framework, KM is defined as "an integrated approach of creating, sharing, and applying knowledge to enhance organizational productivity, profitability, and growth."

The rise of KM coincides with the emergence of the so-called knowledge-based economy. In the new economic era, traditional production factors such as land and capital are being replaced by the intangible asset of knowledge as the critical input for corporate competitiveness.

Accessible from the Asian Productivity Organization. http://www.apo-tokyo.org.

7. Quality Circles/Work Improvement Teams

Quality circles (QCs) have been a popular employee-involvement technique among organizations pursuing excellence since the approach was first introduced in Japan in 1962. The philosophy behind QCs is based on quality guru Armand V. Feigenbaum's belief that quality control planning could only succeed with "quality-mindedness" from top management down to workers. Since 1951, QCs have evolved into a structured system to harness the collective wisdom of everyone in an organization.

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Product-related Productivity Initiatives

8. Reduce, Reuse, Recycle (3Rs)

3Rs is one of the techniques included in the GP approach. These are activities that form the basis for waste reduction and production process optimization.

- Reduce means using fewer inputs, including raw materials and energy, so that the pressure on the environment will be less, leading to less waste
- Recycle involves returning part of the waste stream to the system, either to be used for the same type of product for which it was originally manufactured, or to be remanufactured into something new
- Reuse focuses on returning a part of the waste stream of a product to be used repeatedly for the same purpose

3Rs can be more than just an activity or a program. They can become a corporate philosophy shared by every member of the organization, not only leading to improved productivity and environmental indices, but also helping to create a better work environment.

9. Customer Satisfaction Index (CSI)

CSI is a method of monitoring customer satisfaction and taking action to improve it. A number of different methods have been developed such as:

- Net Promoter score, which is a management tool that can be used to gauge the loyalty of a firm's customer relationships
- Kano model, which is a theory of product development and customer satisfaction developed in the 1980s by Professor Noriaki Kano
- SERVQUAL or RATER, which is a service-quality framework incorporated into customer satisfaction surveys to indicate gaps between customer expectations and experiences
- J.D. Power and Associates, which is an organization that measures customer satisfaction and is known for its top-box approach and automotive industry rankings

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10. Eco-design

Eco-design is a method of designing products that takes into account their impact on the environment at all stages of their life cycle. This means attempting to lower the environmental impact and improving the performance of products. The life cycle of a product is usually divided into procurement, manufacture, use, and disposal. Thus, eco-design includes environmental objectives as part of the design objectives to be achieved. Eco-design may, for example, result in the choice of a recyclable or biodegradable material for packaging or the development of products such as detergent that is effective in cold water to reduce the energy consumption of washing machines.

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11. Hazard Analysis and Critical Control Points (HACCP)

The HACCP concept is a systematic approach to the identification, assessment, and control of hazards. It is very simple because it only identifies potential food safety problems and determines where they could be controlled and prevented. The main objective of HACCP is to enhance assurance in food safety in order to prevent food-borne illnesses more efficiently. Additionally, it reduces cost of control and wasted food and it protects the reputation of food processors and the entire industry.

Accessible from Hazard Analysis and Critical Control Point Systems Concepts and Applications, WHO Mediterranean Zoonoses Control Programme. http://www.who.int/zoonoses/institutions/mzcp/en/.

12. Niche Marketing

Niche marketing is a marketing approach that is focused on a small yet perceived as lucrative group of potential customers, not usually served by mainstream or traditional markets or providers. Thus, niche marketing is about finding and serving profitable market segments and designing custom-made products and services for them.

13. Quality Management System (QMS)

QMS is that part of an organization's overall management system that ensures that customer expectations for quality in products and services are met or exceeded continually. This includes the development of a formalized quality policy, a planning phase outlining the structures, responsibilities, and procedures for quality within an organization, and the verification of those procedures. QMS allows the organization to take control of the quality of its products and services. It allows putting a plan in place for consistency, allowing an organization to determine when corrective actions are needed. QMS is a quality and productivity tool, and therefore benefits the whole organization. Benefits can also extend to the supply chain if applied throughout, improving product quality and the relationships between suppliers, clients, and end customers.

14. Supply Chain Management (SCM)

A supply chain is the network of raw material producers, component manufacturers, final product manufacturers, wholesalers and distributors, retailers, and customers, interconnected by several types of flows, including material, information, finance, and people. The Association for Operations Management (APICS) dictionary defines SCM as the "design, planning, execution, control, and monitoring of supply chain activities with the objective of creating net value, building a competitive infrastructure, leveraging worldwide logistics, synchronizing supply with demand, and measuring performance globally."

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Process-related Productivity Initiatives

15. Business Process Reengineering (BPR)

BPR is the fundamental rethinking and radical redesigning of business processes to achieve dramatic improvements in critical and contemporary measures of performance such as cost, quality, service, and speed. Since its implementation, many enterprises, from high-tech industries (e.g., semiconductors) to traditional ones (e.g., footwear and apparel), and from assembly-line sectors to logistics operations, have been applying BPR to improve their productivity and competitiveness in order to face severe global competition and to combat economic decline over the past two decades. The key to BPR is to look at the business processes from scratch and determine how an organization can best rebuild those processes to improve their performance.

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16. Just-in-Time (JIT) Production System/Quick Response Team

JIT is one of the most important components of the Toyota Production System. JIT is a production technology system that promotes economic efficiency with a central principle of "produce(ing) appropriately what is necessary, just as much as needed, when needed". The main goal of JIT is to keep the stock at the necessary minimum during the production process, that is to say, a complete balance between order and production. Generally speaking, there are various production processes between receiving orders and shipment of products, and as a result, prolonged lead-time is often unavoidable. Prolonged lead-time can lead to opportunity loss, especially for general mass-produced products. JIT can also be understood as an inventory strategy for improving the return on investment of a business by reducing in-process inventory and its associated costs.

Accessible from the Asian Productivity Organization. http://www.apo-tokyo.org.

17. Preventive/Productive Maintenance (PPM)

Preventive maintenance means taking measures in advance, before corrective action is needed with regard to the functioning of equipment. Productive maintenance is when the result of the maintenance of equipment is measured (normally in economic terms, e.g., cost-benefit analysis) and the result is positive (e.g., tuning your car regularly will not only prevent damage, it will also save fuel costs. If the fuel saving is superior to the tuning costs, that is productive maintenance). Together, they are referred to as PPM. Total productive maintenance is a systematic approach to productive maintenance. PPM is useful as a means for enhancing productivity, minimizing down time, and maximizing efficiency. It involves keeping equipment operating at peak performance levels to help reduce waste.

18. Six Sigma

Six Sigma was first launched in 1987 by Motorola after it gave the company over ten-fold improvements. R. Tomkins defines Six Sigma as "a program aimed at the near elimination of defects from every product, process, and transaction". Others defined it as a strategic initiative to boost profitability, increase market share, and improve customer satisfaction through the use of statistical tools that can lead to breakthrough quantum gains in quality. If deployed correctly, Six Sigma has the ability to generate a host of benefits for business companies, e.g., improving process speed, raising quality levels, reducing costs, increasing revenues, and deepening customer relationships, among others. Six Sigma is widely regarded as a strategic paradigm for management innovation and for the survival of business companies. It is used in a variety of industries and business models, from manufacturing to services.

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People-related Productivity Initiatives

19. Employee Suggestion Schemes (ESS)

ESS is popular among many organizations striving for world-class business excellence and functions. This employee involvement method taps their knowledge for ideas for improvement. The traditional method focuses on suggestions with a high impact, and handsome rewards are given to employees whose suggestions have a significant effect on the financial performance of the organization. Very often, few suggestions are received since highly innovative suggestions are rare and hard to come by.

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20. Lean Management System (Toyota Management System)

The Lean Production System or Lean Manufacturing is primarily based on the concept of "lean" or doing more with less, i.e., less time, inventory, space, labor, and money. The main source of Lean Production System is the Toyota Production System (TPS), which was developed by the Toyota Motor Company after the Second World War. In the 1980s, as western executives began taking note of Toyota's success, academia also begun studying and writing about the benefits of this seemingly revolutionary production system. Two of these academics were James P. Womack of the Massachusetts Institute of Technology and Daniel T. Jones of the University of Cardiff in Wales, who are widely credited for coining the term "lean manufacturing" to describe the Toyota Production System in the west. In essence, the terms "Toyota Production System" and "Lean Production System" mean the same thing and can be used interchangeably.

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21. Occupational Health And Safety Standard (OHSAS) 18000

OHSAS 18000 consists of a series of two standards, OHSAS 18001 and OHSAS 18002, which provide requirements and guidelines, respectively, for implementing a safety and health management standard. Based on the British Standard BS 8800, OHSAS 18000 was developed by a group of standard bodies, certification bodies, registrars, and consultants, and was first published in 1999. It is not an ISO standard. Although the OHSAS 18000 standards were not developed through the ISO or by using the ISO consensus process, they have gained wide acceptance. In 2002, amendments were made to both standards to consider user demands and to better align these standards with ISO 14001 and ISO 9001.

22. Social Accountability (SA) 8000

The SA 8000 is a global social accountability standard for decent working conditions based on international workplace norms of the ILO conventions, the Universal Declaration of Human Rights, and the UN Convention on the Rights of the Child. The standard was developed by Social Accountability International, which was established in 1997. The SA 8000 standard and verification system is a credible, comprehensive, and efficient tool for assuring humane workplaces.

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23. Workplace Cooperation (WPC)

WPC is a broad concept connoting mutual commitment between labor and management to "working together and working smarter." Specifically, its goal is to develop an ideal situation where management and workers are full partners in identifying problems at the workplace, crafting solutions to those problems, and implementing the agreed-upon solutions. The WPC concept encompasses an underlying philosophy and process, procedures, and organizational structures. The idea is that greater cooperation between labor and management on matters of mutual concern can create a more satisfying and productive workplace. The process involves employee participation in day-to-day decision-making that affects their jobs. The structures and procedures enable the partners to redesign work to encourage group problem-solving, open information sharing, teamwork, and skill development.

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Policy-related Productivity Initiatives

24. Balanced Scorecard (BSC)

BSC is an approach to performance measurement that was introduced by Dr. Robert Kaplan and Dr. David Norton of Harvard Business School in 1992. The approach combines traditional financial measures with non-financial measures that drive business outcomes, so that organizations can focus on the future and act in their long-term best interest. This method provides managers with better and more relevant information about the activities they are managing, increasing the likelihood of organizational objectives, and vision and mission being achieved.

The BSC approach also involves a strategic management system that enables managers to focus on the important performance metrics that drive success and balances the financial perspective with customer, process, and employee perspectives. Measures are often indicators of future performance. BSC was intended to help overcome some of the weaknesses of previous management approaches and provide clear prescription as to what companies should measure in order to link the individual, department, and overall performance to the company's strategy.

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25. Business Excellence (BE) Framework

BE frameworks are widely used around the world to enhance the productivity and quality of organizations, share best practices, and recognize achievements. It is estimated that some 80 countries have national awards based on these frameworks. The most well-known are the BE frameworks adopted from the Malcolm Baldrige National Quality Award of the USA, and the European Foundation for Quality Management Excellence Award.

The BE frameworks used in Singapore and other APO member economies are closely aligned with or based on these models. Research has found that organizations that have adopted BE frameworks enjoy better financial performance, customer satisfaction, and productivity compared with their competitors. In the USA, BE award winners have generally outperformed their peers by a factor of 6.5 to 1 in terms of stock market performance. They also experienced increased sales, income, and total assets. In Europe, a study of 120 BE award winners found that they outperformed companies that were similar in size and operating in the same industries over an 11-year period.

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26. Corporate Social Responsibility (CSR)

CSR is a concept that organizations have an obligation to consider not only in the interests of customers, employees, and shareholders, but also of societies, communities, and environment in all aspects of their operations. This obligation is seen to extend beyond their statutory obligation to comply with legislation. The responsibility stems from the fact that business and society are interdependent; the wellbeing of one depends on the wellbeing of the other.

Many organizations are now taking their corporate environment responsibility as a part of their CSR and including it in their CSR reporting. The World Business Council for Sustainable Development in its publication *Making Good Business Sense* used the following definition: "Corporate Social Responsibility is the continuing commitment by business to behave ethically and contribute to economic development while improving the quality of life of the workforce and their families as well as of the local community and society at large".

Accessible from the Asian Productivity Organization. http://www.apo-tokyo.org.

27. Energy Conservation/Management

Energy Conservation/Management is a series of activities/programs designed to prevent, mitigate, and correct energy leaks or loss throughout an organization. These activities include:

- Energy Conversion: Avoiding energy loss during energy transfer operation
- Transfer: Reducing unwanted energy transfer (e.g., irradiated heat) or redesigning to benefit from energy transfer (e.g., steam recovery)
- Energy Utilization: Improving the efficiency with which energy is used and how it should be used
- Energy Recovery: Using energy from waste streams (potential or actual) to feed other processes

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28. Environmental Management System (EMS)

EMS is a set of processes and practices that enables an organization to reduce its environmental impact and increase its operating efficiency. In other words, EMS is the part of the overall management system that addresses the impact of an organization's activities, products, and services on the environment. EMS is often based on the plan-do-check-act (PDCA) model. The ISO 14000 series of standards is the world's most widely recognized for a systematic approach to environmental management.

Accessible from the Asian Productivity Organization. http://www.apo-tokyo.org.

29. Good Agricultural Practices (GAP)

GAP refers to the package of recommendations and available knowledge to address environmental, economic, and social sustainability for on-farm production and postproduction processes, resulting in safe and healthy food and nonfood agricultural products.

The adoption of GAP will ensure a clean, safe working environment for employees while eliminating the potential contamination of food products. GAP may consist of guidelines addressing the issues of site selection, adjacent land use, fertilizer use, water sourcing and use, pest control and pesticide monitoring, harvesting practices (including worker hygiene, packaging, storage, field sanitation, and product transportation), and cooler operations.

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30. ISO 9000 Quality Management System (QMS)

ISO 9000 is a family of standards developed by the ISO that provides a standardized model for a QMS. ISO 9001 is the specification standard in this series. ISO 9000 is primarily concerned with quality management, which means ensuring a certain standard of quality in products and services to meet customer quality requirements. An organization can self-declare its compliance with the requirements or obtain external validation, usually by third-party registration or certification.

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31. National Quality Award/Business Excellence Award

National quality awards are sometimes used interchangeably with business excellence awards due to their similarities. In some cases, business excellence awards are used to engage the private sector fully because profit and commercial success are more important concerns than organizational performance excellence. Such awards recognize business enterprises with excellent records or consistency in gaining the competitive advantage.

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