Conceptual design and simulated operation of economies of scope and scale manufacturing enterprises

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- A Doctoral Thesis. Submitted in partial fulfillment of the requirements for the award of Doctor of Philosophy of Loughborough University.

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Engineer air-conditioners to customer orders

DM1 Customers
DM2 Suppliers
DM3 Sellers
DM4 Marketers
DM5 Product Designers
DM6 A/C Producers
DM7 Business Managers
DM8 Logistics Providers
DM9 Production Supporters

Context diagram

Project Title: Improvement of productivity and planning at Shenling A/C
Created: 15/07/08
Modelling by: Shenling project team
Created: 15/07/08
Updated: 2008-8-3
BP3.1 Obtain & process orders

- EA 3.1.1 Identify customers
- EA 3.1.2 Negotiate sales
- EA 3.1.3 Verify contract terms
- EA 3.1.4 Get contract documents signed
- EA 3.1.5 Distribute contract documents

BP3.2 Arrange delivery of finished A/Cs

- EA 3.2.1 Verify completion date
- EA 3.2.2 Check customer details
- EA 3.2.3 Arrange transportation
- EA 3.2.4 Print customer details and delivery documents

BP3.3 Provide after sales services

- EA 3.3.1 Verify customer product identity
- EA 3.3.2 Analyse complaint/faults
- EA 3.3.3 Provide technical support

DP3 Prepare sales contract

General Blocks

<table>
<thead>
<tr>
<th>CIMOSA Domain</th>
<th>Non-CIMOSA Domain</th>
<th>Activity</th>
<th>External Link</th>
<th>Event</th>
<th>Information</th>
<th>HR</th>
<th>Physical</th>
<th>Finance</th>
</tr>
</thead>
</table>

Resources

<table>
<thead>
<tr>
<th>Flow Control Logic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conditional</td>
</tr>
</tbody>
</table>

Flow Type

- Flow of Resource
- Flow of Process
- Alternative Flow

Operation Type

- Direct Generation
- Direct Supportive
- Indirect Supportive
BP3.1 Obtain & process orders

BP3.2 Arrange delivery of finished A/Cs

BP3.3 Provide after sales services

Pre-sales interactions

DP4

BP3.1

Customer specifications

Contract document

Create designs and BOMs

A/Cs

Drawings, design specs, BOMs

Provide orders

DP1

Provide transport

A/Cs

Delivery documents

DP8

Completion dates and product information

Flow of Resource

Flow of Process

Flow Control Logic

Flow Type

Operation Type

Customer complaints

CIMOSA Domain

Non-CIMOSA Domain

Activity

External Link

Event

Information

HR

Physical

Finance

Conditional

OR

AND

Sub-Process

Chained Process

Delay

Direct Generation

Direct Supportive

Indirect Supportive

Project Title: Customer specifications

Page: 5 OF 44

Version: 1

Revised by: Z.Cui

Updated: 2008-8-3

Created: 15/07/2008

Modelled by: Shenling Project team

sub-interaction diagram for sales dp3
BP3.1 Obtain & process orders
 BP5.1 Produce designs
   BP5.2 Generate BOMs
     BOMs
       Drawings
         Initial scheme designs

BP3.2 Negotiate sales

DP6
  Produce air conditioners

BP7.4
  Control quality

DP9
  Support production

sub-interaction diagram for design dp5

Modelled by: Shenling project team
Created: 15/07/08
Updated: 2008-8-3
**BP6.1**
Fabriicate metal sheets

**BP6.2**
Produce heat exchanger parts

**BP6.3**
Assemble small sized A/Cs

**BP6.4**
Assemble large sized A/Cs

**BP6.5**
Store materials

**BP6.6**
Maintain machines

**BP6.7**
Prepare production and purchasing plans

**BP6.8**
Assemble electronic control units

**BP6.9**
Support production

**BP7.1**
Manage purchases

**BP7.2**
Support production

**Materials and components**

**Finshed products**

**Machine breakdown history, maintenance plans**

**Drawings, BOMs, production methods**

**Resources**
- Physical
- Finance
- Human Resources
- Information
- Event
- External Link
- Activity

**Flow Control Logic**
- Conditional
- OR
- AND
- Sub-process
- Chained process
- Delay

**Flow Type**
- Flow of Resource
- Flow of Process
- Flow of Process / Alternative Flow

**Operation Type**
- Direct Generation
- Direct Supportive
- Indirect Supportive

Created: 15/07/2008

Updated: 2008-8-3
structure diagram for manage business dp7

DP7.1
Realize purchases

BP7.1.1
Order materials

BP7.1.2
Manage supplier payments

BP7.1.3
Identify new suppliers

DP7.2
Control finance

BP7.2.1
Prepare departmental budgets

BP7.2.2
Update product cost

BP7.2.3
Control cash flow

DP7.3
Manage human resources

BP7.3.1
Recruit staff

BP7.3.2
Train staff

BP7.3.3
Manage support staff and services

DP7.4
Control quality

BP7.41
Study product design, specs and reports

BP7.42
Conduct in-process product quality inspection

BP7.43
Inspect & release final product

Project Title: Realize purchases
Modelled by: Shenling Project team
Created: 15/07/2008

Loughborough University

MSI Research Institute
**BP7.1.1**
Order materials

**BP7.1.2**
Manage supplier payments

**BP7.1.3**
Identify new suppliers

- **EA 7.1.1.1**
  Study purchase list
- **EA 7.1.1.2**
  Create initial purchase request (PR)
- **EA 7.1.1.3**
  Obtain quotes and samples
- **EA 7.1.1.4**
  Check quality of samples
- **EA 7.1.1.5**
  Evaluate, negotiate and select supplier
- **EA 7.1.1.6**
  Raise Purchase orders (POs)
- **EA 7.1.1.7**
  Approve POs
- **EA 7.1.1.8**
  Send POs to approved Suppliers

- **EA 7.1.2.1**
  Request for payment
- **EA 7.1.2.2**
  Check transaction
- **EA 7.1.2.3**
  Approve payment
- **EA 7.1.2.4**
  Authorize payment

**DP7.1**
Realize purchases

- **EA 7.1.3.1**
  Send new production requirements to various suppliers
- **EA 7.1.3.2**
  Investigate suppliers potential
- **EA 7.1.3.3**
  Check samples and validate supplier identity
- **EA 7.1.3.4**
  Select supplier and update supplier list
sub-interaction diagram for purchasing dp 7.3

**General Blocks**
- **CIMOSA Domain**
- **Non-CIMOSA Domain**
- **Activity**
- **External Link**
- **Event**

**Resources**
- **Information**
- **HR**
- **Physical**
- **Finance**

**Flow Control Logic**
- **Conditional**
- **OR**
- **AND**
- **Sub-Process**
- **Chained Process**
- **Delay**

**Flow Type**
- **Flow of Resource**
- **Flow of Process**
- **Alternative Flow**

**Operation Type**
- **Direct Generation**
- **Direct Supportive**
- **Indirect Supportive**

**Project Title:**
- sub-interaction diagram for purchasing dp 7.3

**Created:**
- 15/07/2008

**Updated:**
- 2008-8-3

**Modelling:**
- Shenling project team

**Revised by:**
- KAK/FL/ZC/RHW
Pre-sales information and customer details

Sales Officer

Customer specifications

EA3.1.1 Identify customers

Initial sales doc, due dates, price estimate

EA3.1.2 Negotiate sales

Contract document

Sales Engineer

EA3.1.3 Verify contract terms

Sales Manager

Customer

EA3.1.4 Get contract documents signed

Signed contract document

EA3.1.5 Distribute contract documents
Customer complaints

EA3.3.1 Verify customer product identity

Product type and fault

EA3.3.2 Analyse fault

Fault analysis, cost, implementation dates

After sales Engineer

EA3.3.3 Provide technical support

Technical support report

EA3.3.1 Verify customer product identity

EA3.3.2 Analyse fault

EA3.3.3 Provide technical support

Customer complaints

Sales Officer

Product type and fault

After sales Engineer

Technical support report

Activity diagram for sales (part 3) bp3.3

Modelled by: Shenling Project team

Created: 15/07/2008

Updated: 2008-8-3
EA5.1.1 Select scheme design

EA5.1.2 Modify scheme design

EA5.1.3 Create detail design

EA5.1.4 Check detail design

EA5.1.5 Modify detail designs and update PDM file

EA5.1.6 Print and distribute

Product Design Engineer

Contract document

Scheme drawings

CAD software

Design Manager

Modified drawings

Detailed drawings

Edited detail drawings

Final drawings

Printer

Hard copy drawings

General Blocks

Resources

Flow Control Logic

Flow Type

Operation Type

CIMOSA Domain

Non-CIMOSA Domain

Activity

External Link

Event

Information

HR

Physical

Finance

Conditional

OR

AND

Sub-Process

Chained Process

Delay

Direct Generation

Direct Supportive

Indirect Supportive

Project Title: activity diagram for design (part 1) bp5.1

Modelled by: Shenling Project team

Created: 15/07/2008

Updated: 2008-8-3
EA5.2.1 Study designs

EA5.2.2 Check available material list

EA5.2.3 Modify existing BOMs

EA5.2.4 Update PDM file

EA5.2.5 Attach BOM to drawings and lock PDM file

General Blocks

Resources

Flow Control Logic

Flow Type

Operation Type

Contract document, detailed drawings

Product Design Engineer

Drawings, material list

CAD software

Existing BOMs

Modified BOM

Final BOMs

Final detail drawings

Design file

CIMOSA Domain

Non-CIMOSA Domain

Activity

External Link

Event

Information

HR

Physical

Finance

Conditional

OR

AND

Sub-Process

Chained Process

Delay

Flow of Resource

Flow of Process

Alternative Flow

Direct Generation

Direct Supportive

Indirect Supportive

activity diagram for design (part 2) bp5.2

Modelled by: Shenling Project team

Created: 15/07/2008

Project Title: Contract document, detailed drawings

Page: 20 OF 44

Version: 1

Revised by: Z.Cui

Updated: 2008-8-3
activity diagram for develop maintenance plan-bp6.6.1

EA6.6.1.1 Study maintenance manuals

EA6.6.1.2 Prepare draft preventive maintenance plan

EA6.6.1.3 Modify maintenance plan

Historical maintain data

Draft maintenance plans

Machine failure report

Modified plan

Initial ideas about machine maintenance requirement

Production Supervisor

Manuals

Production

Parts

Resources

Flow Control Logic

Flow Type

Operation Type

CIMOSA Domain
Non-CIMOSA Domain
Activity
External Link
Event
Information
HR
Physical
Finance
Conditional
OR
AND
Sub-Proces
Chained Process
Delay
Flow of Resource
Flow of Process
Alternative Flow
Direct Generation
Direct Supportive
Indirect Supportive

Modified plan

Adjusted maintenance plans

Direct Supportive

Indirect Supportive

Created: 15/07/2008
Updated: 28/07/08

Modelled by: Shenling Project team

Version: 1

Revised by: Z.Cui

Updated: 28/07/08

Project Title: RESEARCH INSTITUTE

Page: 27 OF 44
activity diagram for machine maintenance-bp6.6.2

- **Source**
- **Tools**
- **Maintenance history**
- **Technician**
- **workers**
- **Faults report**

**General Blocks**
- CIMOSA Domain
- Non-CIMOSA Domain
- Activity
- External Link
- Event

**Resources**
- Information
- HR
- Physical
- Finance

**Flow Control Logic**
- Conditional
- OR
- AND
- Sub-Process
- Chained Process
- Delay

**Flow Type**
- Flow of Resource
- Flow of Process
- Alternative Flow

**Operation Type**
- Direct Generation
- Direct Supportive
- Indirect Supportive

**Process Flow**
1. **EA6.6.2.1 Analyse fault**
2. **EA6.6.2.2 Rectify problem**
3. **EA6.6.2.3 Run machine**

**Outputs**
- Identified solution
- Repaired machine

**Inputs**
- Faults report
- Maintenance history
- Technicians
- Tools

**Source**
- Production
activity diagram for transfer customer orders to production plan-bp6.7.1

EA6.7.1.1 Study due dates and contract requirements

EA6.7.1.2.1 Create technique report for new product

EA6.7.1.2.2 Initial check of contract element

EA6.7.1.3 Create contract record

EA6.7.1.4 Contract check by Tech manager

EA6.7.1.5 Contract check by business manager

EA6.7.1.6 Release contract to P & C
EA6.7.2.1 Creat initial production & purchase plans

EA6.7.2.2 technical ability check

EA6.7.2.3 Create design plan

EA6.7.2.4.1 feedback confirm from P & C

EA6.7.2.4.2 Assign Jobs (tech design)

EA6.7.2.5 Create design plan

EA6.7.2.6 Release plan jobs

EA6.7.2.7 Release Production plan with drawing

EA6.7.2.8 Payment check

Production

Activity diagram for modify production plan bp6.7.2
 EA6.7.33 Understand contract and BOM

 EA6.7.3.2 Run MRP

 EA6.7.3.1 Study BOM, contract document and purchase decisions

Decision on design parts to be purchased

BOMs

Contract document

Material Controller

Tech design

Data for MRP application

MRP purchase list

customer requirements

Unused material list

Purchase
activity diagram for purchase-order materials-bp7.1.1

EA7.1.1.1 Study purchase list
- Purchasing Officer
- Purchase list
- Approved purchase list

EA7.1.1.2 Create initial purchase orders
- Initial purchase order

EA7.1.1.3 Obtain quotes and samples
- Samples
- Proforma invoice
- Approved samples

EA7.1.1.4 Check quality of samples
- Approved purchase orders

EA7.1.1.5 Evaluate, negotiate and select supplier
- Approved supplier

EA7.1.1.6 Raise purchase orders
- Purchase orders

EA7.1.1.7 Approve purchase orders
- Approved purchase orders

EA7.1.1.8 Send PO to approved supplier
- Fax, electronic mail, post

EA7.1.1.9 Approval of purchase list
- Initial purchase order

EA7.1.1.10 Obtain quotes and samples
- Approved purchase orders

EA7.1.1.11 Check quality of samples
- Approved purchase orders

EA7.1.1.12 Evaluate, negotiate and select supplier
- Approved supplier

EA7.1.1.13 Approve purchase orders
- Purchase orders

EA7.1.1.14 Send PO to approved supplier
- Approved purchase order

EA7.1.1.15 Approval of purchase order
- Approved purchase order

Tech design

Resources

General Blocks

Flow Logic

Flow Type

Operation Type

Direct Generation
Direct Supportive
Indirect Supportive

CIMOSA Domain
Non-CIMOSA Domain
Activity
External Link
Event
Information
HR
Physical
Finance
Conditional
OR
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Sub-Process
Chained Process
Delay
Flow of Resource
Flow of Process
Alternative Flow

Project Title: Project Title
Modelling by: Shenling Project team
Created: 15/07/2008

Page: 32 OF 44
Updated: 2008-8-4

Version: 1
Revised by: Z.Cui
Activity diagram for purchasing and managing supplier payments (bp7.1.2)

1. **Request for payment**
   - **Purchasing Officer**
     - Delivery notes
     - Invoices

2. **Check transaction**
   - **Purchasing Manager**
     - Endorsed payment documents

3. **Approve payment**
   - **Deputy General Manager**
     - **Verified payment documents**

4. **Authorize payment**
   - **General Manager**
     - **Approved payment documents**

5. **Make payments**
   - **Finance Officer**
     - **Source for invoice**
     - **Source for notes**

6. **Payment destination**

---

**General Blocks**
- CIMOSA Domain
- Non-CIMOSA Domain
- Activity
- External Link
- Event

**Resources**
- Information
- HR
- Physical
- Finance

**Flow Control Logic**
- Conditional
- OR
- AND
- Sub-Process
- Chained Process
- Delay

**Flow Type**
- Flow of Resource
- Flow of Process
- Alternative Flow

**Operation Type**
- Direct Generation
- Direct Supportive
- Indirect Supportive

---

**Activity Details**
- **Project Title:** Activity diagram for purchasing and managing supplier payments (bp7.1.2)
- **Modelled by:** Shenling Project team
- **Created:** 15/07/2008

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**Team Information**
- **Page:** 33 OF 44
- **Version:** 1
- **Revised by:** Z.Cui
- **Updated:** 2008-8-4
**Activity Diagram for Purchase-Indentify New Suppliers 7.1.3**

- **New production requirements**
- **Purchasing Officer**
- **Source**
- **Supply materials**
- **Delivery and payment terms**
- **Supplier profile**
- **Samples**
- **Proforma invoices**
- **Purchase request**
- **Initial supplier list**
- **Samples and supplier identity confirmation**
- **Purchasing Manager**
- **Destination**
- **Updated supplier list**

**General Blocks**
- CIMOSA Domain
- Non-CIMOSA Domain
- Activity
- External Link
- Event

**Resources**
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**Flow Control Logic**
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**Flow Type**
- Flow of Resource
- Flow of Process
- Alternative Flow

**Operation Type**
- Direct Generation
- Direct Supportive
- Indirect Supportive

**Activity Descriptions**
- **EA7.1.3.1**: Send new production requirements to various suppliers
- **EA7.1.3.2**: Investigate suppliers potential
- **EA7.1.3.3**: Check samples and validate supplier identity
- **EA7.1.3.4**: Select Supplier and update supplier list

**Flow Diagram Notes**
- **New production requirements**
- **Purchasing Officer**
- **Source**
- **Supply materials**
- **Delivery and payment terms**
- **Supplier profile**
- **Samples**
- **Proforma invoices**
- **Purchase request**
- **Initial supplier list**
- **Samples and supplier identity confirmation**
- **Purchasing Manager**
- **Destination**
- **Updated supplier list**

**Project Information**
- **Created**: 15/07/2008
- **Updated**: 2008-8-4
- **Updated by**: Z.Cui

**Modelled by**: Shenling Project team
**Activity Diagram for Control Finance: Prepare Departmental Budgets**

1. **Obtain departmental budgets**
   - **Finance Officer**
   - **Available and expected income level of company**
   - **Other sundry expenses**
   - **Compiled departmental budgeted figures**

2. **Adjust departmental budgets**
   - **Approved budget figures for departments**

3. **Update departmental budget list and report**
   - **Final budgetted figures**

**General Blocks:**
- **CIMOSA Domain**
- **Non-CIMOSA Domain**
- **Activity**
- **External Link**
- **Event**

**Resources:**
- **Information**
- **HR**
- **Physical**
- **Finance**

**Flow Control Logic:**
- **Conditional**
- **OR**
- **AND**
- **Sub-Process**
- **Chained Process**
- **Delay**

**Flow Type:**
- **Flow of Resource**
- **Flow of Process**
- **Alternative Flow**

**Operation Type:**
- **Direct Generation**
- **Direct Supportive**
- **Indirect Supportive**

**Project Title:** activity diagram for control finance-prepare departmental budgets-bp7.2.1

**Modelled by:** Shenling Project team

**Created:** 15/07/2008

**Updated:** 2008-8-4
**Activity Diagram for Manage Human Resource - Recruit Stuff - BP7.3.1 & BP7.3.2**

**General Blocks**
- CIMOSA Domain
- Non-CIMOSA Domain
- Activity
- External Link
- Event

**Resources**
- Information
- HR
- Physical
- Finance

**Flow Control Logic**
- Conditional
- OR
- AND
- Sub-Process
- Chained Process
- Delay

**Flow Type**
- Flow of Resource
- Flow of Process
- Alternative Flow

**Operation Type**
- Direct Generation
- Direct Supportive
- Indirect Supportive

**Diagram Details**
- Modelled by: Shenling Project team
- Created: 15/07/2008
- Updated: 2008-8-7

**Key Activities**
- EA7.3.1.1 Plan for Recruitment
- EA7.3.1.2 Advertise for Personnel
- EA7.3.1.3 Interview
- EA7.3.1.4.1 Organise & Conduct Exams
- EA7.3.1.4.2 Second Interview
- EA7.3.2.1 Estimate Budget for HR (Training)
- BP7.3.2 Train Staff

**Processes**
- Staff Requirements
- Staff Needs & Development
- Exhibit at Graduate Recruitment Events
- Websites
- IT Support for R & D
- Every Department
- HR Officers
- Potential New Staff List
- Recruitment Plan
- New Recruited People
- Trained New Staffs
- Finance
- Payment for Training

**Notes**
- EA7.3.1.1 Plan for Recruitment
  - Every department
  - Staff requirements
  - Staff needs & development
  - HR officers

- EA7.3.1.2 Advertise for Personnel
  - Potential new staff list
  - Recruitment plan
  - HA officers

- EA7.3.1.3 Interview
  - HA officers

- EA7.3.1.4.1 Organise & Conduct Exams
  - New recruited people

- EA7.3.1.4.2 Second Interview

- BP7.3.2 Train Staff
  - Training plans
  - Trained new staffs
  - HR department
  - Every department
  - Finance
  - Payment for training

- EA7.3.2.1 Estimate Budget for HR (Training)
  - Training budget
  - Every department
  - HR officers

- EA7.3.3.1 Plan for HR (Training)
  - Training budget
  - Every department
  - HR officers

- EA7.3.3.2 Train Staff
  - Training plans
  - Trained new staffs
  - HR department
  - Every department
  - Finance
  - Payment for training

- EA7.3.3.3 Organise & Conduct Exams
  - New recruited people

- EA7.3.3.4 Second Interview

- BP7.3.2 Train Staff
activity diagram for manage human resource-manage support stuff and service-bp7.3

BP7.3.3.1 Management Support

EA7.3.3.2 Establish own policy

EA7.3.3.3 Create General HR report

EA7.3.3.4 Implement policy

Senior managers and directors

HR data for each dep

Accommodation report
Security report
Info on uniforms
Daily management records
ISO certificate etc

Each department

HR stuffs

Accommodation report
Security report
Info on uniforms
Daily management records
ISO certificate etc

CIMOSA Domain
Non-CIMOSA Domain
Activity
External Link
Event

Information

Resource

Physical

Finance

Flow Control Logic

Conditional

OR

AND

Sub-Process

Chained Process

Delay

Flow Type

Flow of Resource
Flow of Process
Alternative Flow

Operation Type

Direct Generation
Direct Supportive
Indirect Supportive

Created: 15/07/2008
Updated: 2008-8-7
Modelled by: Shenling Project team

RESEARCH INSTITUTE

Project Title: Loughborough University

Page: 39 OF 44
Version: 1
Revised by: Z.Cui
Updated: 2008-8-7
BP7.4.1
Study product drawings, specs and reports

BP7.4.2
Conduct in-process product quality inspection

BP7.4.3
Inspect and release final product
activity diagram for support production (part1)-Product & Manufacturing tools-bp9.1

Project Title: Product & Manufacturing tools-bp9.1
Modelled by: Shenling Project team
Created: 15/07/2008

General Blocks
- CIMOSA Domain
- Non-CIMOSA Domain
- Activity
- External Link
- Event

Resources
- Information
- HR
- Physical
- Finance

Flow Control Logic
- Conditional
- OR
- AND
- Sub-Process
- Chained Process
- Delay

Flow Type
- Flow of Resource
- Flow of Process
- Flow of Process
- Alternative Flow

Operation Type
- Direct Generation
- Direct Supportive
- Indirect Supportive

Version: 1
Page: 41 of 44
Revised by: Z.Cui
Updated: 2008-8-4
EA9.2.1 Study product designs

Process Controller

Product drawings and specifications

Draft production method

EA9.2.2 Inspect production method

Shop floor production method

Existing production method

destination

EA9.2.3 Document existing production method

tech design

CIMOSA Domain
Non-CIMOSA Domain
Activity
External Link
Event
Information
HR
Physical
Finance
Conditional
OR
AND
Sub-Process
Chained Process
Delay
Direct Generation
Direct Supportive
Indirect Supportive

Flow of Resource
Flow of Process
Alternative Flow

Flow Type

Operation Type

General Blocks

Resources

Flow Control Logic

Flow Type

Operation Type

activity diagram for support production (part2)-document existing production methods-bp9.2

Project Title: Loughborough University
Modelled by: Shenling Project team
Created: 2007/08

Page: 42 OF 44
Version: 1
Revised by: Z.Cui
Updated: 2008-8-4
activity diagram for support production (part3)-Specify new production methods-bp9.3

**Project Title:**

**Modelled by:** Shenling Project team

**Created:** 20/07/08

**Updated:** 2008-8-4

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**General Blocks**

- CIMOSA Domain
- Non-CIMOSA Domain
- Activity
- External Link
- Event

**Resources**

- Information
- HR
- Physical
- Finance

**Flow Control Logic**

- Conditional
- OR
- AND
- Sub-Process
- Chained Process
- Delay

**Flow Type**

- Flow of Resource
- Flow of Process
- Alternative Flow

**Operation Type**

- Direct Generation
- Direct Supportive
- Indirect Supportive

---

**Activity Diagram**

1. **Process Controller**
2. **New product designs**
3. **Draft production method**
4. **EA9.3.1 Inspect product designs**
5. **EA9.3.2 Specify production method**
6. **EA9.3.3 Document and print new production method**
7. **New product method**
8. **New production method**

**Source:**

**Destination:**
EA9.4.1 Verify existing production method

Observed differences in production methods

Improved production methods and solutions

EA9.4.2 Rectify production method

Production staff

EA9.4.3 Train production staff

Standardized production methods

Trained production staff

source

destination

Tech design

Process Controller

Product designs

Documented production method

CIMOSA Domain

Non-CIMOSA Domain

Activity

External Link

Event

Information

HR

Physical

Finance

Conditional

OR

AND

Sub-Process

Chained Process

Delay

Flow of Resource

Flow of Process

Alternative Flow

Direct Generation

Direct Supportive

Indirect Supportive

General Blocks

Resources

Flow Control Logic

Flow Type

Operation Type

activity diagram for support production (part4)-inspect production methods-bp9.4

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