Governance of Manufacturing IT

Agenda

Who should take care of IT in the plants?

1. Introduction
2. Response **demographics**
3. How **mature** are the **IT landscapes** in the plants?
4. How **professional** are the **support processes**?
5. How **satisfied** are the **users**?
6. How well do **plants perform**?
7. Which **governance model** provides the best results?
8. Which **role** should be **accountable** for IT in the plants?

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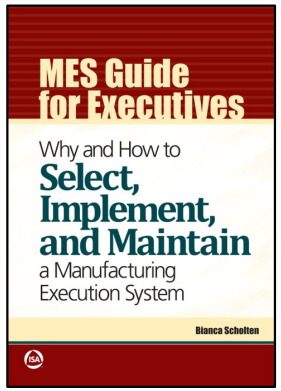
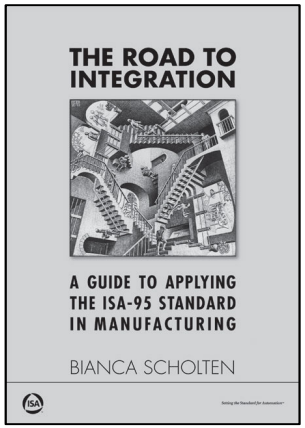
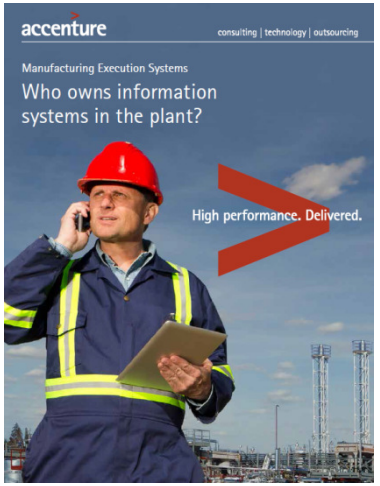
Presenter: Bianca Scholten, Accenture

- Bianca Scholten is a principal consultant with more than fifteen years of experience in the manufacturing industry.
- She has guided management of many manufacturing enterprises through the definition of their manufacturing IT strategy, defining the As Is and the To Be situation, developing a roadmap based on the company's strategy, defining the business case and selecting the MES and other solutions, establishing a governance structure, etc.
- Bianca is also an award winning author and an active member of the SP95 committee for Enterprise-Control System integration.

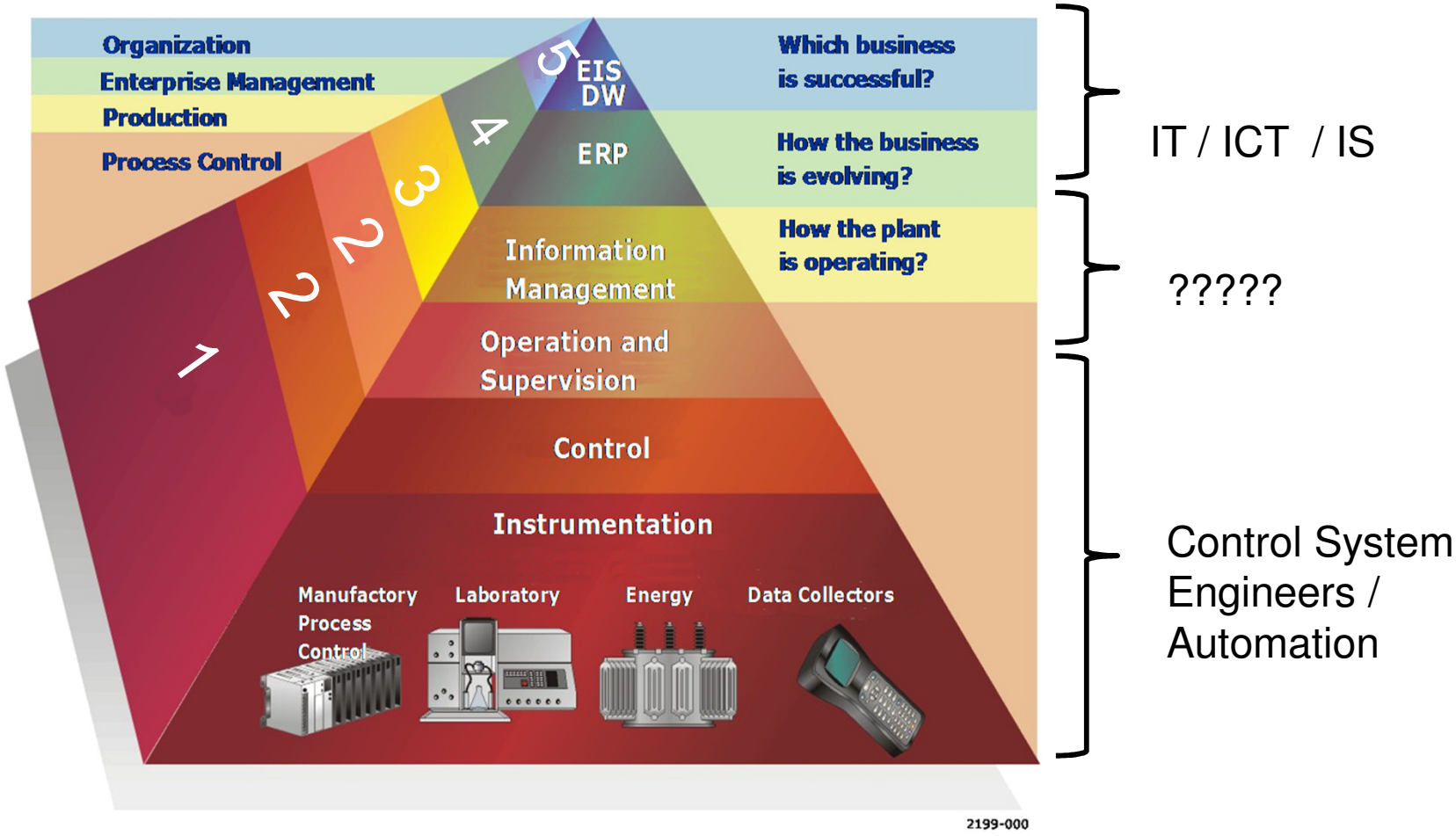






Who should take care of IT in the plants?

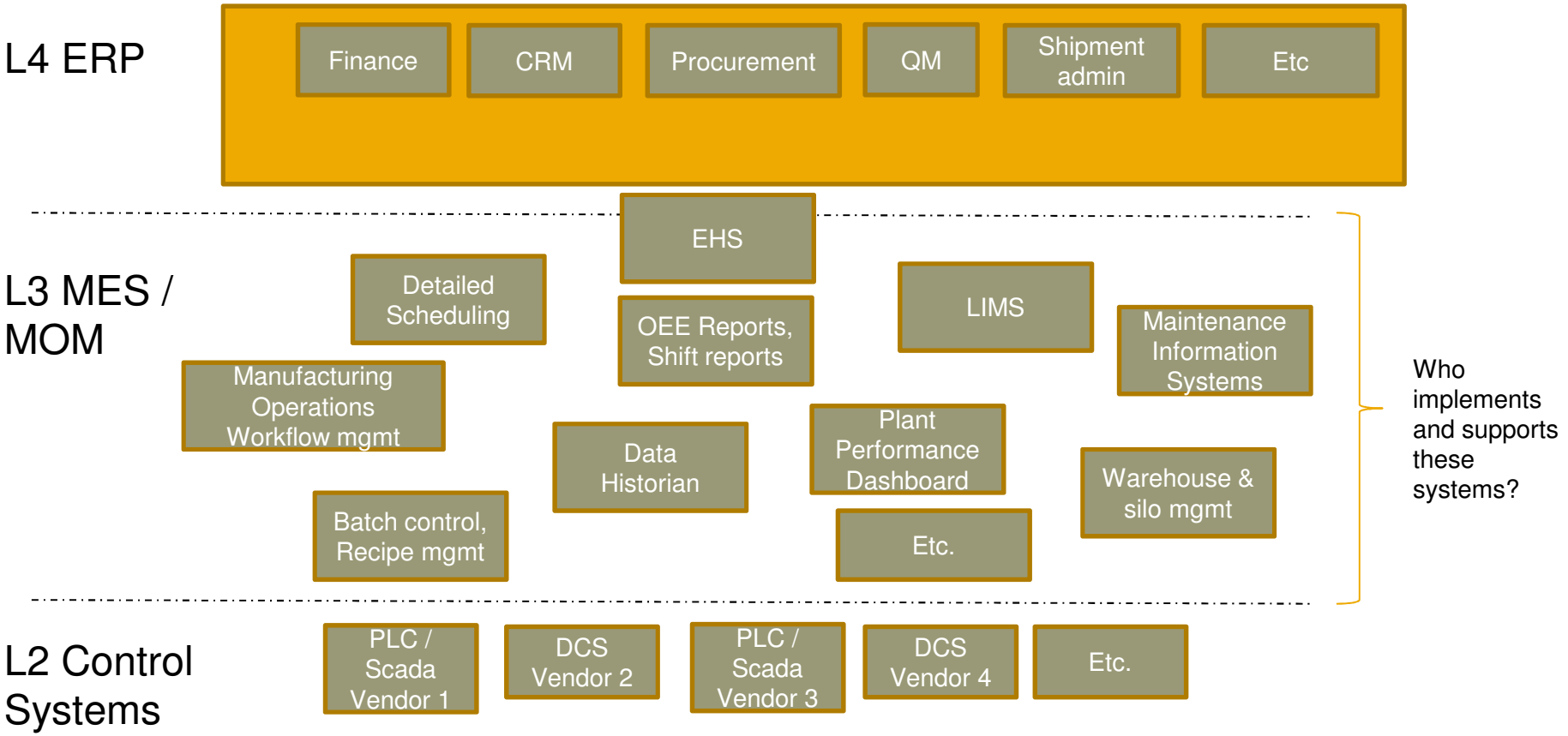
No Man's Land



Who should take care of IT in the plants?

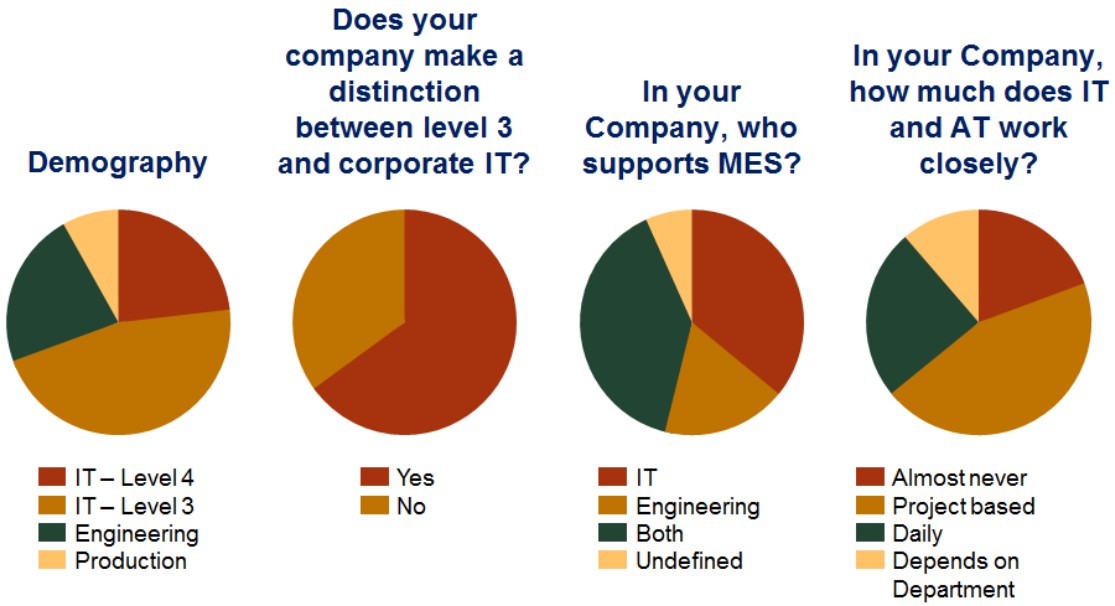
ERP= Enterprise Resource Planning
MES= Manufacturing Execution System
MOM = Manufacturing Operations Management

Level 3 IT tools



Introduction

Informal Research by Bianca Scholten in 2007



- A plant manager wanted to purchase an MES solution and went to the engineers for help.
- The **engineers sent her to the IT department. IT told her to go to engineering**.
- The plant manager wondered: who should support IT in my plant?
- 2007: As a free lance author, Bianca Scholten did some informal research.
- 25 respondents with backgrounds in IT, engineering and manufacturing.
- **Topic** turned out to be something **companies struggle with**
- Many different governance models exist, but it's not clear which one works best
- **Should IT support IT in the plants? Or engineering? Or some dedicated competence center?**
- **Should CIO be accountable? COO? ...?**

Research 2007

Opinions collected in interviews in 2007

Neither engineering nor IT can offer enough for effective MES functionality.

The biggest challenge for an IT person is to think like a production person.

In my opinion, IT and engineering do not collaborate in our company.

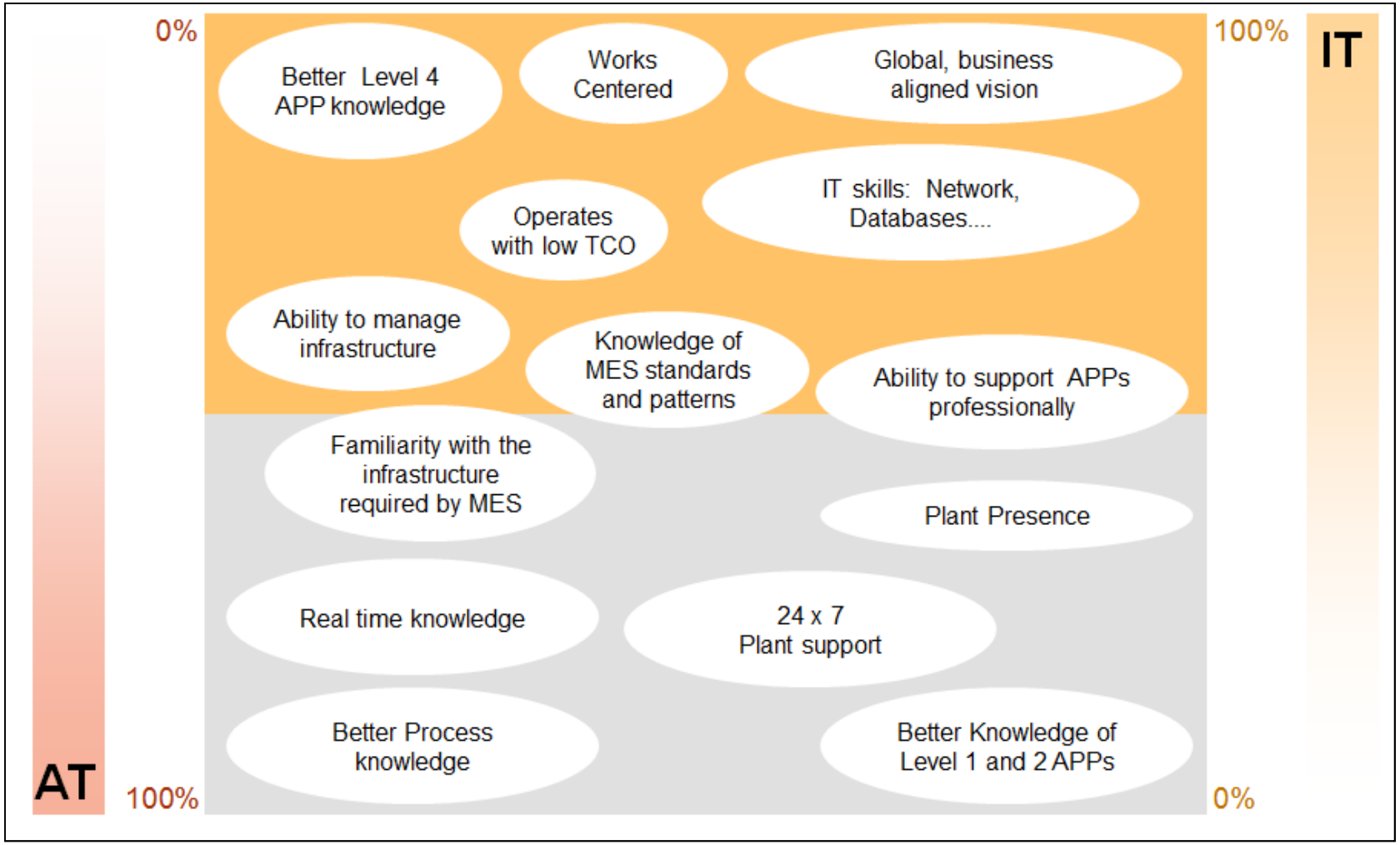
IT is not trained to help blue collar personnel and give support for a 24 hours/seven days environment. To shut down an ERP system during a weekend for maintenance is OK for an Office, but not in production.

Generally speaking, there is not enough cooperation. Nevertheless, it is become clearer that there is a need for a separate manufacturing IT entity.

Source: Bianca Scholten – IT or Engineering… Which of them should support MES ?

IT versus AT (Automation Technology)

Different teams have different skills



2013 Accenture benchmark study: Governance of Manufacturing IT

Central question: Who should support the IT tools in the plants?

- **'Who', meaning:**
  - Which team (IT, engineering/automation, competence center, operational excellence team, …)
  - Final accountability (COO? CIO? Site Manager? ….)
- **'IT tools in the plants', meaning**
  - ISA-95 functionality: MES, historians, batch systems, detailed scheduling, workflow, maintenance, quality, inventory, EHS)
- **'Support', meaning:**
  - during Build & Implement phase
  - 2nd line during Run and Maintain phase

2013 Accenture benchmark study: Governance of Manufacturing IT

Method, steps:

1. Understand Current Governance models
2. Understand Current Accountable roles
3. Understand Current Maturity of Plant IT landscape
4. Understand Current Level of User Satisfaction
5. Understand Current Performance of Plants
6. Find relationships between all the above mentioned characteristics
7. Deduct from this governance model & accountable role with
    - ***Highest maturity of Manufacturing IT landscape***
    - ***Highest maturity of support processes***
    - ***Highest level of user satisfaction***
    - ***Highest performance improvements of plants***

2013 Accenture benchmark study: Governance of Manufacturing IT

Method: Structured Interviews with 'business' representatives and with IT/AT representatives

Application Category	Applications currently in use	In place since	Maturity	Integration	User Experience	Application supported by	Comments
MES	Kronos, Wonderware MES 4.0, PDT, Excel OEE	< 5 y	Varies a lot per plant	Integrated with 1 or just a few systems	Varies a lot per site	Local engineering / automation	
Historian	Wonderware	5-10 y	COTS template	Integrated with 1 or just a few systems	Satisfied	Local engineering / automation	
Batch mgmt system	WRMS (Recipe Mgt), Inbatch, PDT	5-10 y	Home built	Integrated with 1 or just a few systems	Slightly satisfied	Local engineering / automation	WRMS only outsourced to external supplier.
Detailed production scheduling	MS Excel, Preactor	< 5 y	COTS, local implementation	Integrated with 1 or just a few systems	N..a.	Local engineering / automation	System not fully deployed yet - still in prototyping phase
Workflow	Nintex	< 5 y	COTS, local implementation	Stand alone	Slightly satisfied	Corporate IT team	
LIMS	Labware	5-10 y	COTS, local implementation	Integrated with 1 or just a few systems	Not satisfied	Varies a lot per site	
Mainten-ance mgmt	Shire	5-10 y	COTS, local implementation	Stand alone	Not satisfied	Local engineering / automation	
WMS	Pallet Tracker - (bolt-on to JDE)	5-10 y	Home built	Integrated with 1 or just a few systems	Slightly satisfied	Corporate IT team	Operations are not satisfied but materials control are partly satisfied.
EHS	Wonderware MES and Historian	< 5 y	COTS template	Varies a lot per plant / site	Slightly satisfied	Local engineering / automation	

2013 Accenture benchmark study: Governance of Manufacturing IT

Method: Structured Interviews with 'business' representatives

Availability of good IT tools is essential for my plant(s) to achieve high performance	Totally agree
The best team to support IT in my plant(s) is	Local engineering/autom.
The team actually supporting IT applications in the plant(s) is	Local engineering/autom.
This has been the case since	As far as I can remember
We have realized significant improvements in OEE in the … years	Past 2 yrs
We have realized significant improvements in efficiency of personnel in the plant(s)	Not yet, still a lot of room for improvement.
We have realized significant improvements in reduction of cost of quality	Not yet, still a lot of room for improvement.
We have realized significant improvements in reduction of inventory cost	Past 2 yrs
We have realized significant improvements in reduction of cost of energy / utilities	Not yet, still a lot of room for improvement.
In my opinion the following role should have final accountability for support of IT applications in the plant(s)	COO (Chief Operations Officer)
A company wide approach to IT applications in the plants is preferred over every local plant developing and implementing its own solutions	Agree

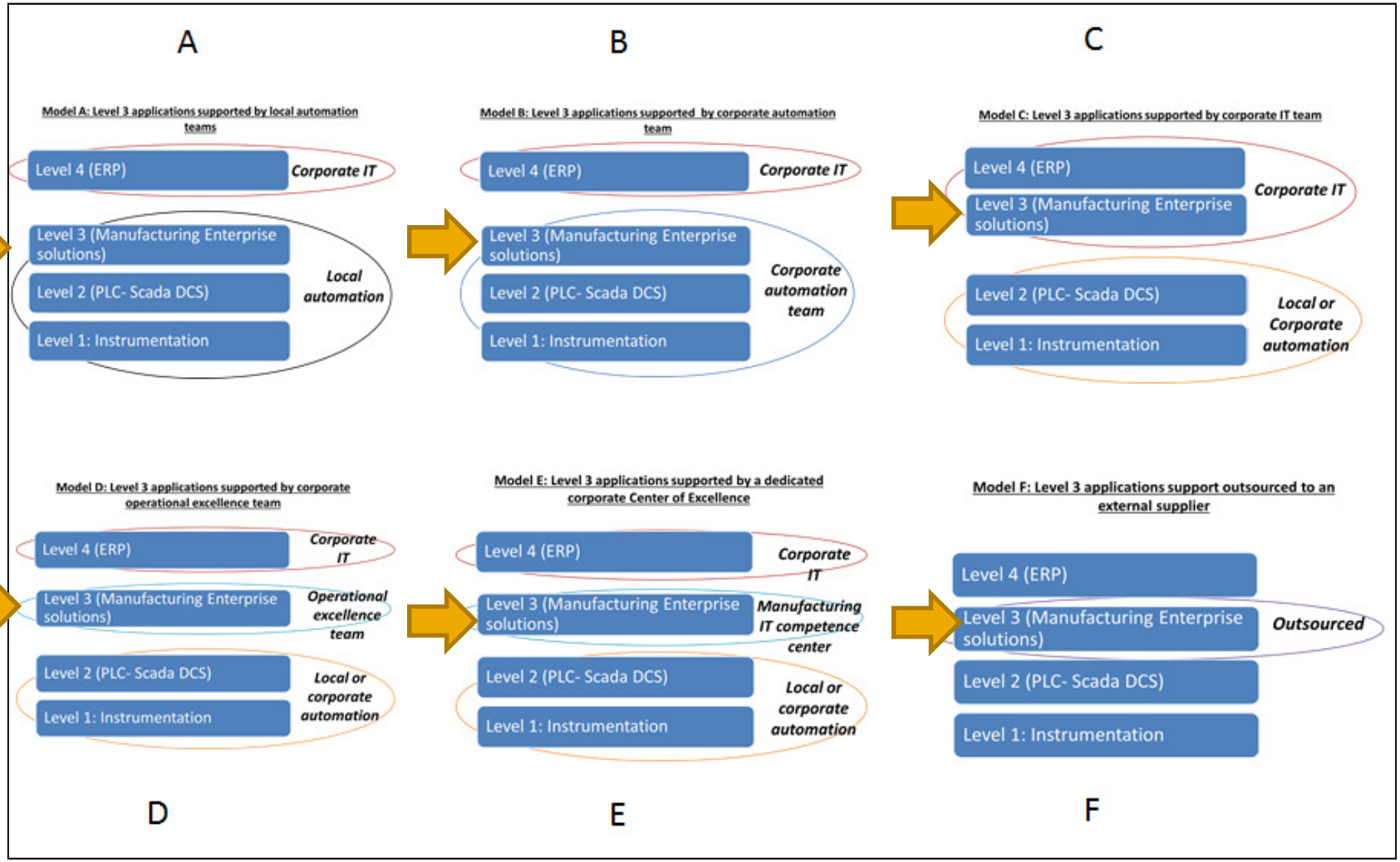
2013 Accenture benchmark study: Governance of Manufacturing IT

…and with IT/AT representatives

1b Questionnaire	Answers
Which model comes closest to the model your company uses for the development and extensions of level 3 applications?	D (the drive for MES comes from the local operational excellence team.)
Which model comes closest to the model your company uses for the daily support of level 3 applications?	A (This refers to field support only)
In your company, which role has the final accountability for IT in the plants?	CIO
To what extend is the landscape of software applications standardized across sites?	Partly (Only Recipe management and LIMS are somewhat standerdized.)
What's the level of visibility of the cost for support of IT in the plants?	Hardly visible
There is a clear, cross sites, manufacturing IT strategy available for the plants	Agree (We are starting to work on this on a divisional level now)
There are metrics in place to measure value from the IT tools in the plants	Disagree
There's an inventory list available of IT related risks relevant for the plants	Varies a lot per plant / site
Performance of IT tools (downtime, issue log, etc), used by the plants is monitored based on a structured approach	Agree
IT sourcing decisions are made based on a formal sourcing strategy	Disagree
Responsibilities for security of IT in the plants are clearly defined and audits take place on a regular basis	Agree
There is a formal training and personnel development plan available for employees involved in support of the IT tools used in the plants	Disagree
For employees providing support on the IT tools in the plant, a formal evaluation process is in place concerning their IT tasks	Agree
We have a structured method in place to measure user satisfaction	Varies a lot per plant / site
There is a formal change mgmt procedure in place for the plants to request changes and extensions to the existing IT landscape	Agree
Relationships between the plants and the support organization are based on	Trust
In case there is a corporate support center for manufacturing IT, what decision power does this team have?	N.a.
In my opinion the following role should have final accountability for IT in the plants?	CIO

2013 Accenture benchmark study: Governance of Manufacturing IT

Reference Models (based on practical examples from Accenture clients)



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Demographics

Intermediate Status: 20 interviews conducted

- Mostly **Manufacturing IT representatives** (e.g. head control systems engineering, MES application manager, Competence center leader, etc.)
- Still **looking for more site / plant managers**, business representatives to participate
- Still **looking for more CIOs** to participate
- **Yellow**: these interviews have not been processed in the intermediate results that are presented in this deck.

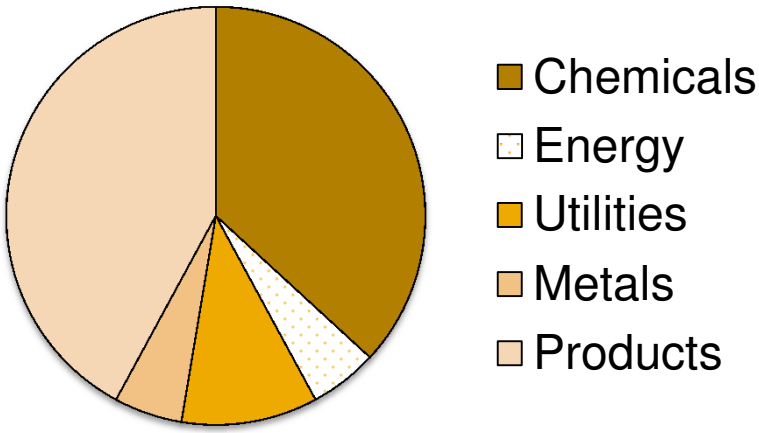
Nr	Industry	Role	Excel tool validated
1a	Chemicals	Plant Manager	
1b	Chemicals	Operational Excellence lead	
2a	Utilities	Manufacturing IT Lead	
3a	Products	Manufacturing IT Lead	
4a	Products	Manufacturing IT Lead	
5a	Products	Manufacturing IT Lead	
6a	Chemicals	VP Operational Excellence	
6b	Chemicals	CIO delegate	
6c	Chemicals	Manufacturing IT lead	
7a	Chemicals	Manufacturing IT Lead	
8a	Chemicals	Manufacturing IT Lead	
9a	Chemicals	IT lead	
9b	Chemicals	Site manager	
9c	Chemicals	CIO	
10a	Steel / Mining	Manufacturing IT Lead	
10b	Steel / Mining	Manufacturing IT Lead	
11a	Chemicals	Manufacturing IT Lead	
11b	Chemicals	Operational Excellence lead	
12a	Chemicals	Manufacturing IT Lead	
13a	Chemicals	Manufacturing Operations director	
14a	Products	Manufacturing IT Lead	
15a	Products	Manufacturing IT Lead	
16a	Utilities	Manufacturing IT Lead	
17a	Steel/Mining	Manufacturing IT Lead	
18a	Chemicals	Manufacturing IT Lead	
18b	Chemicals	Plant Manager	
19a	Products	Manufacturing IT Lead	
20a	Energy	Plant Manager	
20b	Energy	Manufacturing IT Lead	
21a	Products	Manufacturing IT Lead	

Response demographics

Company profiles: Industry

Industry

- Total nr of companies interviewed up till now: **19**
  - Energy/Oil/Gas/Terminals: **1**
  - Steel/Metals/Mining: **1**
  - Utilities: **2**
  - Chemicals: **7**
  - Products (Food & beverage, life sciences, etc.): **8**



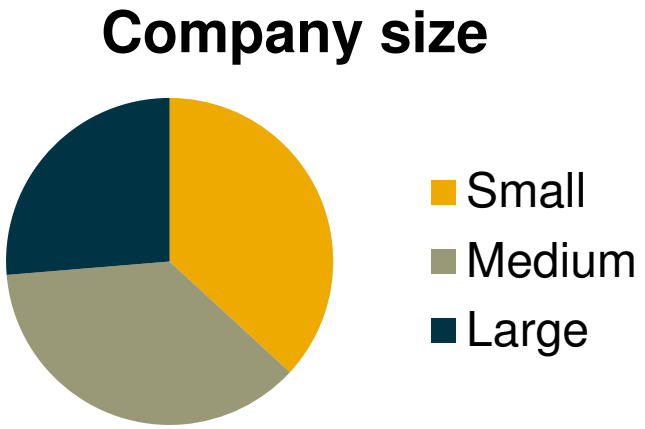
Response demographics

Company profiles: Size

Company Size

- **7** Small companies
- **7** Medium companies
- **5** Large companies

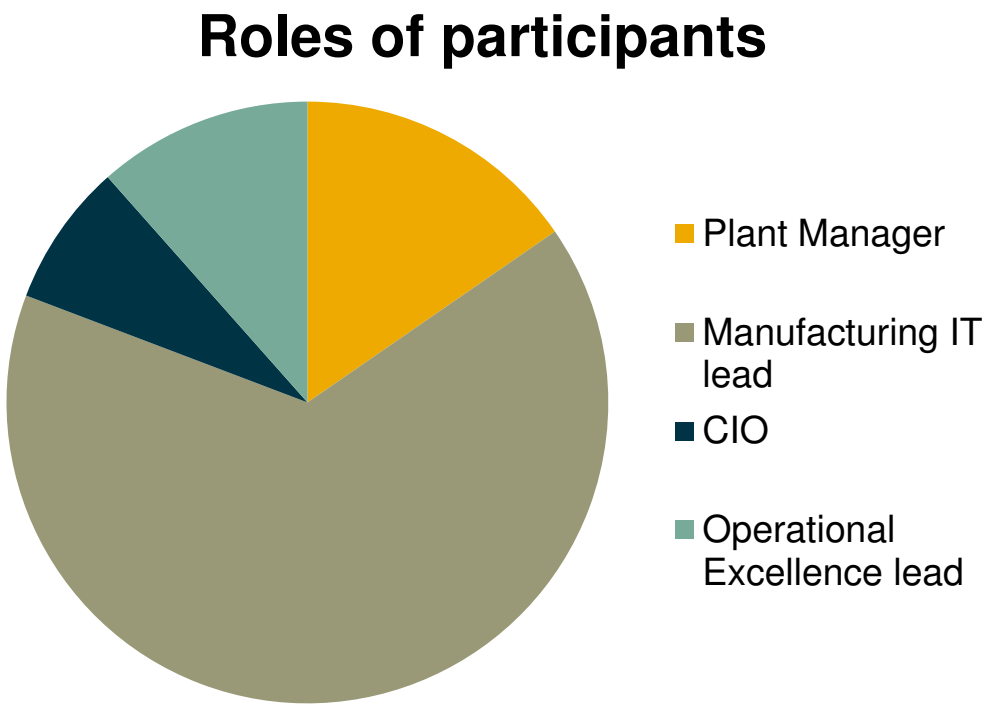
	Small	Medium	Large
# employees	<25000	25000 to 75000	>75000
# manufacturing sites	<25	25-75	>75
# countries	<10	10 to 75	>75
Revenue 2012	<1 Billion	1 to 10 Billion	> 10 Billion



Response demographics

Roles of interviewees

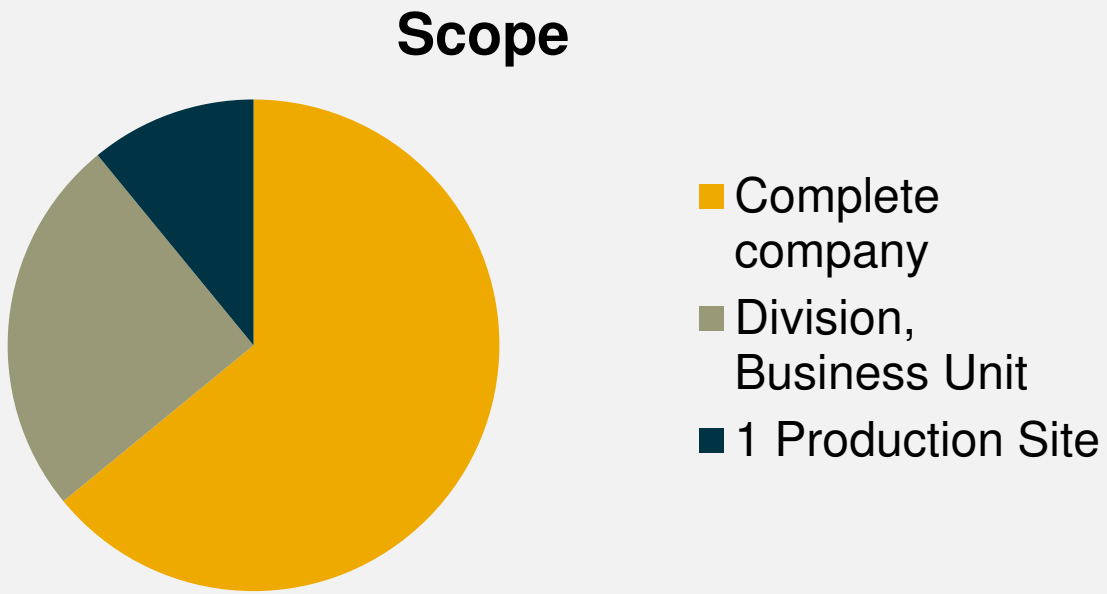
- Total nr of participants: **26**
- Nr of companies with more than 1 participant: **6**
- Roles of participants:
  - Plant Manager (incl. site manager, operations manager): **4**
  - Manufacturing IT lead (incl. global engineering lead, local automation lead, manufacturing IT competence center lead): **17**
  - CIO/ IT director: **2**
  - VP Operational Excellence / OpEx Lead: **3**



Response demographics

Interview scope (note: more than 1 person per company)

- Complete company: **15**
- Division / business unit of the company: **7**
- 1 Site / 1 Plant: **4**



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The current IT Landscape in the Plants

Intermediate results

Which vendors did we encounter up till now?

Category	Supplier	Total
MES	Invensys / Wonderware Archestra	7
	Kronos MES	2
	Apriso FlexNet	2
	Simatic IT	5
	GE IP Plant Applications	4
	PSI Metals	1
	Aspentech	1
	Superscada	1
	MS Office (Excel, paper prints, Access)	4
	Werum PAS X	2
		0
		0
Data Historian	Wonderware Historian, Insql	2
	OSI soft PI	6
	Aspentech IP21	5
	GE Ihistorian	1
	PSI Metals	1
	Simatic IT Historian	1
	Emerson	1
	Yokogawa	1
	Werum Pas X	1
		0
		0
	MS Office (Excel, paper prints, Access)	0
Batch system	Wonderware InBatch	2
	Simatic Batch	3
	Proleight BrewMaxx	1
	Emerson DeltaV	1
	Emerson	1
	Yokogawa	1
		0
	MS Office (Excel, paper prints, Access)	2

Category	Supplier	Total
		0
Detailed Scheduling	PreActor	1
	GMS Generation Management	1
	Infor	1
	Oracle AS Scheduler	1
	MS Office (Excel, paper prints, Access)	7
	GE IP Plant Applications	2
	Wonderware Archestra	1
	SAP APO	2
	Broner	1
	JDA	1
	Quintiq	1
	PSI Alpha planner	1
	Hyperion	1
		0
		0
		0
Work flow	Sharepoint Nintex	1
	SAP PM	1
	Simatic IT Unilab	1
	MS Office (Excel, paper prints, Access)	0
	Werum PAS X	2
		0
		0
		0
LIMS	LabWare	3
	Simatic IT Unilab	1
	SAP QM	2
	Oracle QM	1
	Starlims	1
	MS Office (Excel, paper prints, Access)	3
	Simatic IT MES	2
	Labvantage	1
		0

The current IT Landscape in the Plants

Intermediate results

Which vendors did we encounter? (Continued)

Category	Supplier	Total
		0
		0
Maintenance	Shire Systems	1
	SAP PM	10
	Maximo	3
	MS Office (Excel, paper prints, Access)	2
	Meridium	1
	Ivara	1
	Ultimo	1
		0
		0
WMS, Silo mgmt	Apriso	1
	Wonderware Archestra	1
	Simatic IT	1
	SAP WM	7
	MS Office (Excel, paper prints, Access)	3
	Emerson	1
	Yokogawa	1
		0
		0
		0
		0
		0
EHS	Wonderware MES & historian	1
	SAP EHS	1
	GE Gensuite	2
	BSI Entropy	1
	MS Office (Excel, paper prints, Access)	4

Preliminary conclusion

- Very large variety of vendor solutions

Statement:

- Challenging for internal and external suppliers (e.g. system integrators) to provide mature services

Statement:

- Consolidation is needed within the companies and in the market to reduce cost and improve service level

How Mature is the IT Landscape in the Plants?

What we'll learn from the study

- Average application maturity level:
  - Home built
  - COTS local implementation
  - COTS template
  - Varies a lot per site
- Average maturity level per application category:
  - MES
  - Data Historian:
  - Batch Control System
  - Detailed Scheduling
  - Workflow:
  - LIMS
  - Maintenance mgmt
  - WMS
  - EHS

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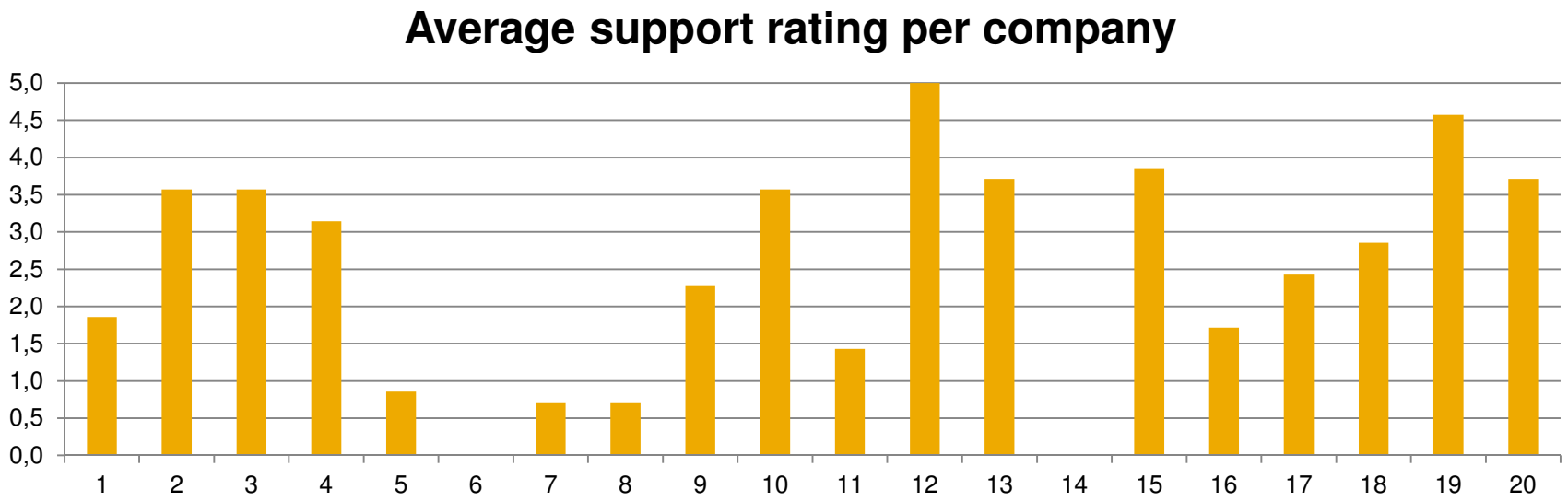
How Professional are the Support Processes?

Intermediate results

Maturity of support processes



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How Satisfied are the Users?

What we'll learn from the study

- Average 'user experience'
  - Not satisfied
  - Varies a lot per plant
  - Slightly satisfied
  - Satisfied
  - Very satisfied

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How well do Plants Perform?

What we'll learn from the study

- To what extend have plants improved their performance (key KPI's such as OEE, energy consumption, cost of quality, cost of inventory,…)
  - In the past 2 years
  - In the past (more than) 5 years
  - Not yet, there's still a lot to improve
  - Other

- *Goal: try to find the relation with how long a specific governance model has been in place*

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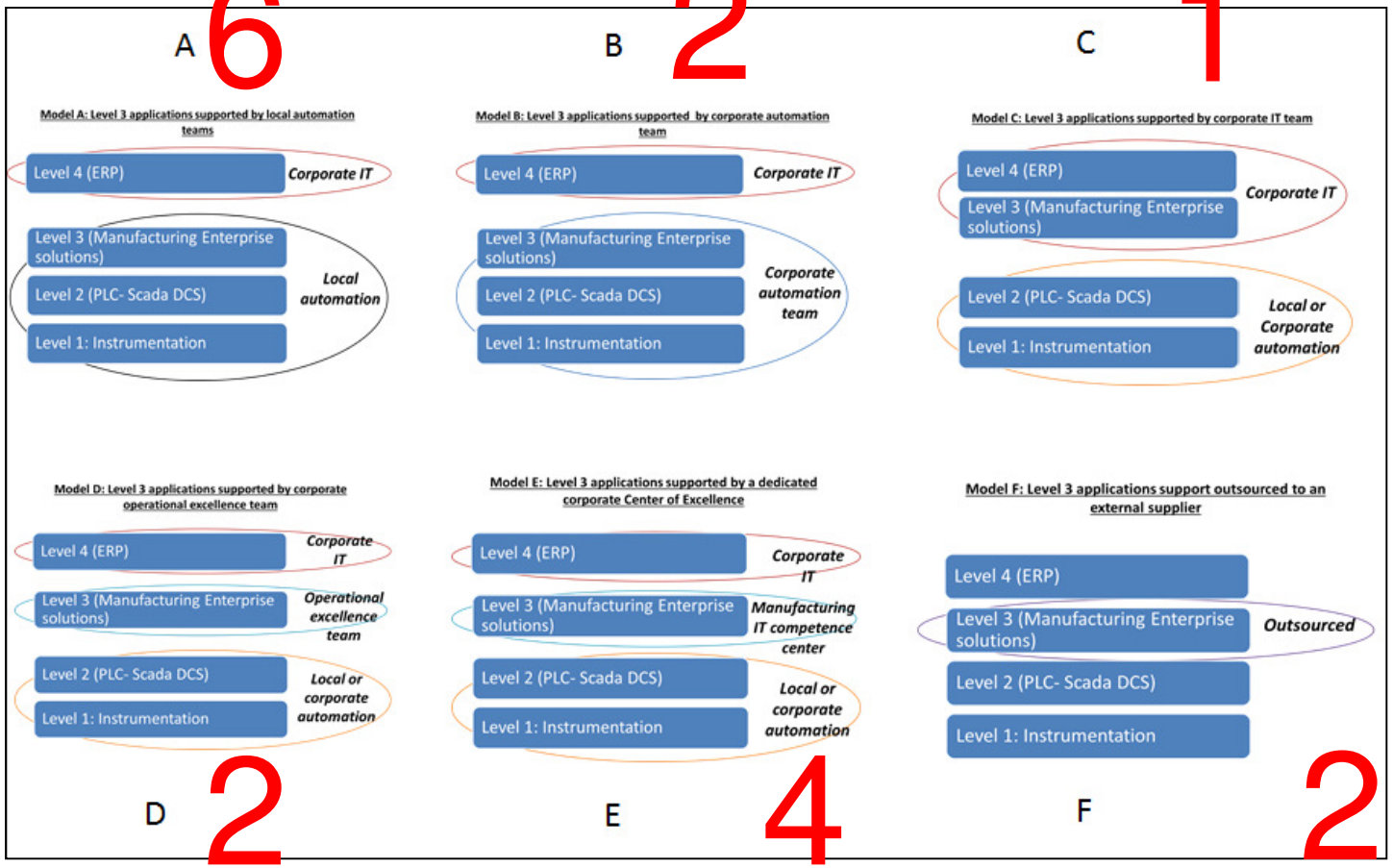
Which Governance models are used?

Intermediate results

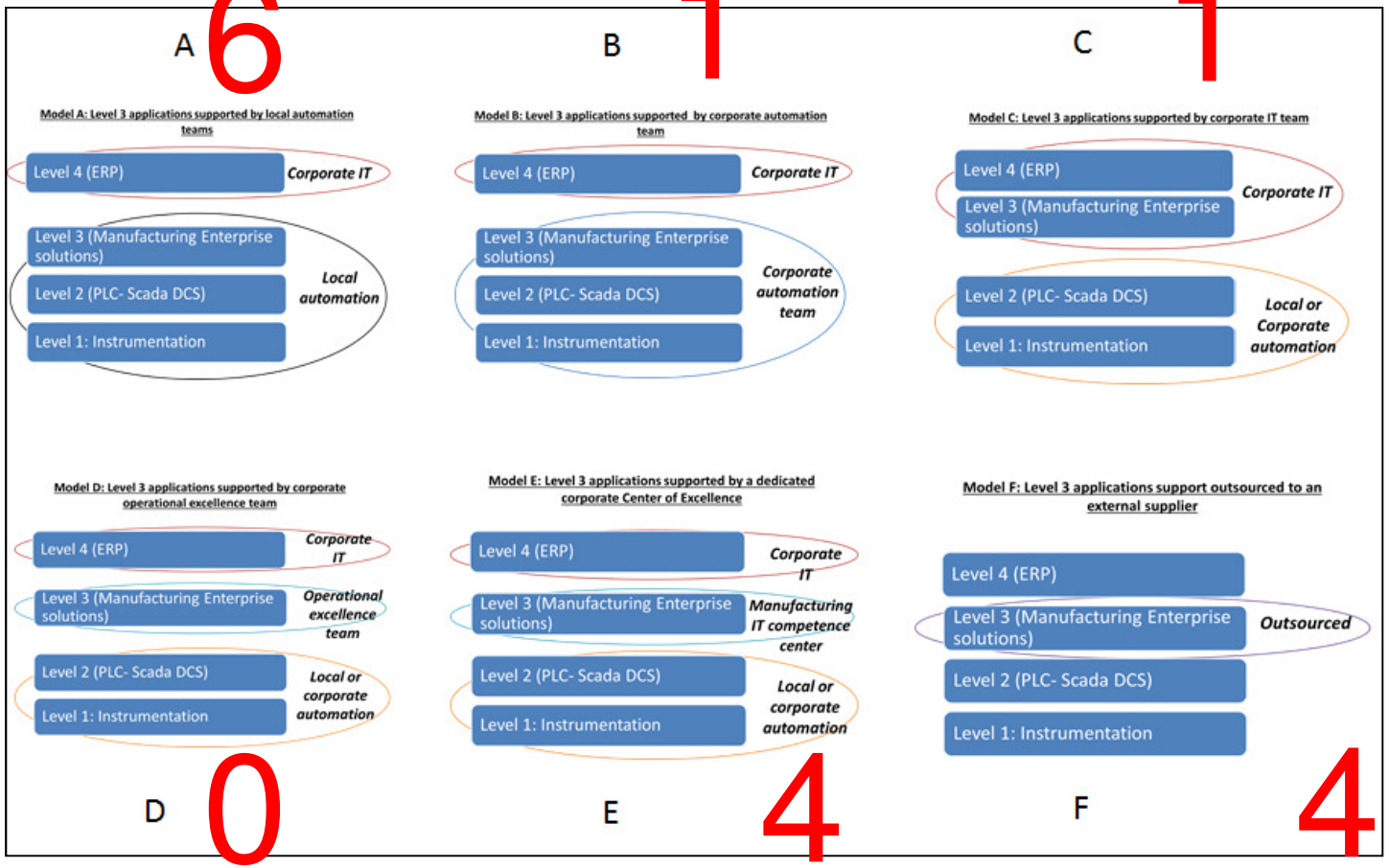
Governance models for manufacturing IT projects (design, roll out)



Which Governance models are used?

Intermediate results

Governance models for manufacturing IT run and maintain

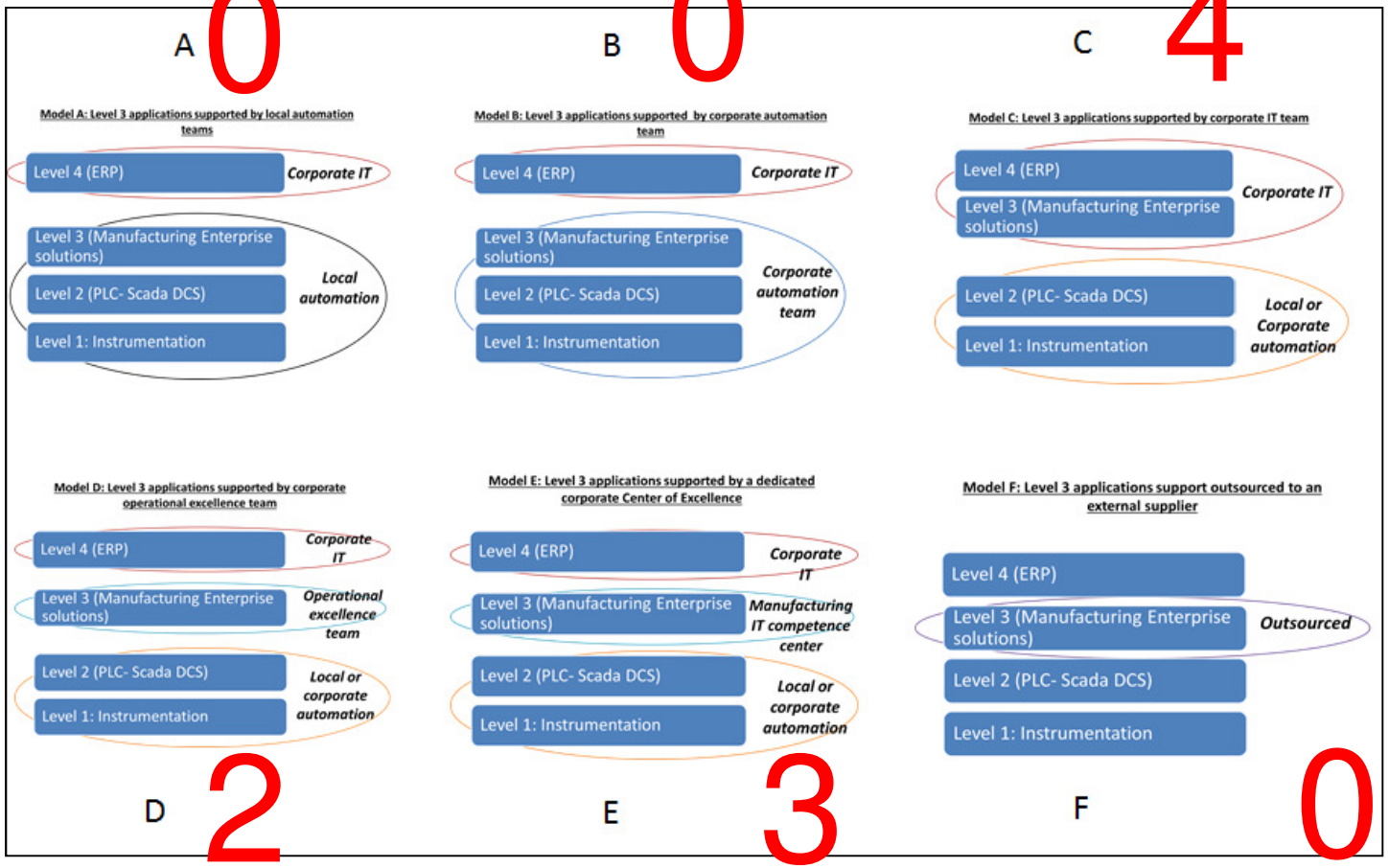


Which Governance models are used?

Intermediate results

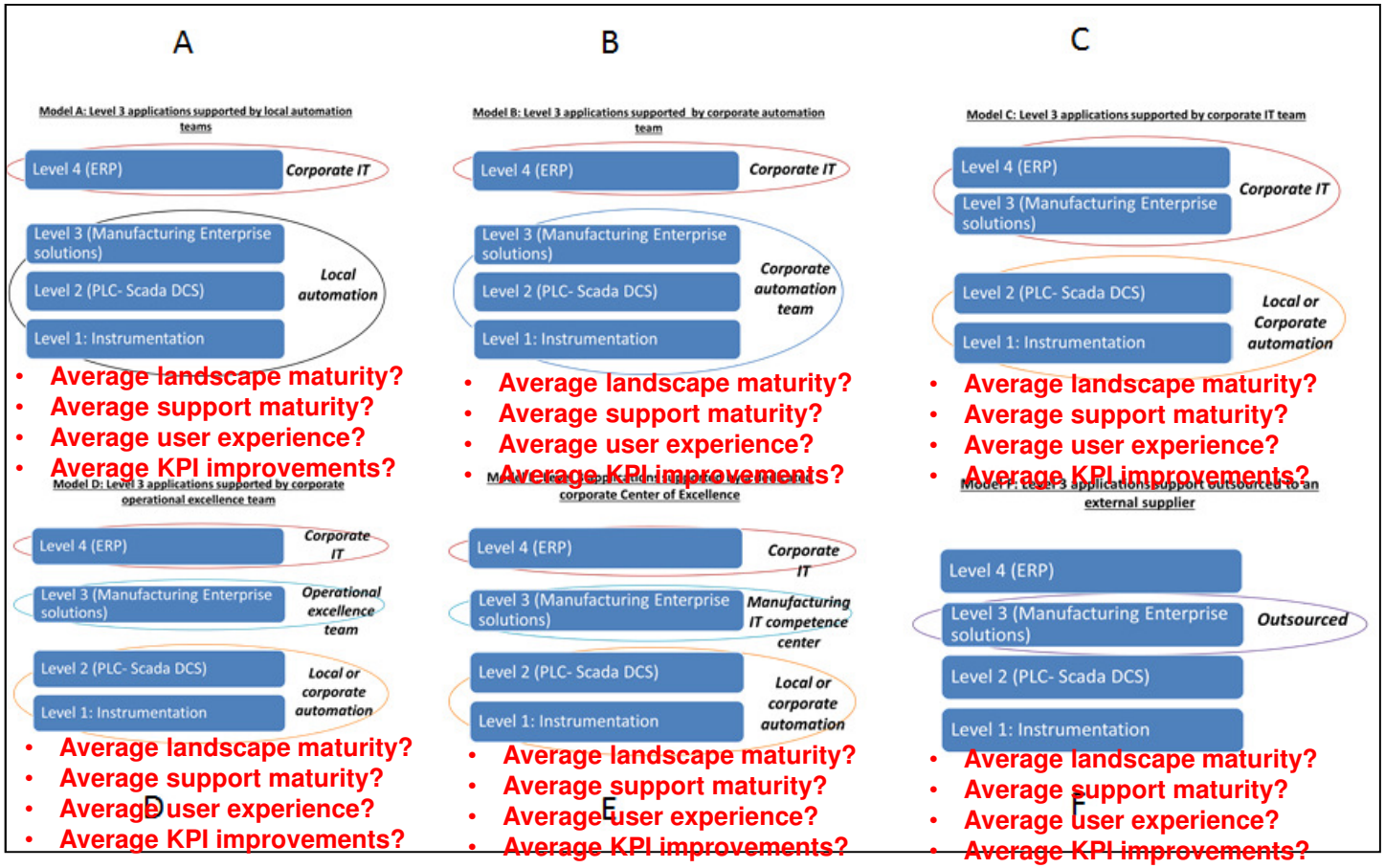
Companies currently transitioning to model…

(9 companies currently not transitioning to another model, and other 9 are transitioning)



Which Governance model provides the best results?

To be continued…



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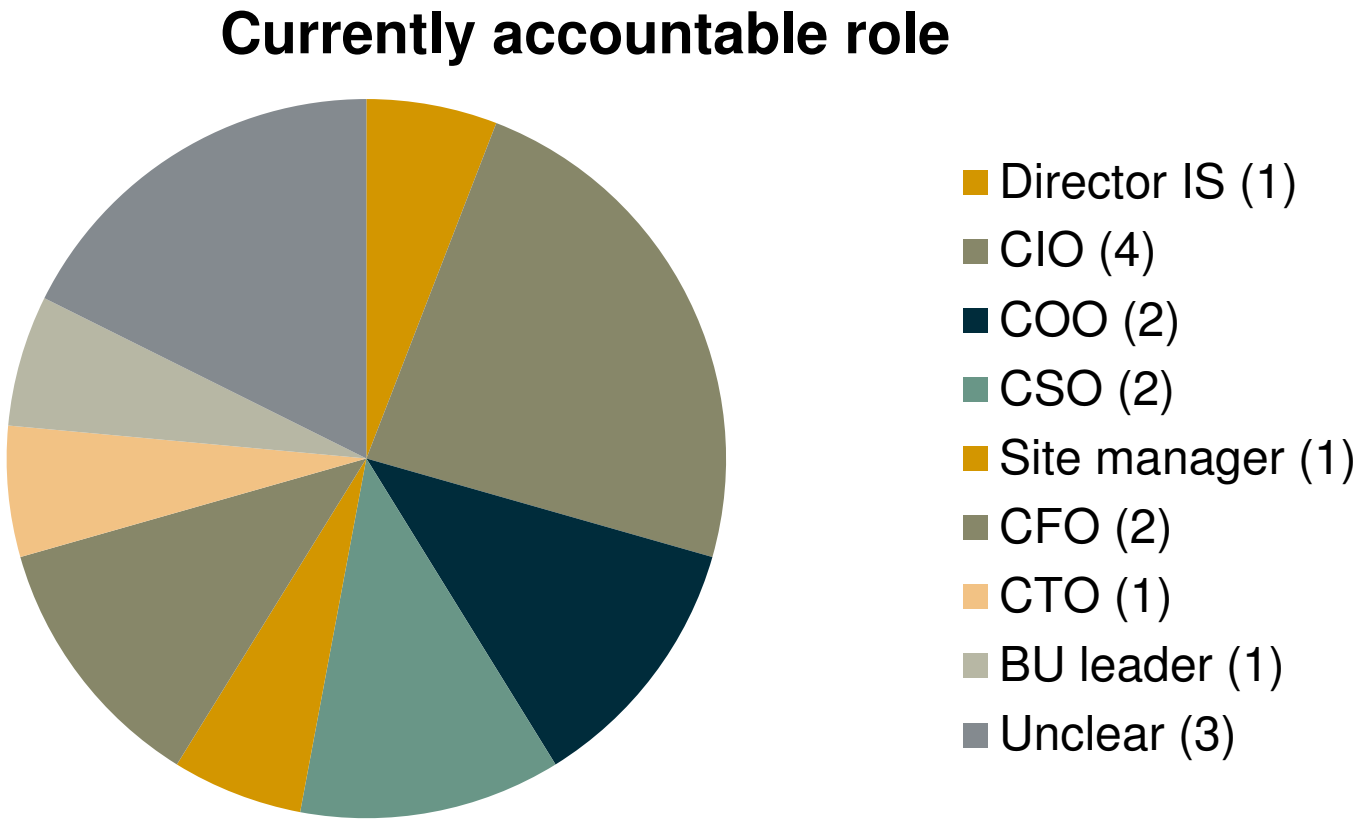
Which Role is currently Accountable?

Intermediate results

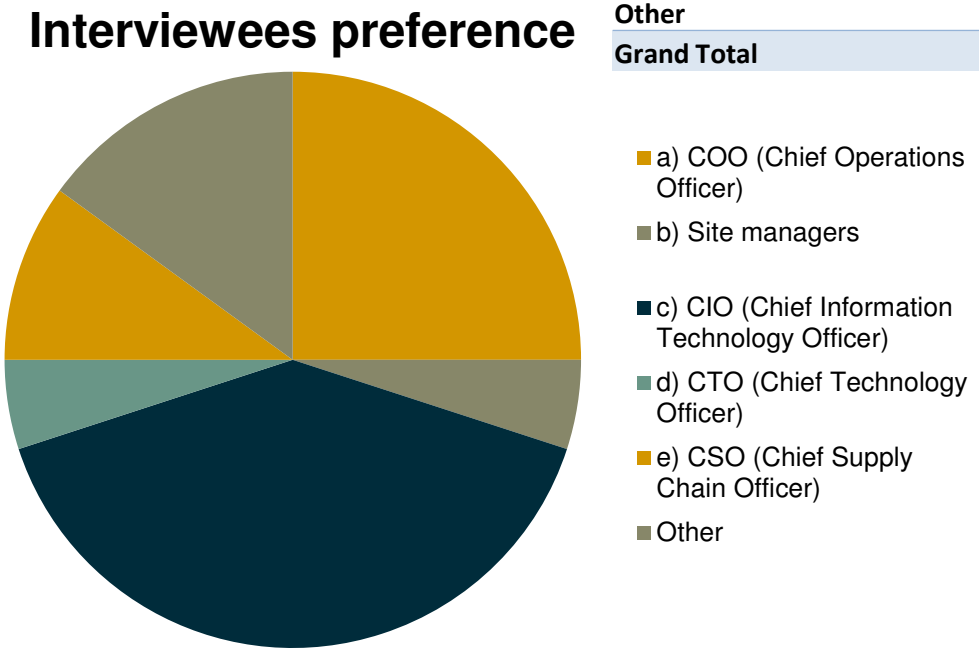


Which Role should be Accountable?

Intermediate results

Opinions of participants

Row Labels	Count: In my opinion, the following role should have final responsibility / accountability for IT in the plants
a) COO (Chief Operations Officer)	5
b) Site managers	1
c) CIO (Chief Information Technology Officer)	8
d) CTO (Chief Technology Officer)	1
e) CSO (Chief Supply Chain Officer)	2
Other	3
Grand Total	20



Which Role should be Accountable?

What we'll learn from the study

Role	Average landscape maturity	Average support maturity	Average User Experience	Average Plant Performance Improvements	Rating
CIO	?	?	?	?	?
COO	?	?	?	?	?
CFO	?	?	?	?	?
CSO	?	?	?	?	?
CTO	?	?	?	?	?
BU Manager	?	?	?	?	?
Site Manager	?	?	?	?	?
…..					

Finally

Current Status

- Interviews still taking place
- Target = 50 companies => it's not too late to participate
- Participation is anonymous
- Participants will receive the resulting report
- Target report publication date: before Christmas 2013