**Highlights of Extensions in Operations**

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| 1 | **Supply Chain Management** |
| 2 | **Project Management** |
| 3 | **Quality Management** |
| 4 | **Business Sustainability** |
| 5 | **Business Analytics** |

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| **Supply Chain Management** |
| *Description*: “Management of Systems between Supplier and Customerthat Satisfies Customer Demands” |
| *Definition*: “The design, implementation and control of systems that managethe flow of information, material, money, knowledge and services throughout the supply chainto continually improve quality, lower cost and increase customer satisfaction.” |

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| ***Supply Chain Model****:* |
| 🡨 Flow of Information 🡨 |
|  | Supplier | 🡪 | Manufacturer | 🡪 | Distributor | 🡪 | Retailer | 🡪 | Customer |  |
| 🡪 Flow of Material 🡪 |
| Supply Chain Initiatives: Lean, Green, Resilient, Responsive, Smart |
| Key Supply Chains: Commodity, Global, Service, Reverse |
| Functions: Inventory, Logistics, Relationships, Information, Strategy |

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| ***Supply Chain Industry****:* |  |
|  |  | ***Supply Chain Initiatives*** |  |
|  |  | Lean(Cost,Waste) | Green(TBL,CSR) | Resilient(Risk) | Responsive(Agile) | Smart(Technology) |  |
| ***Key Supply Chains*** | CommoditySupply Chain |  |  |  |  |  |  |
| GlobalSupply Chain |  |  |  |  |  |  |
| ServiceSupply Chain |  |  |  |  |  |  |
| ReverseSupply Chain |  |  |  |  |  |  |
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|  | ***Supply Chain Functions*** | Inventory | Logistics | Relationships | Information | Strategy |  |
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| ***Supply Chain Industry:*** |
| ***Supply Chain Initiatives*** |
| ***Key Supply Chains*** |
| ***Supply Chain Functions*** |

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| ***Supply Chain Industry:*** |
| ***Supply Chain Initiatives*** |
| ***Key Supply Chains*** |
| ***Supply Chain Functions*** |

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| ***Supply Chain Initiatives*** |
| Lean Supply Chain. An efficient supply chain with a focus on reducing cost by eliminating waste throughout the supply chain. |
| Green Supply Chain. A supply chain with a focus on sustainability throughout the supply chain based on the triple bottom line (TBL) of economic, environmental, and sociopolitical sustainability. An ultimate focus is on corporate social responsibility.  |
| Resilient Supply Chain. A supply chain that mitigates risks through preparation, responding, and recovering from disruptive supply chain events or threats. |
| Responsive/Agile Supply Chain. A supply chain that is responsive to new challenges encountered by a supply chain by maintaining an agility in meeting the changing demands within a supply chain. |
| Smart Supply Chain. A supply chain that relies on the use of technology such as a digital supply chain or employs supply chain analytics such as an intelligent supply chain. |
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| ***Key Supply Chains*** |
| Commodity Supply Chain. A supply chain that extracts and supplies commodities to satisfy downstream requirements or transforms commodities into other commodities. |
| Global Supply Chain. A supply chain that spans international boundaries. |
| Service Supply Chain. A supply chain that provides services to support a physical supply chain or a supply chain that provides services to meet an external supply chain demand for services. |
| Reverse Supply Chain. A supply chain where physical goods travel upstream due to causes such as returns, recalls, or recycling for purposes such as reuse, repair, recycle, or disposal. |
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| ***Supply Chain Functions*** |
| Inventory. Topics include echelon inventory, forecasting, and risk pooling. |
| Logistics. Topics include network configurations, transportation, and cross-docking. |
| Relationships. Topics include procurement, outsourcing, and alliances. |
| Information. Topics include communication, analysis, and bullwhip effect. |
| Strategy. Topics include PUSH-PULL strategies, standardization, and delayed differentiation. |
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| **Project Management** |
| ***Description***: “*The art and science of transforming an idea into a product or service.”* |
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| **What is a project?**“A project is a temporary endeavor undertaken to create a unique product or service.” |
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| **What is project management?**“Project management is the application of knowledge, skills, tools, and techniquesto project activities that fulfills the project scope on time and within budgetin order to meet or exceed stakeholder needs and expectations.” |
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|  | “Project management is the |  |
| Integration |  application of  ***knowledge, skills, tools, and techniques*** | PMBOK |
| Flexibility |  to project *activities* that fulfills the  ***project scope on time and within budget*** | Triple Constraint |
| Focus |  in order to meet or exceed ***stakeholder*** needs and expectations.” | Success |
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| ***Project Management:*** |
| ***Project Management Terms*** |
| ***Project Management Checklist*** |

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| ***Project Management:*** |
| ***Project Management Terms*** |
| ***Project Management Checklist*** |

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| **Project Management Terms.*** Phases.
	+ Project Life Cycle Phases.
		- Concept, Development, Implementation, Close-out
	+ Project Time Phases.
		- Sequential, Overlapping, Iterative
	+ Product Life Cycle Phases.
		- Design, Prototype, Final Assembly
* Process groups.
	+ Initiating Process Group. Processes needed to start the project.
	+ Planning Process Group. Processes needed to determine what is to be done in the project.
	+ Executing Process Group. Processes needed to do the project.
	+ Monitoring and Controlling Process Group. Processes needed to manage the project.
	+ Closing Process Group. Processes needed to finalize the project when done.
* Knowledge areas.

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| * + Project Integration Management
	+ Project Scope Management
	+ Project Schedule Management
	+ Project Cost Management
	+ Project Quality Management
 | * + Project Resource Management
	+ Project Communications Management
	+ Project Risk Management
	+ Project Procurement Management
	+ Project Stakeholder Management
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| **Project Management Checklist.*** + - Charter. (Initiates the project.)
		- Scope Statement. (Defines the project.)
		- Integrated Change Control. (Includes: CCB (Change Control Board), Process.)
		- Stakeholder Analysis. (Definition, Project Direction, Project Validation.)
		- Project Plan. (Primary document for a project that contains the detailed work.)
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|  |  |  | Process Groups |
| Knowledge Areas |  | Initiate | Plan | Execute | Control | Close |
| Integration | Scope |  |  |  |  |  |  |
| Schedule |  |  |  |  |  |  |
| Cost |  |  |  |  |  |  |
| Quality |  |  |  |  |  |  |
| Resource |  |  |  |  |  |  |
| Communications |  |  |  |  |  |  |
| Risk |  |  |  |  |  |  |
| Procurement |  |  |  |  |  |  |
| Stakeholder |  |  |  |  |  |  |

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***Quality Management***

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| **Defining Quality.**1. Meeting and exceeding the expectations of customer satisfaction.
2. Meeting and exceeding the specifications of a product or service.
3. Maintaining total commitment to quality and continual improvement.

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| **Quality Program** |
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| ***Quality******Planning*** | **→** | ***Quality******Assurance (QA)*** | **→** | ***Quality******Control (QC)*** |
| “Define quality, standards, and the process to achieve them.” |  | “Implement the quality management plan.” |  | “Monitor project results and improve project performance.” |
|  |  | **↑** | **←** | **↓** |
| Create Plan |  | Follow ProcessesMeet Standards |  | Identify ChangesImprove Quality |

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| **History & Foundations.**1. Walter A. Shewhart – SPC
2. W. Edwards Deming – PDCA
3. Joseph M. Juran – Handbook
4. Armand V. Feigenbaum – TQM
5. Kaoru Ishikawa – 7 Basic Tools
6. Genichi Taguchi – Six-Sigma
7. Shigeo Shingo – Pokayoke
 | **Necessary Elements of Quality.*** Customer Driven & Employee Empowered
* Education & Training
* Measurement & Accountability
* Culture & Environment
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| **Plan** | **-** | **Do** | **-** | **Check** | **-** | **Act** |

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| **7 Management Tools**1. Affinity Diagram (Creativity)2. Relationship Diagram (Logic)3. Tree Diagram4. Matrix Diagram5. Data Matrix6. CPM/PERT7. PDPC “Process Decision Program Chart” |  | **7 Basic Tools**1. Check Sheet 2. Pareto Analysis 3. Stratification 4. Cause and Effect Diagrams5. Histograms 6. Scatter Diagrams 7. Control Charts |

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**Business Sustainability**

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| **Sustainability** |
| *Meeting the needs of the present**without compromising the ability of future generations to meet their needs.* |
| *From Our Common Future, Brundtland Report, Report of the World Commission on Environment and Development, United Nations, 1987.* |
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| **Business Sustainability** |
| *The design, implementation, control, and improvement of human practices* *that balance the economic growth, environmental protection and societal harmony* *of the global community and that will be accepted and advanced by future generations* *with a view to improve the balance.* |
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| A business sustainability approach balances three perspectives known as |
| ***Triple Bottom Line & Corporate Social Responsibility*** |
| *Business Sustainable Development*. [ Triple Bottom Line, TBL ] 1. Profit. Economic Sustainability. 2. Planet. Environmental Sustainability. 3. People. Sociopolitical Sustainability. | *Corporate Social Responsibility (CSR)*. [ Triple Bottom Line, TBL ] 1. Profit. Responsible Economic Growth. 2. Planet. Responsible Environmental Impact. 3. People. Responsible Sociopolitical Involvement. |
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|  | ***Sustainability Initiatives*** |  |
|  | *Corporate Social Responsibility (CSR)*.[ Triple Bottom Line, TBL ] | *Sustainability Categories* |  |
|  |  1. Profit. Responsible Economic Growth. | Lean🡪Production efficiencyEnergy🡪Renewable |  |
|  |  2. Planet. Responsible Environmental Impact. | Green🡪Environmental concernsMaterial🡪Biodegradable |  |
|  |  3. People. Responsible Sociopolitical Involvement. | Social🡪Workplace conditionsPolitical🡪Regulations |  |
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|  | ***Sustainable Program*** |  |
| ***Sustainable Strategy*** Commit to a long-term vision. | ***Sustainable Development*** Establish goals. | ***Sustainable Planning*** Implement metrics. |
| Standards(Voluntary/Mandatory) | Sustainability Index(Benchmarks) | CSF: Critical Success Factors |
| Regulations(Domestic/International) | Sustainability Scorecard(Improvement) | KPI: Key Performance Indicators(Carbon Footprint) |

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**Business Analytics**

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| **Business Analytics** |
| An integrated, quantitative approach to managing business by gaining insights to the past, present, and future through data, models and scientific inquiry. |

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| **Seven Perspectives in Business Analytics**Consider the Seven Perspectives of Business Analytics consisting of three primary disciplines, three secondary disciplines and the integrated discipline of Business Analytics. |
| *Disciplines* | *Perspectives* |
| Primary Disciplines:  | 1. Mathematics & Statistics2. Computer Science3. Business Domain Knowledge |
| Secondary Disciplines:  | 4. Data Science5. Business Intelligence6. Business Analysis |
| Integrated Discipline:  | 7. Business Analytics |

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| **Levels of Business Analytics**Consider one commonly presented Levels of Business Analytics. |
| *Levels* | *Descriptions* | *Examples* |
| Descriptive Analytics: | What has happened?What is happening? | GraphsMeasures |
| Predictive Analytics: | What will happen? | ForecastingTime Series AnalysisRegression Analysis |
| Prescriptive Analytics: | What could happen? | Optimization ModelingMultivariate Statistics ModelingArtificial Intelligence |

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| **Advanced Analytics** |
| A collection of advanced quantitative **techniques** that incorporates **data** with characteristics of velocity, variety, and volume within coordinated **approaches** to gain insights into underlying **constructs** related to business objectives. |
| **Techniques**: | Multivariate Statistics, Optimization, Time Series Analysis |
| **Data**: | Big Data, Structured & Unstructured Data, Streaming Data, Dirty Data |
| **Approaches**: | Data Mining, Cloud, Machine Learning, Artificial Intelligence |
| **Constructs**:  | Concepts, Propositions, Hypotheses, Theories |



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|  |  |  | **Levels of Business Analytics** |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  | Prescriptive Analytics |  |  |  |
|  |  |  |  | Predictive Analytics |  |  |  |  |
|  |  |  | Descriptive Analytics |  |  |  |  |  |
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|  | **Levels of Business Analytics (Business Intelligence)** |  |
|  |  |  | **Business Intelligence** |  |  |  |  |
|  |  |  |  |  | Prescriptive Analytics |  |  |  |
|  | What will happen? |  |  | Predictive Analytics |  |  |  |  |
|  | What is happening?What has happened? |  | Descriptive Analytics |  |  |  |  |  |
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|  | **Levels of Business Analytics (Advanced Analytics)** |  |
|  |  |  |  | **Advanced Analytics** |  |  |  |
|  |  |  |  |  | Prescriptive Analytics |  | What could happen? |  |
|  |  |  |  | Predictive Analytics |  |  | What will happen? |  |
|  |  |  | Descriptive Analytics |  |  |  |  |  |
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