

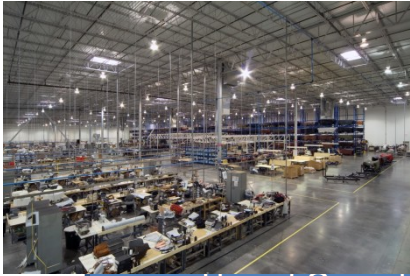
# Operation Management (OM) Introduction

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# Coordinates

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- **Study material** : will be updated regularly (is.muni.cz)
- **Seminar work** : will assigned after some theory will be presented. Accepted seminar work is the second condition to be admitted to exam)
-

# What is going on ?

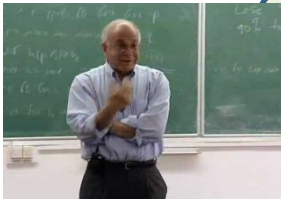
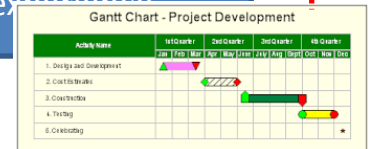


Use of Operations Management (OM) in external environment  
**(main target)**



General knowledge of OM methods acquired at university and long-standing experiences

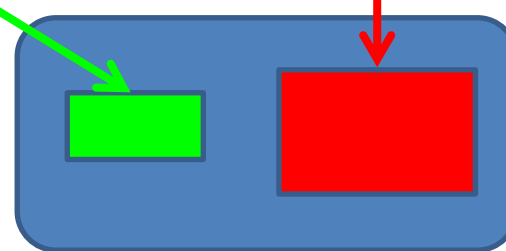
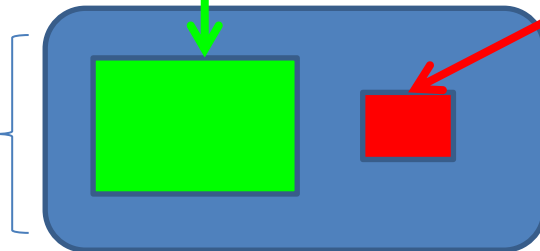
$$= \frac{\sum_{x_1} f_1(x_1) f_2(x_2, x_1)}{\sum_{x_1} f_1(x_1) \sum_{x_2} f_2(x_2, x_1)}$$



Knowledge of methods and experience from research and literature - **teachers**



Knowledge of methods and experience from outside world – **consultants, managers, ...**



Extent of knowledge

Extent of knowledge



**Synergy and put OM into practice**

# OM all around us (**vertical solutions**)

OM is the management of all processes used to design, supply, produce, and deliver valuable goods and services to customers



**IN**

**Processing-transformation**

**Out**

**TQM = Total Quality Management**

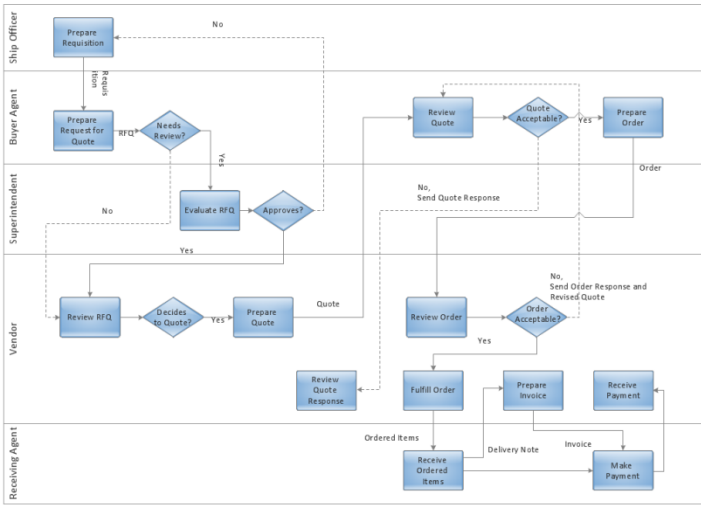
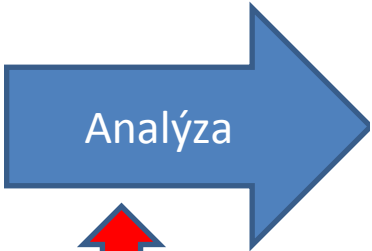
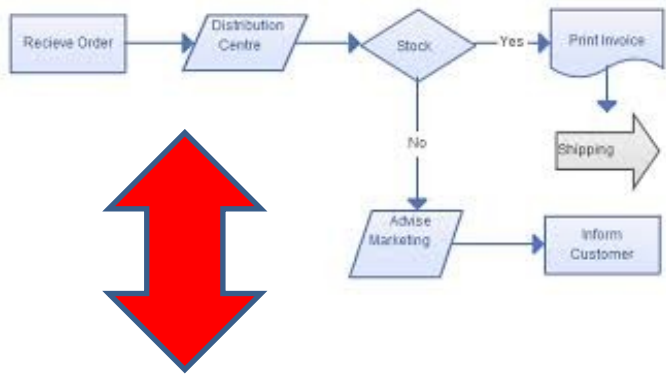
**ERP: Logistics, Transportation**

**MRP, JIT, APS, Lean Manufacturing, Little's law**

**ERP: Marketing, Selling, Invoicing, Payment,....**

# Some OM methods

- Theory of Constraints
- Balanced Scorecard (how to implement – use of this tools)
- Project Management methods (Critical Chain, SCRUM,...)
- Material Requirement Planning and Just-in-Time
- Advanced Planning and Scheduling
- Six Sigma – quality management (Ishikawa and Pareto synergy)
- Boston, SWOT and Magic Quadrant Matrices
- Little 's Law (relations between WIP, Throughput and Cycle time)
- Linear programming (cutting, blending,..)
- Business Intelligence principles
- Yield Management
- Kepner-Tregoe (support of decision making and MaxiMax, MaxiMax and Hurwitz)

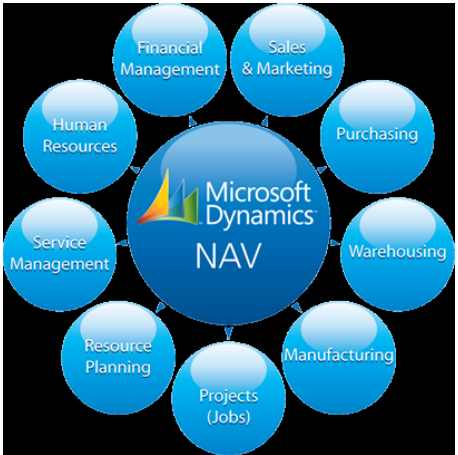


- Podíl na trhu, stabilita, růst
- Nulové defekty, včasné dodávky,...
- Logistika, štíhlá výroba, řízení kvality (six sigma)..
- Výuka, týmová práce,...

- TOC
- Ishikawa
- Kepner-Tregoe
- Linear Programming

Balanced Scorecard

Metody (vybrané)



**ERP =Enterprise Resource Planning System**



# Jazyky, které se budou používat



**Konec třetí 4 hodinové lekce = Modelové podniky (SZZ) !!!!!**

# OM main tool (bude krátce ukázáno v živé ukázce ERP NAV 2016)

2016)

The screenshot displays the Microsoft Dynamics NAV Classic interface. The main window is titled 'CRONUS International Ltd. - Microsoft Dynamics NAV Classic'. The left-hand navigation pane shows the 'Financial Management' section expanded, with sub-items like 'General Ledger', 'Chart of Accounts', 'Budgets', 'General Journals', 'Analysis & Reporting', 'Intercompany Postings', 'Reports', 'History', 'Periodic Activities', 'Cash M...', 'Receivable', 'Payable', 'Fixed Assets', 'Inventory', and 'Setup'. The main area is divided into several panes:

- Chart of Accounts:** A table showing account details.
 

No.	Name	Income/Balance	Account Type	Totaling	G... G... G...	Net Change	Balance
6620	Job Sales	Income Statement	Posting				
<b>6695</b>	<b>Total Sales of Jobs</b>	Income Statement	End-Total	6605..6695			
6710	Consulting Fees - Dom.	Income Statement	Posting		S.. N.. S..	-235 592,91	-235 592,91
6810	Fees and Charges Rec. - Dom.	Income Statement	Posting		S.. N.. M..	-961,03	-961,03
6910	Discount Granted	Income Statement	Posting			36 610,08	36 610,08
<b>6950</b>	<b>Sales of Service Contracts</b>	Income Statement	Begin-Total				
6955	Service Contract Sale	Income Statement	Posting		S.. N.. S..		
- 6110 Sales, Retail - Dom. - General Ledger Entries:** A table showing ledger entries.
 

Posting Date	Document Type	Document No.	G/L Account No.	Description	Department Code	G... G... G... P... B... P... Amount	Bal. A... Bal. T... Account No.	Entry No.
15.01.12	Credit Memo	104001	6110	Credit Memo 104001	SALES	S.. N.. R..	246,60 G..	2590
16.01.12	Invoice							2771
17.01.12	Invoice							2617
17.01.12	Credit Memo							2622
18.01.12	Invoice							2762
20.01.12	Credit Memo							2656
- 103018 The Cannon Group PLC - Posted Sales Invoice:** A detailed form for a sales invoice.
 

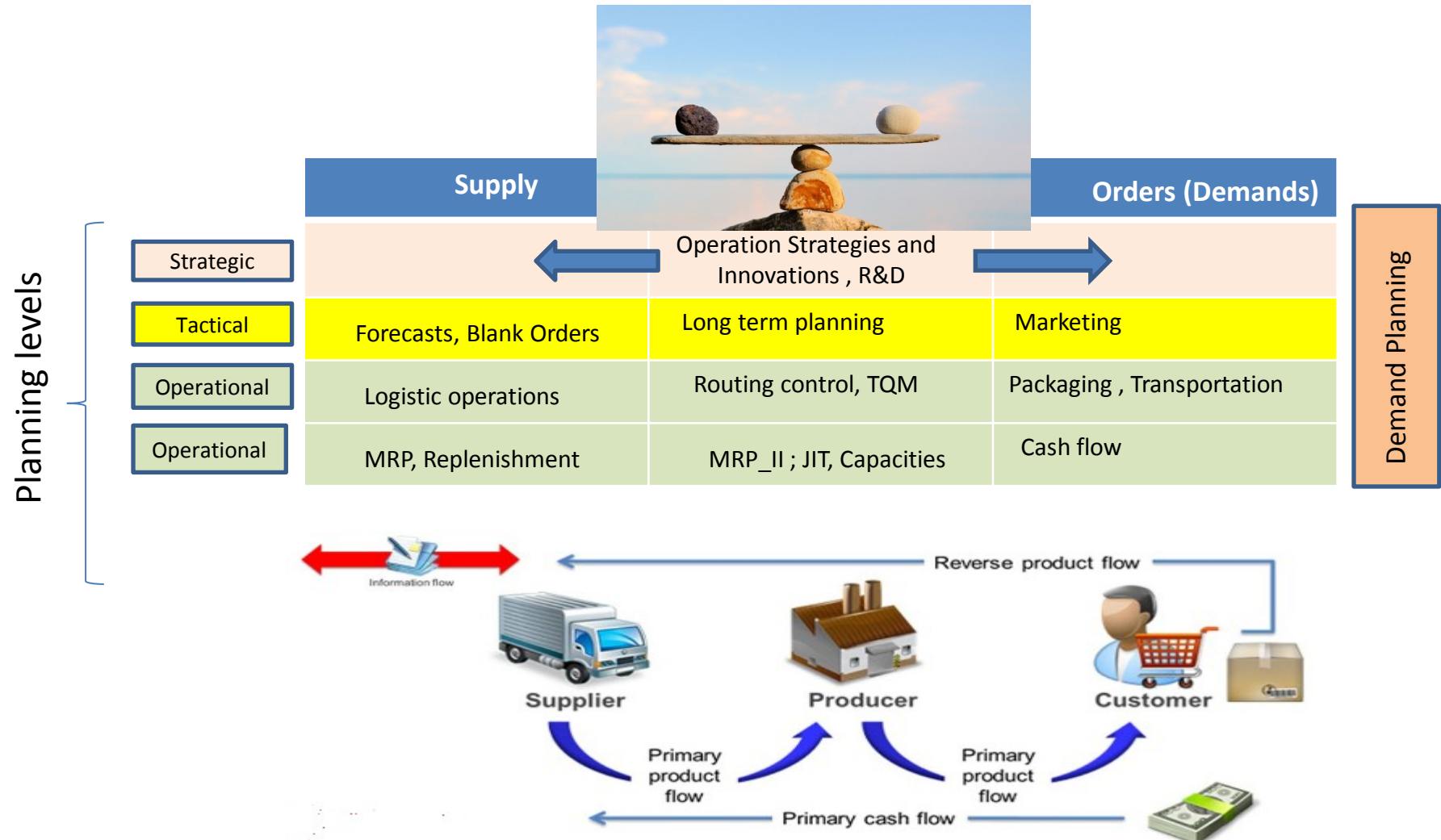
No. . . . . 103018		Posting Date . . . . . 18.01.12
Sell-to Customer No. . . . . 10000		Document Date . . . . . 18.01.12
Sell-to Contact No. . . . . CT000001		Quote No. . . . .
Sell-to Customer Name . . . . . The Cannon Group PLC		Order No. . . . . 6005
Sell-to Address . . . . . 192 Market Square		Pre-Assigned No. . . . .
Sell-to Address 2 . . . . .		External Document No. . . . .
Sell-to Post Code/City . . . . . B27 4KT Birmingham		Salesperson Code . . . . . PS
Sell-to Contact . . . . . Mr. Andy Teal		Responsibility Center . . . . . BIRMINGHAM
No. Printed . . . . . 0		

The bottom of the interface shows a list of items for the invoice:

T... No.	Description	Quantity	Unit of M...	Unit Price...	Line Amount E...	Line ...
I... 1964-W	INNSBRUCK Storage Unit/G.Door	10	PCS	292,00	2 920,00	
I... 70011	Glass Door	5	PCS	72,30	361,50	



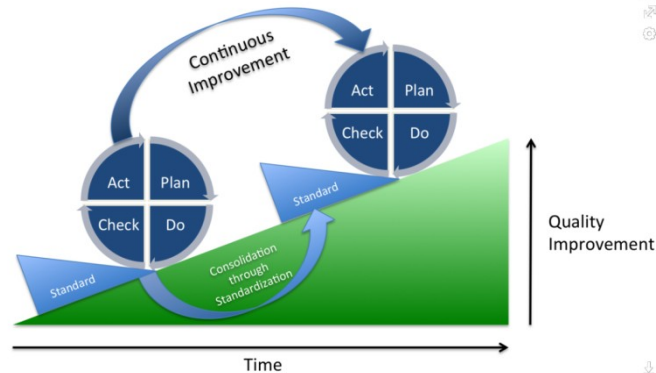
# Controlling processes in Supply Chain Management (SCM)



Used abbreviations : R&D –Research and Development; TQM–Total Quality Management; JIT- Just –In-Time; MRP\_II–Manufacturing and Resource Planning

Used abbreviations (slide number 3 ) : ERP - Enterprise Resource Planning ; APS – Advanced Planning and Scheduling

# Deming cycle (based on periodicity)



**Plan:** Define the problem to be addressed, collect relevant data, and ascertain the **problem's root cause** (e.g. by use of TOC=Theory of Constraints)

**Do:** Develop and implement a solution; decide upon a measurement to gauge its effectiveness.

**Check:** Confirm the results through before-and-after data comparison.

**Act:** Document the results, inform others about process changes, and make recommendations for the problem to be addressed in the next PDCA cycle.

# Explanation of some terms used in PDCA Deming Cycle simple example (**home study**) I.

- **Service level** : represents the expected probability of not hitting a **stock-out**. This percentage is required to compute the safety stock.

Intuitively, the service level represents a trade-off (compromise) between the cost of inventory and the cost of stock-outs (which incur missed sales, lost opportunities and client frustration among others).

$$p = \Phi \left( \sqrt{2 \ln \left( \frac{1}{\sqrt{2\pi}} \frac{M}{H} \right)} \right)$$

M - stock-out cost (often 3 time the gross margin)

H - carrying cost per unit for the duration of the lead time

1litr milk pack -> 1.50€ selling price, 10% margin -> =0,15 €. Lead time = 4 days.

The annual carrying cost is 1.50 € (the value is high because milk is a highly perishable product).

Stock-out cost ->3 time the gross margin, that is to say->M= 0.45€.

$H=(4/365) \times 1.5 \approx 0.0055$   $H \approx 0.0055$  . So  $p=98,5\%$

# Explanation of some terms used in PDCA Deming Cycle simple example (**home study**) II.

The screenshot shows the SAP Item Card for '1952-W OSLO Storage Unit/Shelf' in the 'Planning' tab. The 'Reorder Point' field is highlighted with a red box and contains the value 30. Other fields include Reorder Cycle, Safety Lead Time, Safety Stock Quantity (10), Reorder Quantity (20), Maximum Inventory (0), Minimum Order Quantity (5), and Order Multiple (0). The 'Include Inventory' checkbox is checked, and the 'Reserve' is set to 'Optional'.

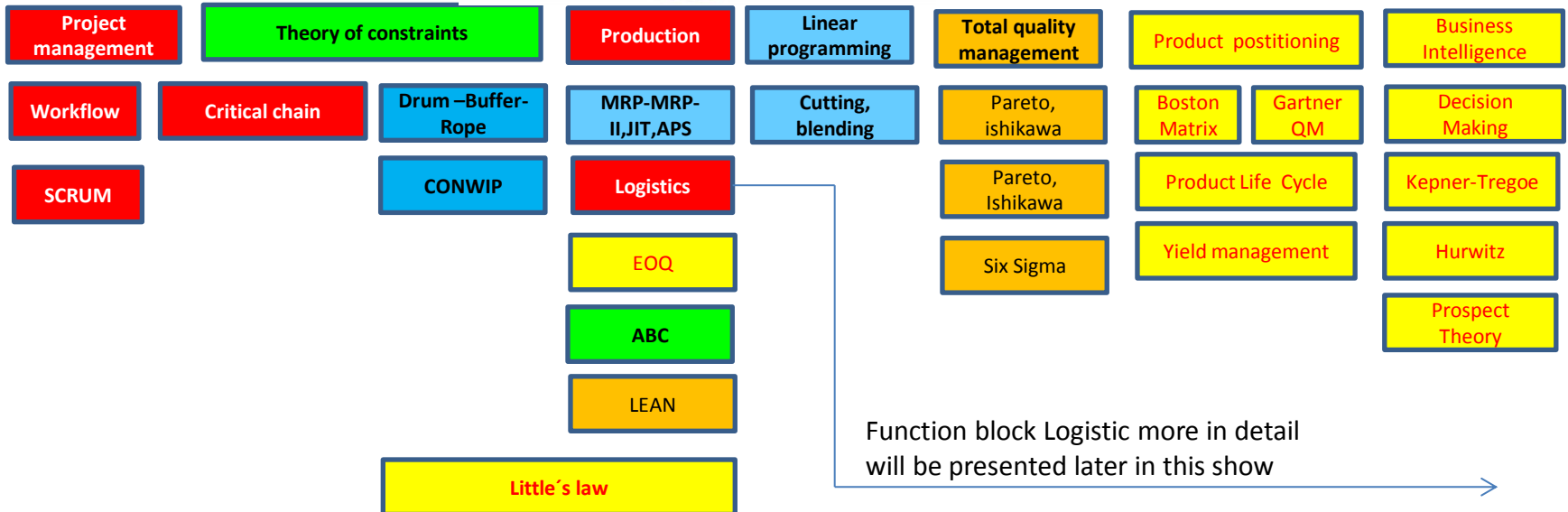
Field	Value
Reordering Policy	Fixed Reorde...
Include Inventory	<input checked="" type="checkbox"/>
Reserve	Optional
Order Tracking Policy	None
Stockkeeping Unit Exists	<input type="checkbox"/>
Critical	<input type="checkbox"/>
Reorder Cycle	
Safety Lead Time	
Safety Stock Quantity	10
Reorder Point	30
Reorder Quantity	20
Maximum Inventory	0
Minimum Order Quantity	5
Maximum Order Quantity	0
Order Multiple	0

Used abbreviations : EOQ – Economic Order Quantity – will be explained during this course

# Another point of view



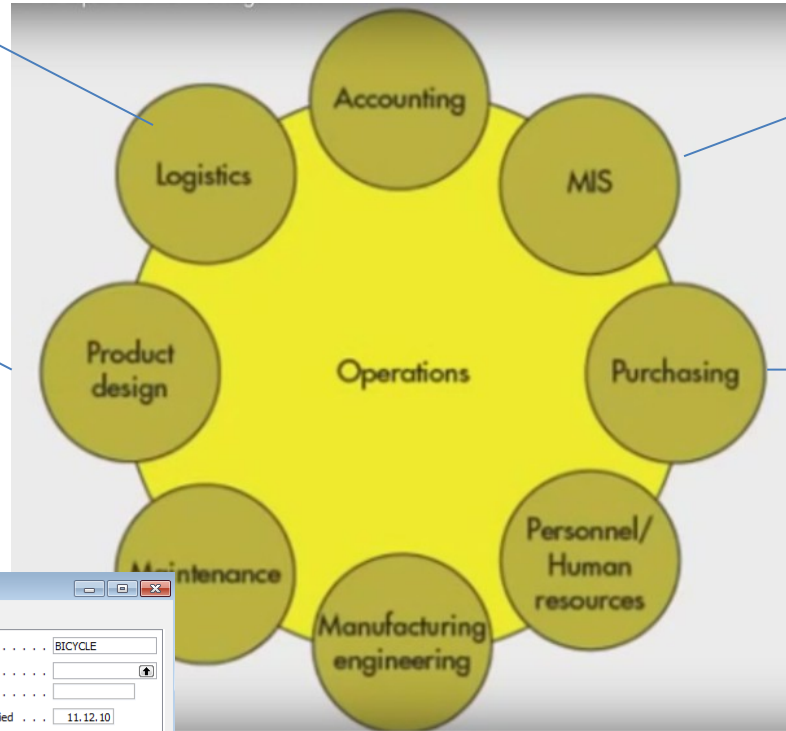
This will be modified in following **South African** project show (example of Balanced Score Card use )



Function block Logistic more in detail will be presented later in this show

# Operations

See next slide



**Manufacturing**

- Product Design
  - Items
  - Production BOM
  - Routings
  - Families
  - Exchange Production BOM Item
  - Delete Expired Components
  - Calculate Low-Level Code
- Reports
- Capacities
- Planning
- Execution
- Costing

1000 Bicycle - Production BOM

General

No. 1000 Search Name BICYCLE

Description Bicycle Version No.

Unit of Measure Code PCS Active Version

Status Certified Last Date Modified 11.12.10

Type	No.	Description	Quantity	Unit of Measu...	Scrap...	Routing Li...
Item	1000	Front Wheel	1	PCS	0	
Item	1200	Back Wheel	1	PCS	0	
Item	1300	Chain Assy	1	PCS	0	
Item	1400	Mudguard front	1	PCS	0	
Item	1450	Mudguard back	1	PCS	0	
Item	1500	Lamp	1	PCS	0	
Item	1600	Bell	1	PCS	0	
Item	1700	Brake	1	PCS	0	
Item	1800	Handlebars	1	PCS	0	
Item	1850	Saddle	1	PCS	0	
Item	1900	Frame	1	PCS	0	

Prod. BOM Component Functions Help

Bill of material

**Microsoft Dynamics NAV 2009 R2**

Version W1 6.0 R2 (6.00.32012)

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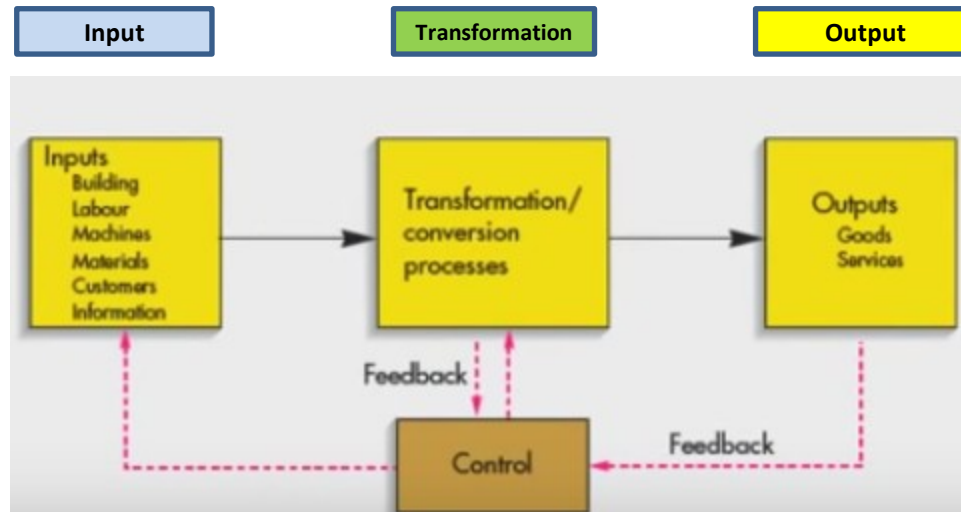
Warning: This computer program is protected by copyright law and international treaties.

Unauthorized reproduction or distribution of this program, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.

**Purchase**

- Planning
  - Items
  - Vendors
  - Requisition Worksheets
  - Recurring Req. Worksheet
  - Order Planning
  - Production Forecasts
  - Purchase Orders
  - Sales Orders
  - Blanket Sales Orders
  - Planned Production Orders
  - Firm Planned Prod. Orders
  - Transfer Orders
- Reports
- Documents
- Setup
- Order Processing
- Inventory & Costing
- Analysis & Reporting
- History
- Setup

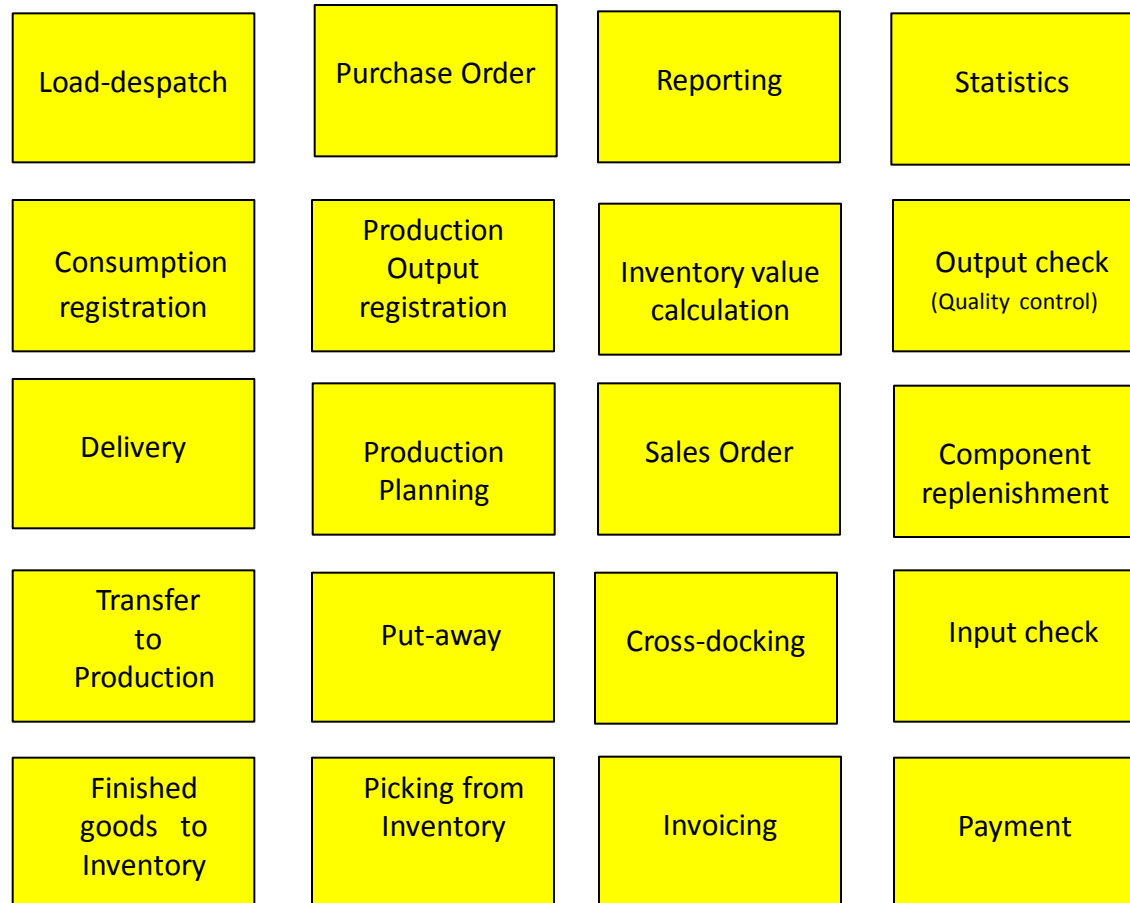
# Procedures-simplified



} Color agenda used later

# Processing

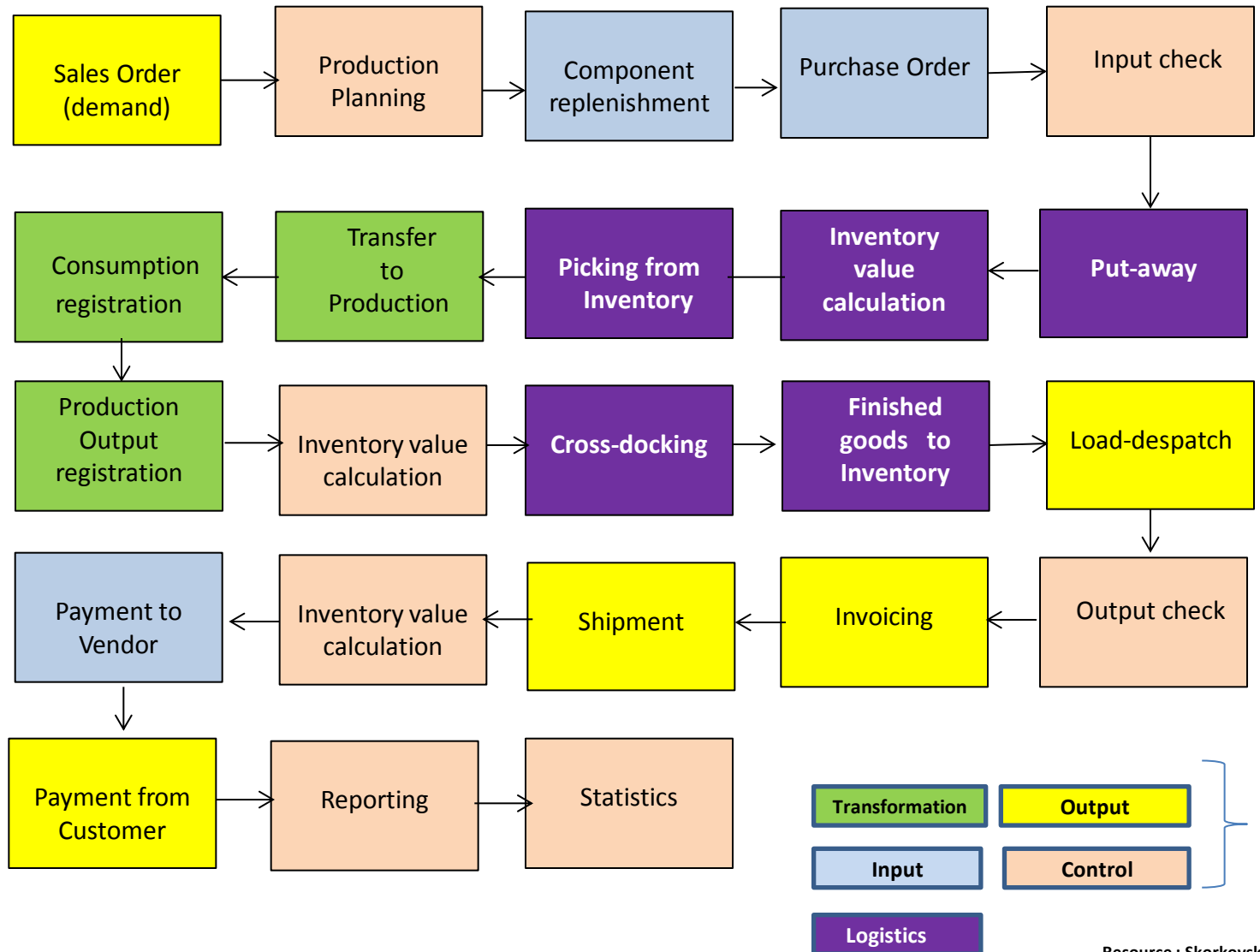
(not organised set of processes, will be presented also as a introduction to project management PWP presentation later)



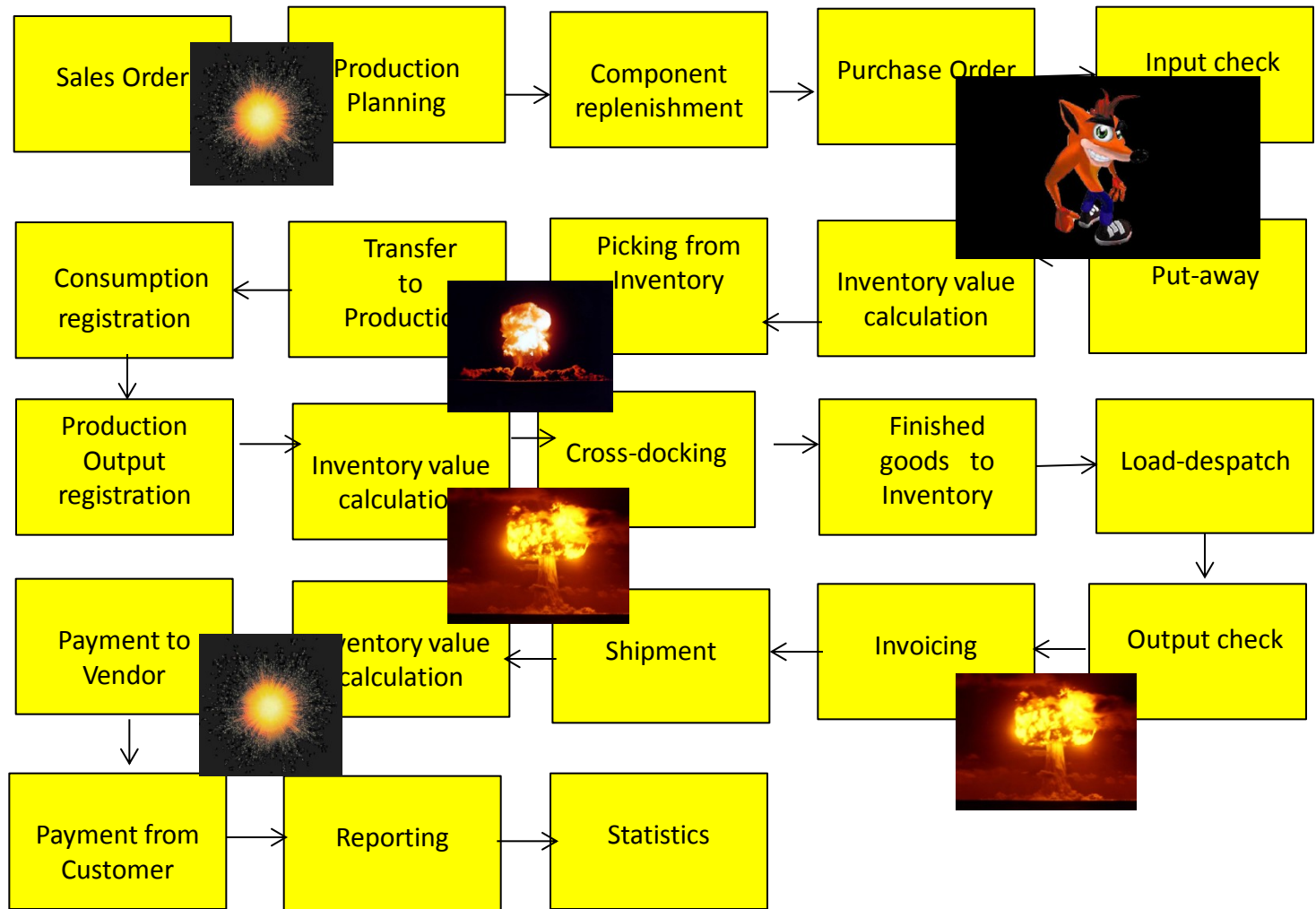


# Your main task

(to organize processes based on business logic)



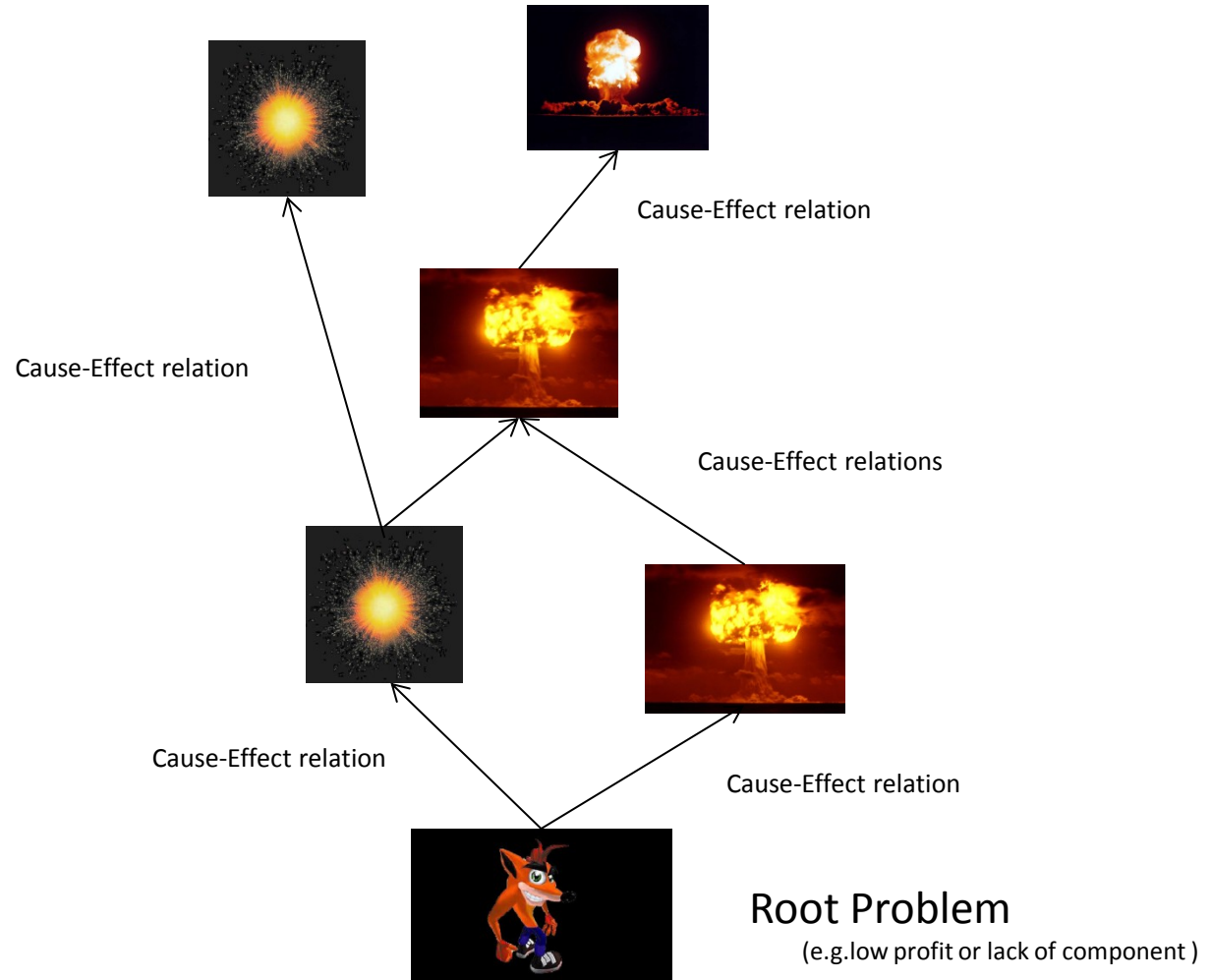
# Your main task (possible problems, bottlenecks, undesirable effects..)



Application of TOC ->thinking tools->Current Reality Tree – first stage

# Your main task

(Search - **HOW** ??? Measure impacts -**HOW** ??? and Destroy - **HOW** ???)



# Basic problem II-I. (over budget)

2012 - Budget

General Filters Options

Budget Name . . . . . 2012 ↑

Show as Lines . . . . . G/L Account ↑

Show as Columns . . . . . Period ↑

Code	Name	Budgeted Amount	26.03.12	02.04.12
<b>8100</b>	<b>Building Maintenance Expenses</b>			
▶ 8110	Cleaning	1 160,00	1 000,00	
8120	Electricity and Heating	1 120,00	1 000,00	
8130	Repairs and Maintenance	1 160,00	1 000,00	
<b>8190</b>	<b>Total Bldg. Maint. Expenses</b>	<b>3 440,00</b>	<b>3 000,00</b>	
<b>8200</b>	<b>Administrative Expenses</b>			
8210	Office Supplies	510,00	500,00	
8230	Phone and Fax	800,00	800,00	
8240	Postage	1 390,00	1 200,00	
<b>8290</b>	<b>Total Administrative Expenses</b>	<b>2 700,00</b>	<b>2 500,00</b>	
<b>8300</b>	<b>Computer Expenses</b>			
8310	Software	1 000,00	1 000,00	

1 7 31 3 12 ◀ ▶ Balance Functions Help

# \* Basic problem II-II. (over budget)

1015 London Postmaster - Purchase Invoice

General Invoicing Shipping Foreign Trade E-Commerce

No. . . . . 1015 ...  Posting Date . . . . . 26.03.12

Buy-from Vendor No. . . . . 10000  Document Date . . . . . 26.03.12

Buy-from Contact No. . . . . CT000066  Vendor Invoice No. . . . . Miki-0983

Buy-from Vendor Name . . . . . London Postmaster Order Address Code. . . . .

Buy-from Address . . . . . 10 North Lake Avenue Purchaser Code . . . . . RL

Buy-from Address 2 . . . . . Campaign No. . . . .

Buy-from Post Code/City N12 5XY  London  Responsibility Center . . . . . LONDON

Buy-from Contact . . . . . Mrs. Carol Philips Assigned User ID . . . . .

Status . . . . . Open

Type	No.	Description	Location Code	Quantity	Unit of Measure ...	Direct Unit Cost Excl...	Line Amount Excl. VAT	Line Disco...	Qty. to Assign
G/L Ac...	8110	Cleaning		10	HOUR	100,00	1 000,00		
G/L Ac...	8120	Electricity and Heating		20	HOUR	200,00	4 000,00		
G/L Ac...	8130	Repairs and Maintenance		30	HOUR	300,00	9 000,00		
G/L Ac...	8210	Office Supplies		10	HOUR	100,00	1 000,00		
G/L Ac...	8230	Phone and Fax		20	HOUR	200,00	4 000,00		
▶ G/L Ac...	8240	Postage		30	HOUR	300,00	9 000,00		

Generation or the real costs

Invoice Line Functions Posting Help

# \* Basic problem II-III. (over budget)

G/L Balance/Budget

Options

Date Filter . . . . . 01.03.12..31.03.12      Budget Filter . . . . . 2012

Department Filter . . . . .      Closing Entries . . . . . Include

Project Filter . . . . .

No.	Name	I... Debit Amount	Credit Amount	Balance/Budget (%)	Budgeted Debit Amount	Budgeted Credit Amount	Budgeted Amount
<b>8100</b>	<b>Building Maintenance Expenses</b>	<b>L...</b>					
8110	Cleaning	I... 1 000,00		100,0	1 000,00		1 000,00
8120	Electricity and Heating	I... 4 000,00		400,0	1 000,00		1 000,00
8130	Repairs and Maintenance	I... 9 000,00		900,0	1 000,00		1 000,00
<b>8190</b>	<b>Total Bldg. Maint. Expenses</b>	<b>L... 14 000,00</b>		<b>466,7</b>	<b>3 000,00</b>		<b>3 000,00</b>
<b>8200</b>	<b>Administrative Expenses</b>	<b>L...</b>					
8210	Office Supplies	I... 1 000,00		200,0	500,00		500,00
8230	Phone and Fax	I... 4 000,00		500,0	800,00		800,00
8240	Postage	I... 9 000,00		750,0	1 200,00		1 200,00
<b>8290</b>	<b>Total Administrative Expenses</b>	<b>L... 14 000,00</b>		<b>560,0</b>	<b>2 500,00</b>		<b>2 500,00</b>
<b>8300</b>	<b>Computer Expenses</b>	<b>L...</b>					
8310	Software	I...			1 000,00		1 000,00

1 7 31 3 12      Account      Functions      Help

Other problems (examples which could be solved are mentioned in PWP Project activities (Činnosti spojené s projektem))

# Tuition –plan-theory

- OM-intro – done (this slide show)
- Real project-South African client (wholesale)
- Theory of constraints
- Critical chain and project management
- Quality management I. (Pareto+ Ishikawa)
- Quality management II. (Six Sigma, Kaizen, Poka Yoke)
- Business metrics (use of matrices – Boston, Gartner MQ)
- Balanced Score Card
- DBR , CONWIP
- Decision making (Kepner-Tregoe methodology,..)
- P&Q analysis (mix of products)
- Business Intelligence – intro and concept
- Little´s law
- Yield management – intro to concept
- Linear programming – concept and use
- Business Intelligence
-