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NetworkRail

railalliance

“E-Collaboration and Information Management: An Inside View of Britain's Railway Market”

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MSc in Project Management — UNIVERSITY OF BIRMINGHAM

Supervisors: Professor David S. Walker
Professor Felix Schmid

Prezi

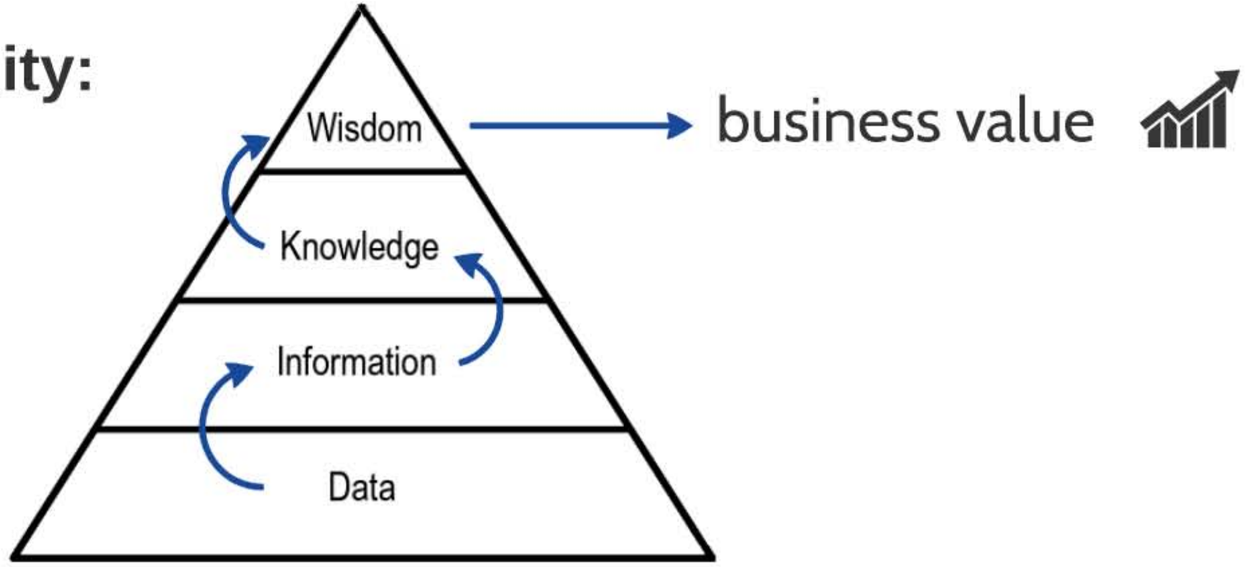
Why information?

My inspiration...

*"**information** is an unusual **good**: the more widely is **shared**, the more people benefit from it"*
(UK Government, 2013)

*"There is a growing realisation that **information** is an organisation's **third capital asset** and should be given the same level of focus as cash and human resources"* *(Hulme, 2012)*

challellenge & opportunity:



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objectives + methodology

Objective 2: BIM - Awareness, perceptions, expectations (Large firms & SMEs)

Objective 3: BIM - Barriers and actions to be overcome (Large firms & SMEs)

Quantitative analysis (Survey among the Rail Alliance members)

From the interviewees' sample & targeting of practitioners

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Qualitative analysis (Personal interviews to a number of the survey's participants/practitioners)

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What is e-collaboration?

'...collaboration among individuals engaged in a common task using electronic technologies'.

Kock et al. (2001)

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What is BIM?

BIM = technology + collaborative work process

(software + 3D models + collaborative work process + information management + asset management + more...)

“Building* Information Modelling (BIM):

“the process of generating, building and managing data through the life of a project by using model-based technologies linked to a database of project information”

(Crossrail)

Building = the **verb not the noun, which describes the process of developing information models to improve the business performance.*

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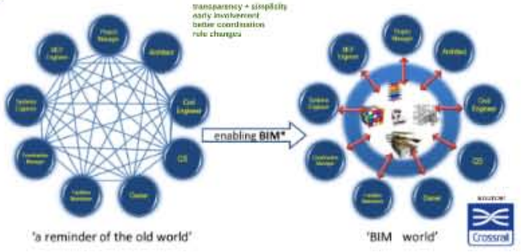
Why BIM?

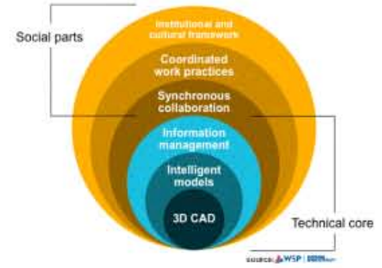
BIM= *e*-collaboration + information management = innovation = game changer

AEC Industry

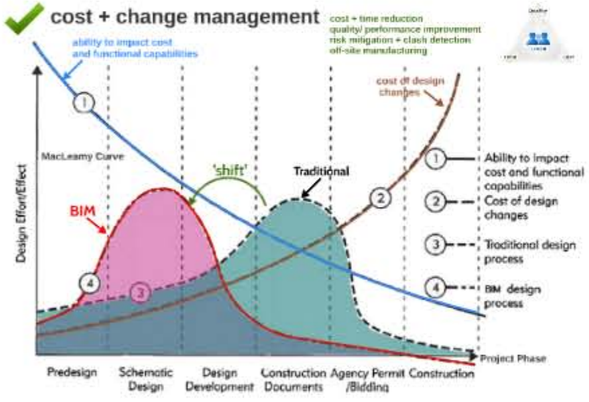
Transformation of stakeholders' relationships = opportunities



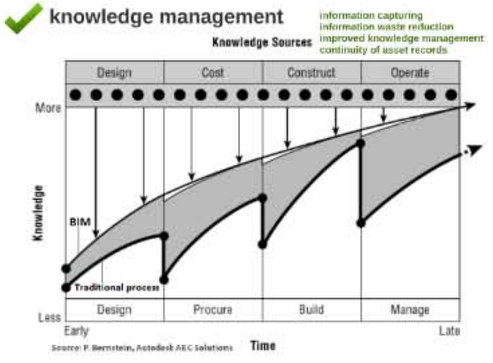
technical core + social parts = a complicated process

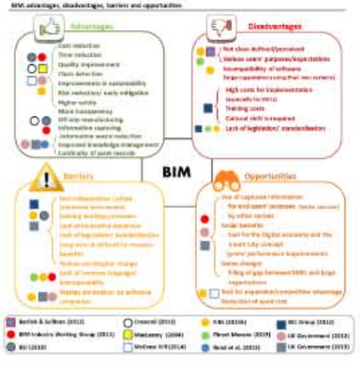


cost + change management



knowledge management

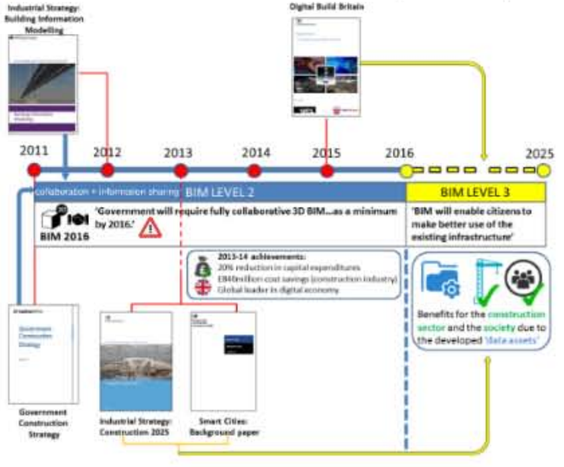




Britain's railway: adoption of BIM + interest

The UK Government Role

Level 2 - 2016: from 3D modelling to collaborative design
Level 3 - 2025: from collaborative tool to an integrated tool with social impact

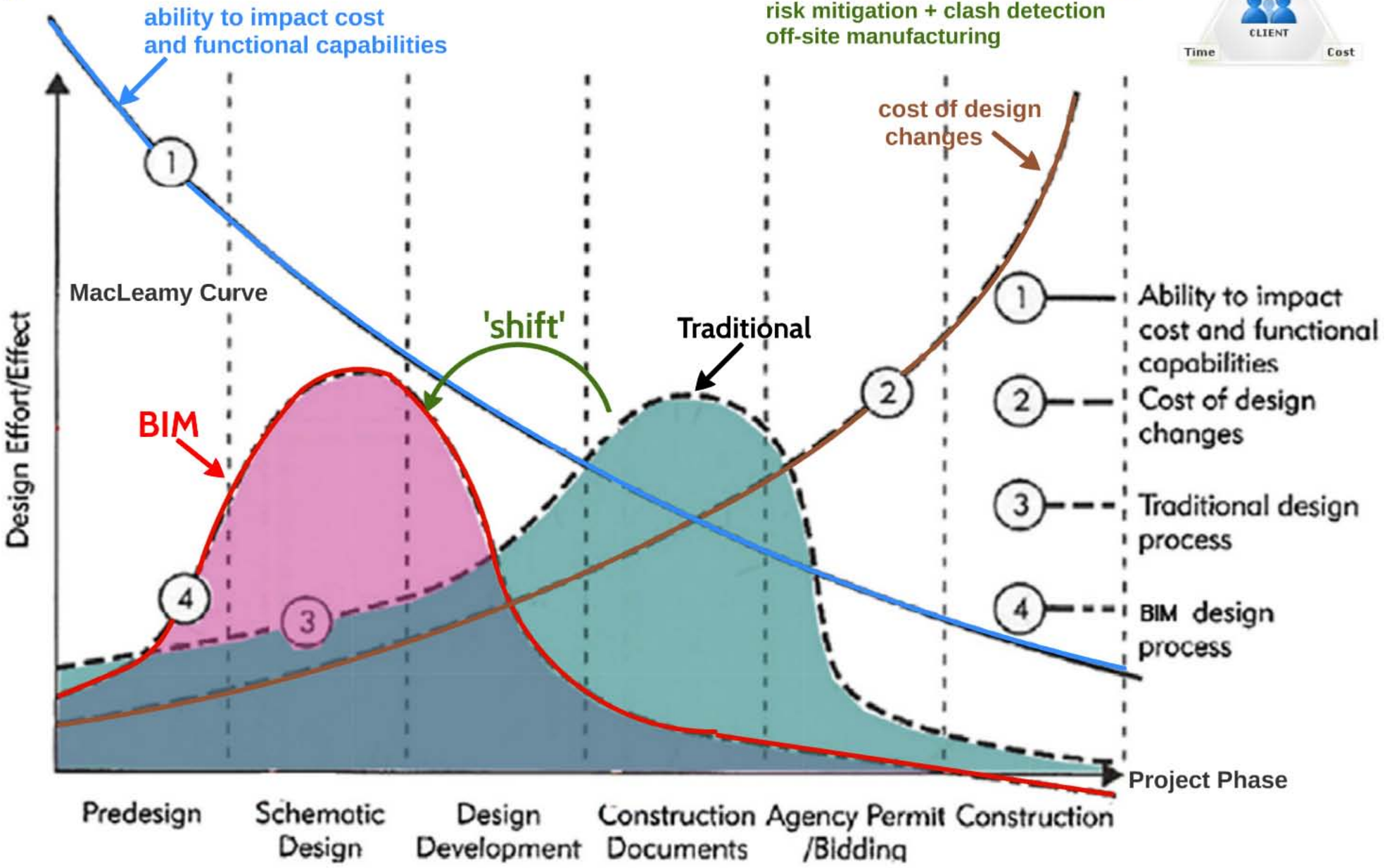


AEC Industry

source: SecorBim

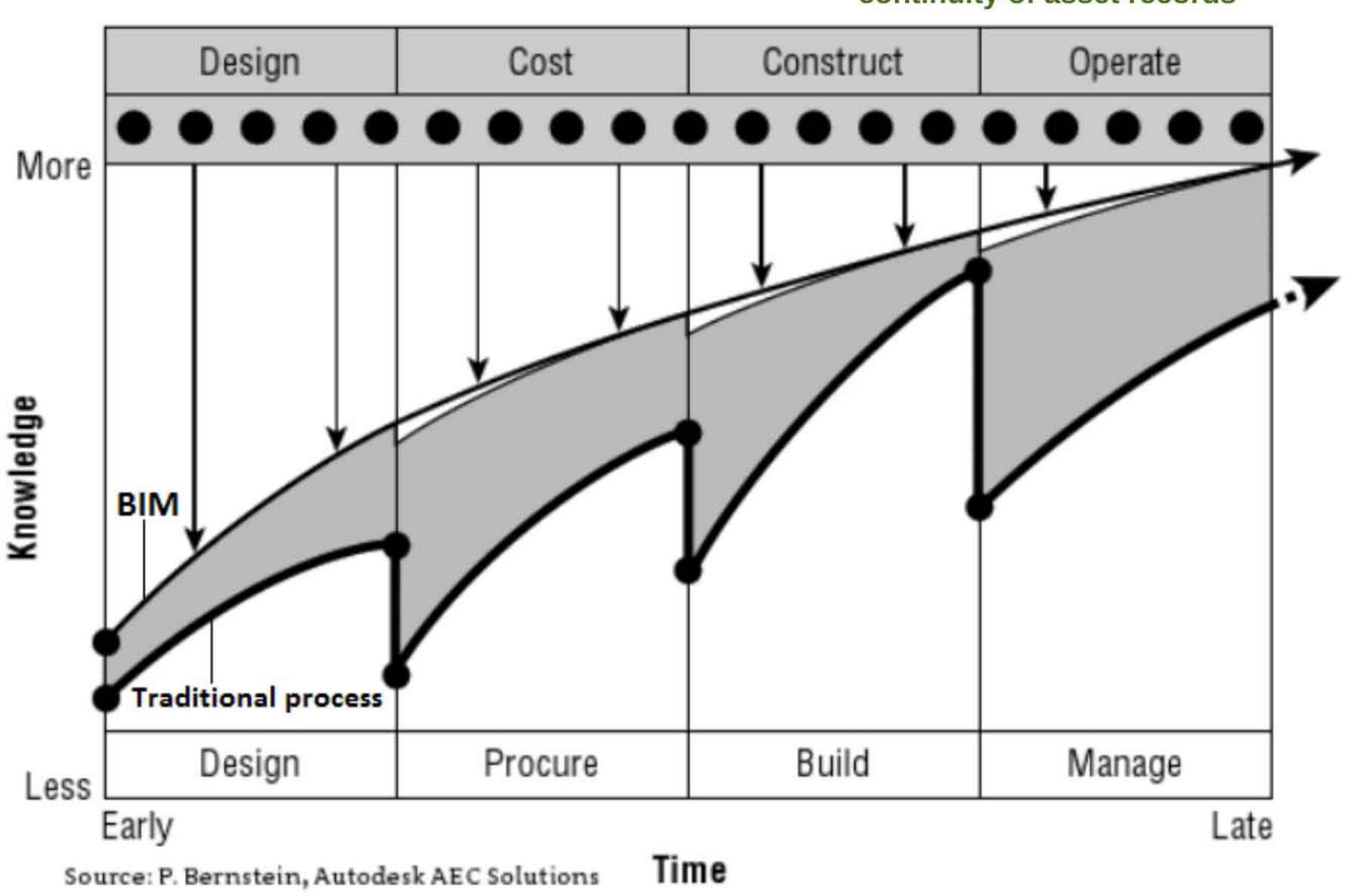
cost + change management

cost + time reduction
quality/ performance improvement
risk mitigation + clash detection
off-site manufacturing



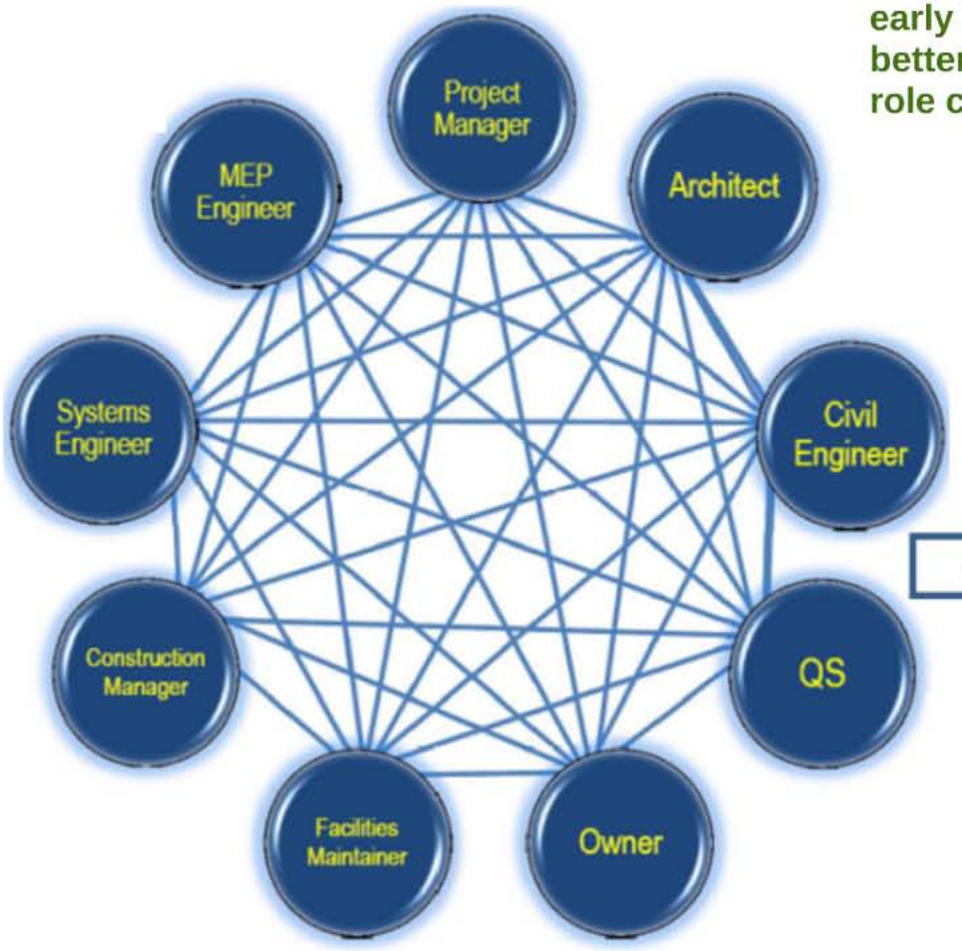
knowledge management

information capturing
information waste reduction
improved knowledge management
continuity of asset records

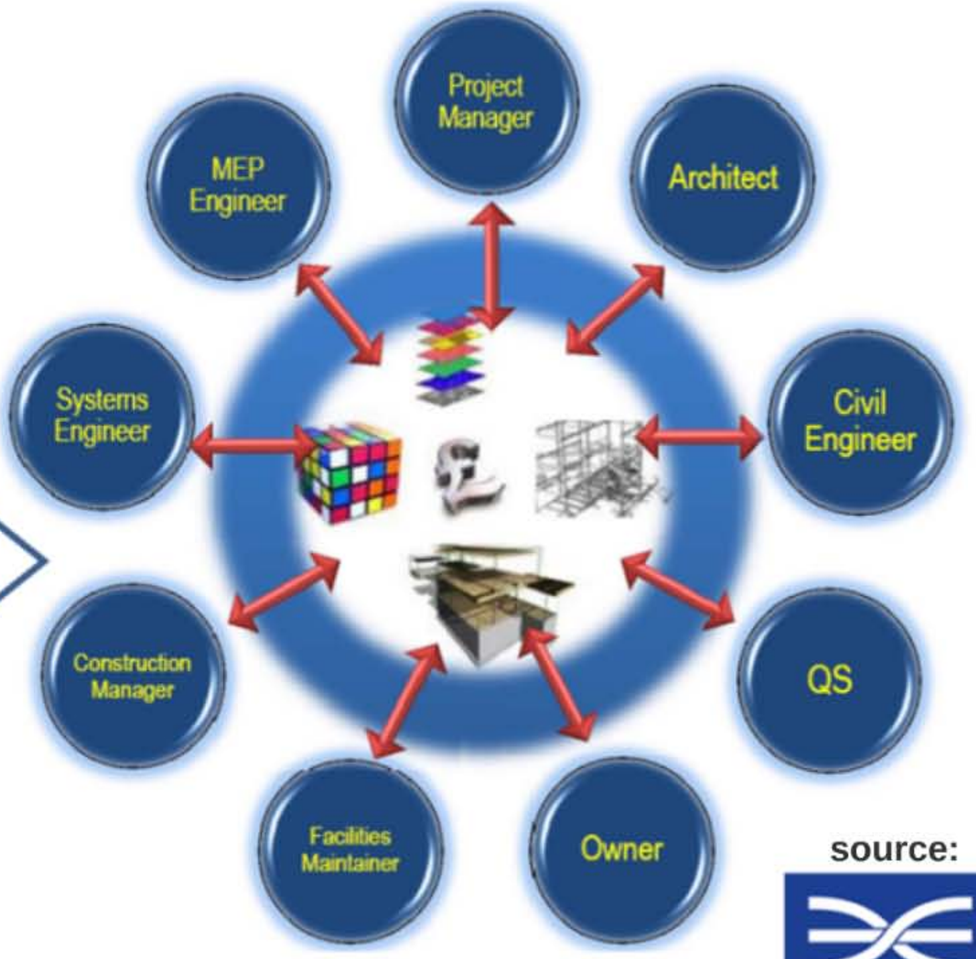


Transformation of stakeholders' relationships = opportunities

transparency + simplicity
early involvement
better coordination
role changes



enabling **BIM***



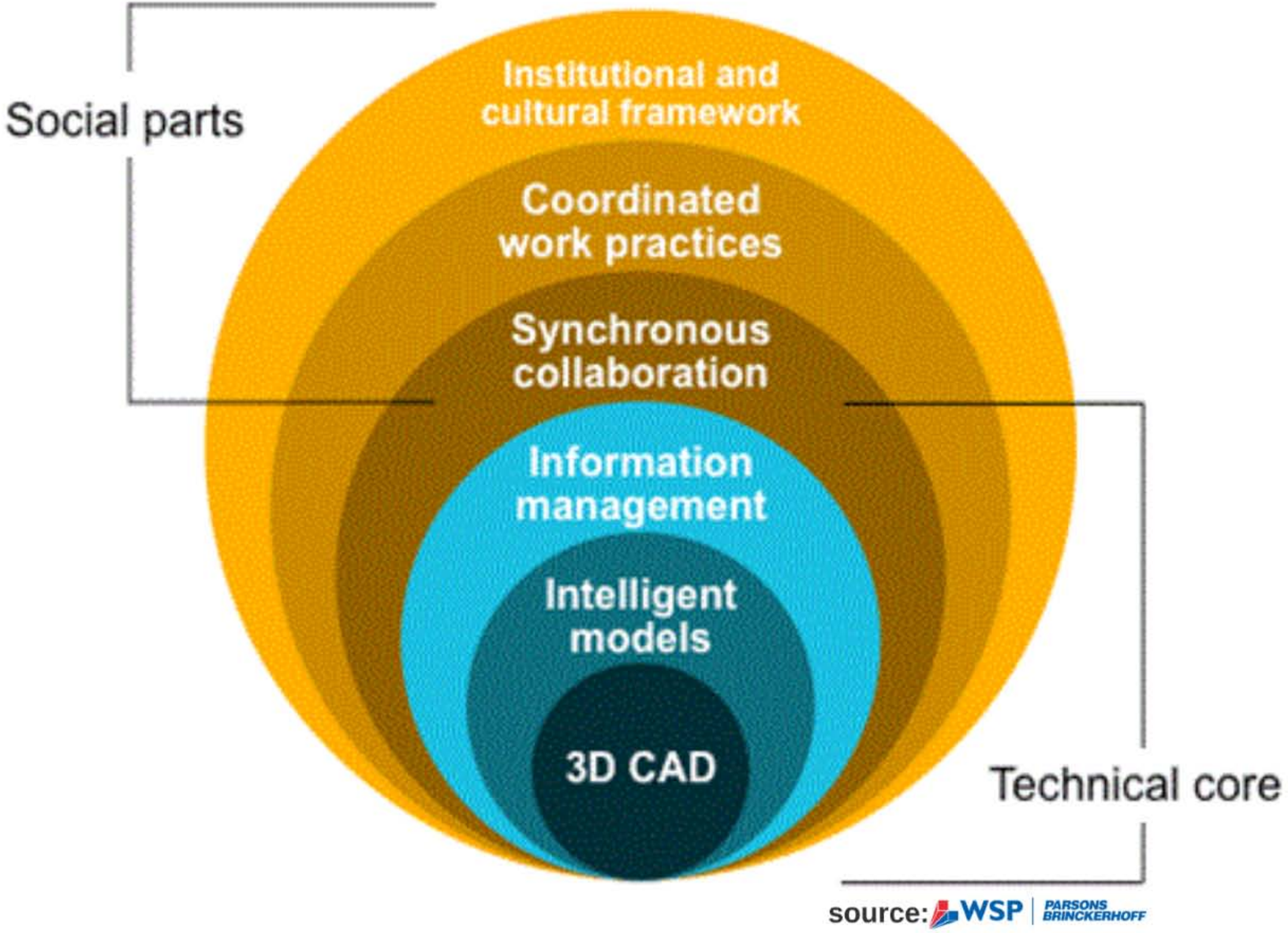
'a reminder of the old world'

'BIM world'

source:

Crossrail

technical core + social parts = a complicated process



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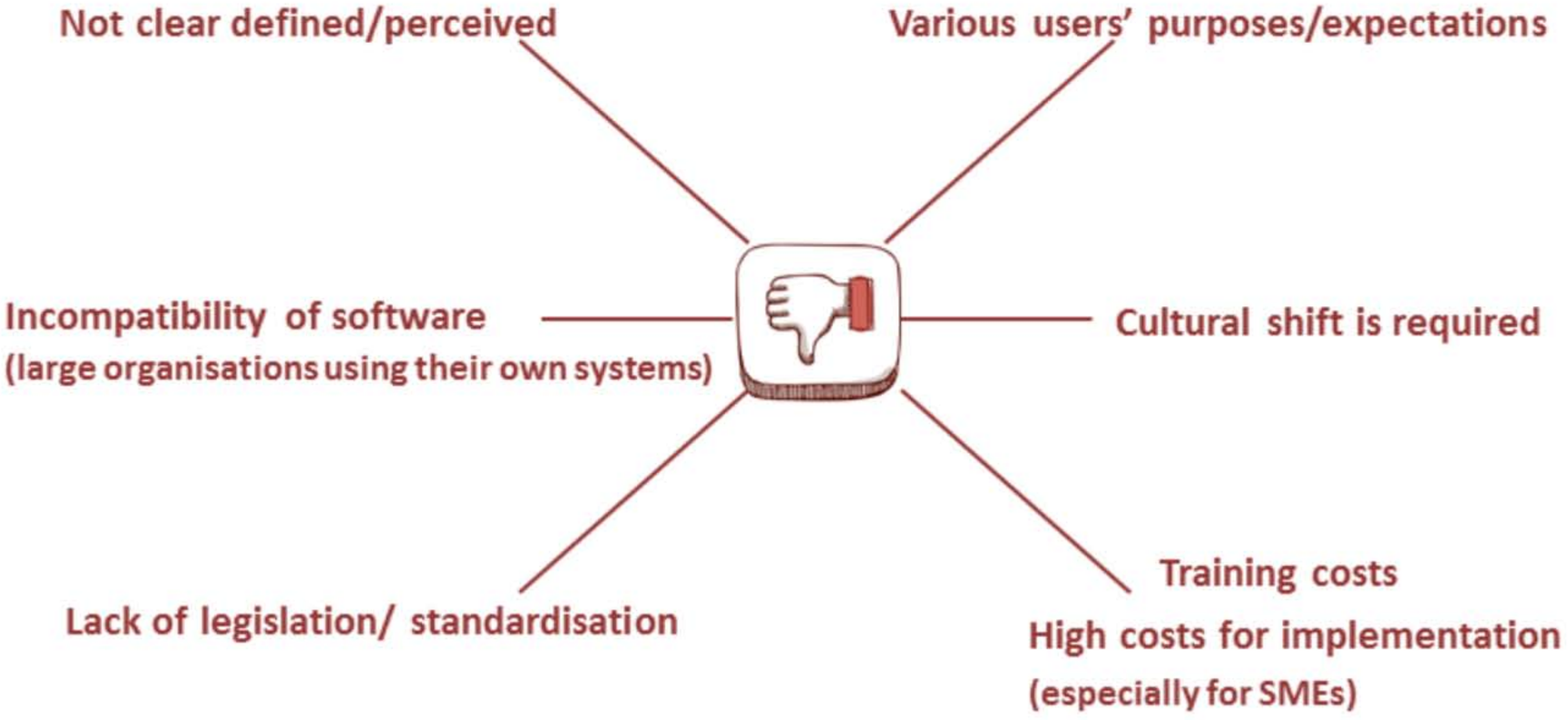
disadvantages



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The UK Government Role

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Industrial Strategy: Building Information Modelling

Digital Build Britain

2011 2012 2013 2014 2015 2016 2025

collaboration + information sharing | BIM LEVEL 2 | BIM LEVEL 3

BIM 2016

'Government will require fully collaborative 3D BIM...as a minimum by 2016.'

'BIM will enable citizens to make better use of the existing infrastructure'

2013-14 achievements:
20% reduction in capital expenditures
£840million cost savings (construction industry)
Global leader in digital economy

Benefits for the **construction sector** and the **society** due to the developed **'data assets'**

Government Construction Strategy

Industrial Strategy: Construction 2025

Smart Cities: Background paper

Britain's railway: adoption of BIM + interest

collaborative 3D environment = contractual requirement
Crossrail BIM 'academy' = interoperability
1 centralised set of linked databases

2014 Asset Management strategy
working on its procurement strategy
follow UK Government BIM strategy

use of a common data environment
readiness to adopt BIM Level 2
appointment of BIM specialists

"We want to build, operate and maintain a virtual railway before we go anywhere near a shovel" (MacNaughton, 2015)

research interest

support of firms (SMEs)
appointment of BIM speialist
support seminars + training

BIM Level 2
appointment of BIM specialists
3D models transferred to 2D deliverables for the client
progress monitoring

2015 conferences

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Survey: BIM in the UK Railway Industry

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Participants: 68

Survey Period: 11/08/15 – 19/08/15

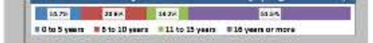
Respondents Profile

Job position

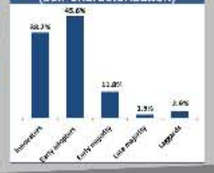
Size of workforce

SMEs (73.5%)

Years of activity in the rail industry (organisation)



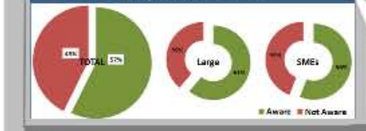
Diffusion of innovation (self-characterisation)



Field of operation

BIM awareness

Are you aware of BIM?



- Almost three fifths (57%) of the participants are aware of BIM.
- The awareness of the respondents can be characterised as sufficient, because of the current conditions of BIM use in the rail industry.

BIM potentials

Do you believe that BIM could be beneficial for the company?*

*answers among the participants who are NOT aware of BIM

43% of the total sample

Note: The BIM definition and further information were provided before the question .

Almost the half of the BIM unaware respondents support that: 'BIM could be beneficial for my company'.

BIM awareness in depth

Definition among the aware respondents (57%)

Construction, digital model-oriented: A way of working and managing information in a team environment, enabling everyone to understand a building by using a digital model.	5.1%
Do not know/ cannot decide	7.7%
Project, 3Dmodel-oriented: A process that involves creating and using an intelligent 3D model to inform and communicate project decisions.	16.4%
Commercial, information sharing model-oriented: A process of business collaboration through shared information models.	32.3%
Project whole lifecycle (asset), digital model-oriented: A process of designing, constructing or operating a building or infrastructure asset by using electronic object-oriented information.	38.5%

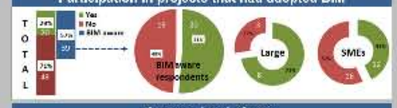
BIM means different things to different people.

Encouragingly, the majority defines BIM either as a commercial process based on information sharing, or as an asset management process for the whole lifecycle of a project.

Awareness of the Governmental target (Use of BIM-Level 2 by 2016)

49% of the respondents (85% of the BIM aware) are aware of the Governmental target.

Participation in projects that had adopted BIM



29% of the respondents (51% of the BIM aware) participated in a BIM project.

Average level of use

among the participants in BIM projects (29%)

Level 1: BIM only for 3D design by the consultants.
Level 2: BIM for design purposes; a collaborative approach was followed by the stakeholders and the information was shared among the participants in order to proceed with a federated BIM model.
Level 3: All the project parties were able to access and modify the information within the same BIM model.

The BIM projects' participants are at an adequate level regarding the governmental strategy (use of BIM-Level 2), especially those from large firms

> "Building Information Modelling (BIM):
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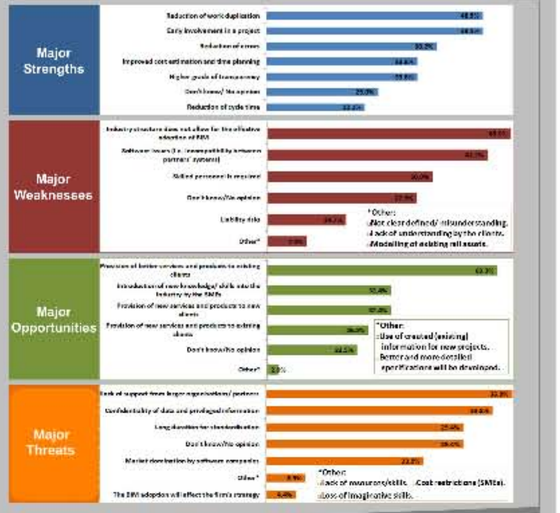
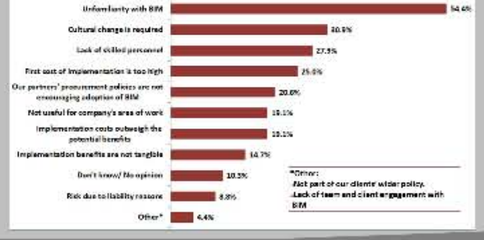
BIM SWOT



BIM barriers

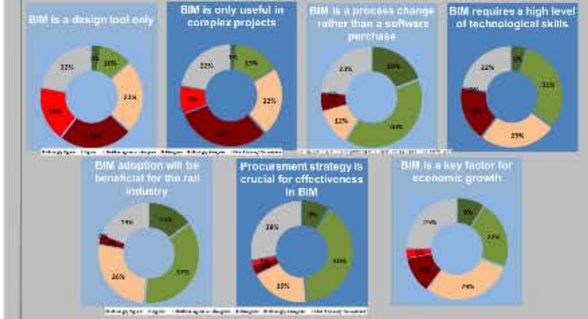
In your opinion which of the following are the main barriers for the BIM adoption by your company?



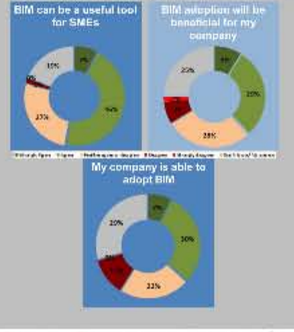
*Other:
-Not part of our clients' wider policy.
-Lack of team and client engagement with BIM

BIM perceptions

'Macro-environment'

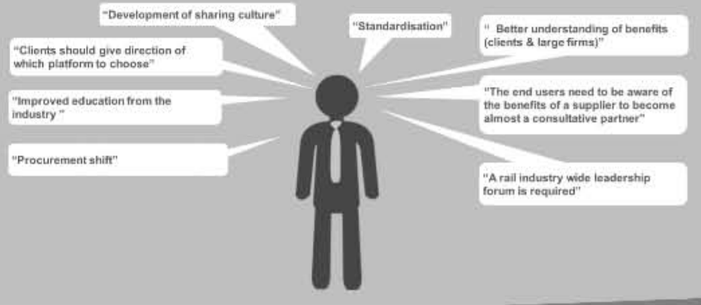


'Micro-environment'



Strongly Agree | Agree | Neither agree or disagree | Disagree | Strongly disagree | Don't know/ No opinion

Ways to overcome the barriers



Supervisors: Professor David S. Walker (D.S.Walker@bham.ac.uk) & Professor Felix Schmid (f.schmid@bham.ac.uk)

September 2015

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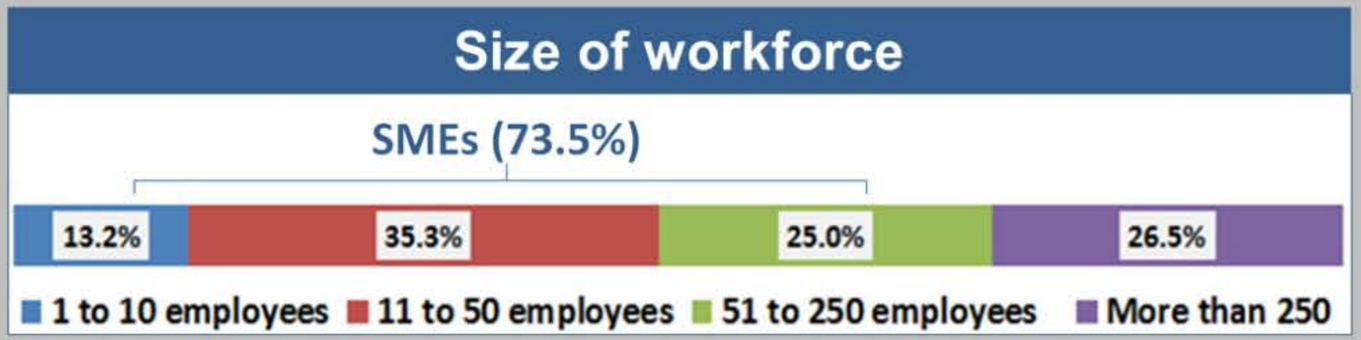
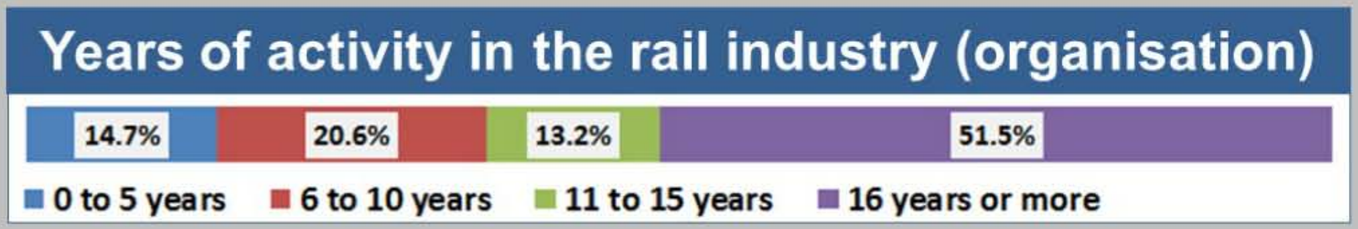
Respondents Profile

Job position

Size of workforce



Years of activity in the rail industry (organisation)



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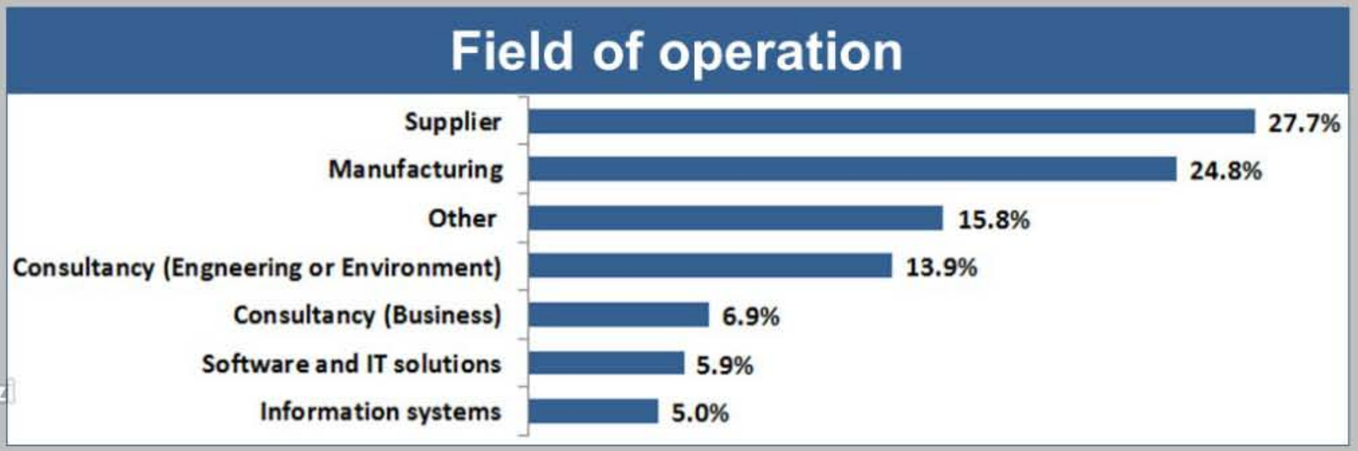

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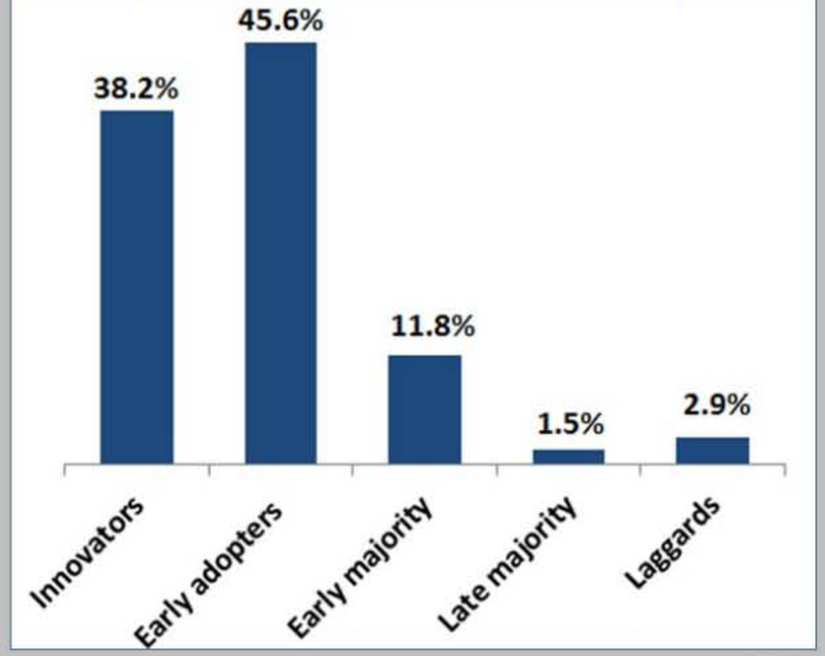
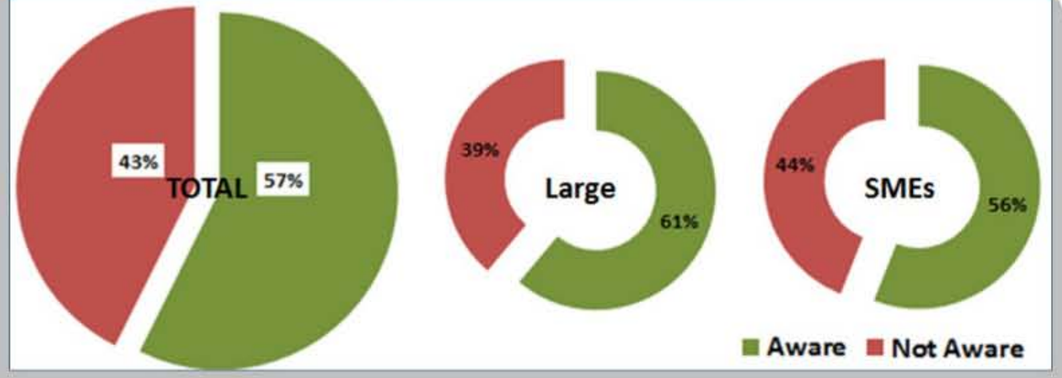


BIM awareness

Are you aware of BIM?



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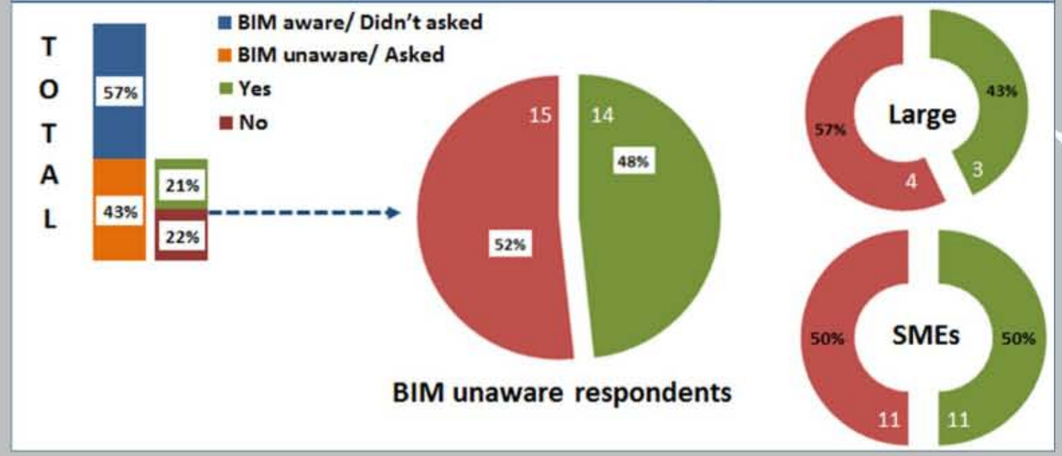

Note: The BIM definition and further information were provided before the question .

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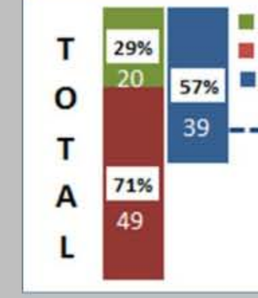
Part



Total (20)

Large (8)

SMEs (12)

Level 1: BIM only

Level 2: BIM for d
stakehol
proceed

Level 3: All the pr
same BIM

"Building
"the process
project by us
information"

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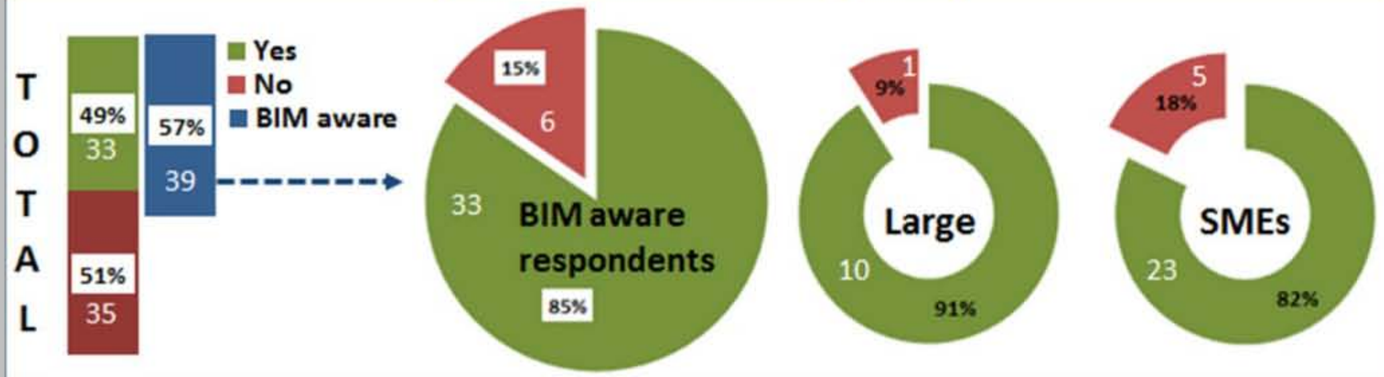
Awareness of the Governmental target

(Use of BIM-Level 2 by 2016)



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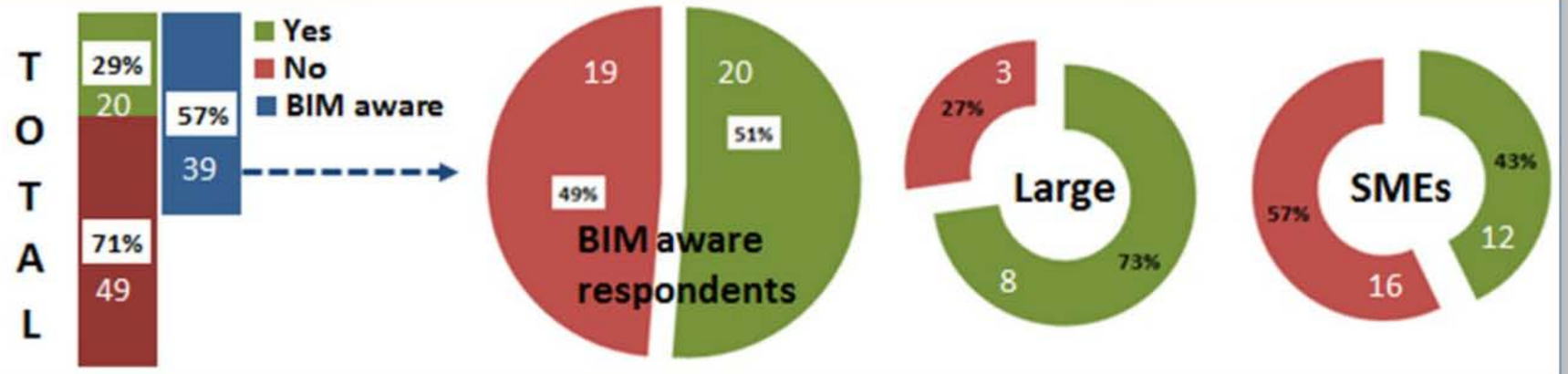

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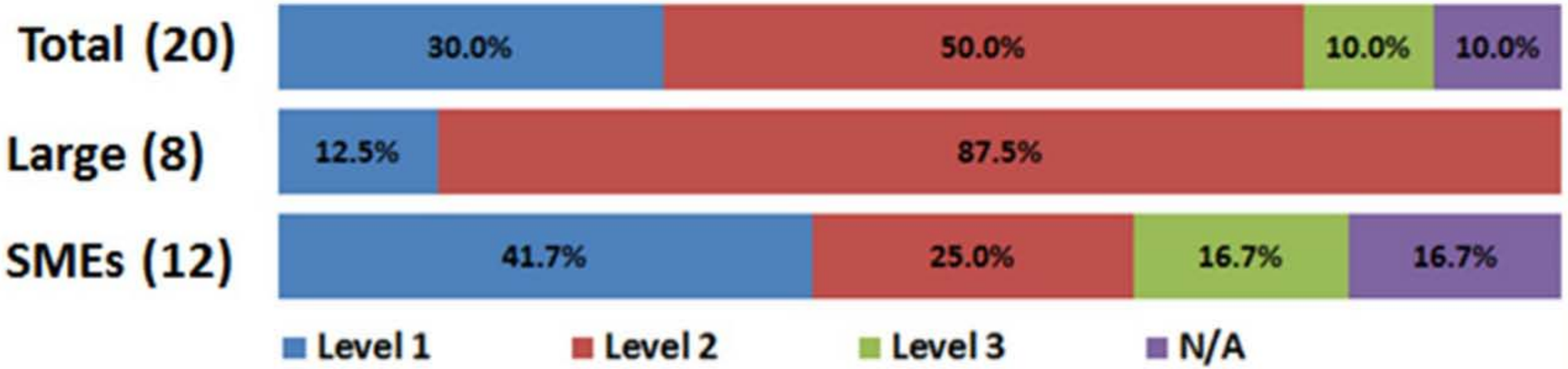

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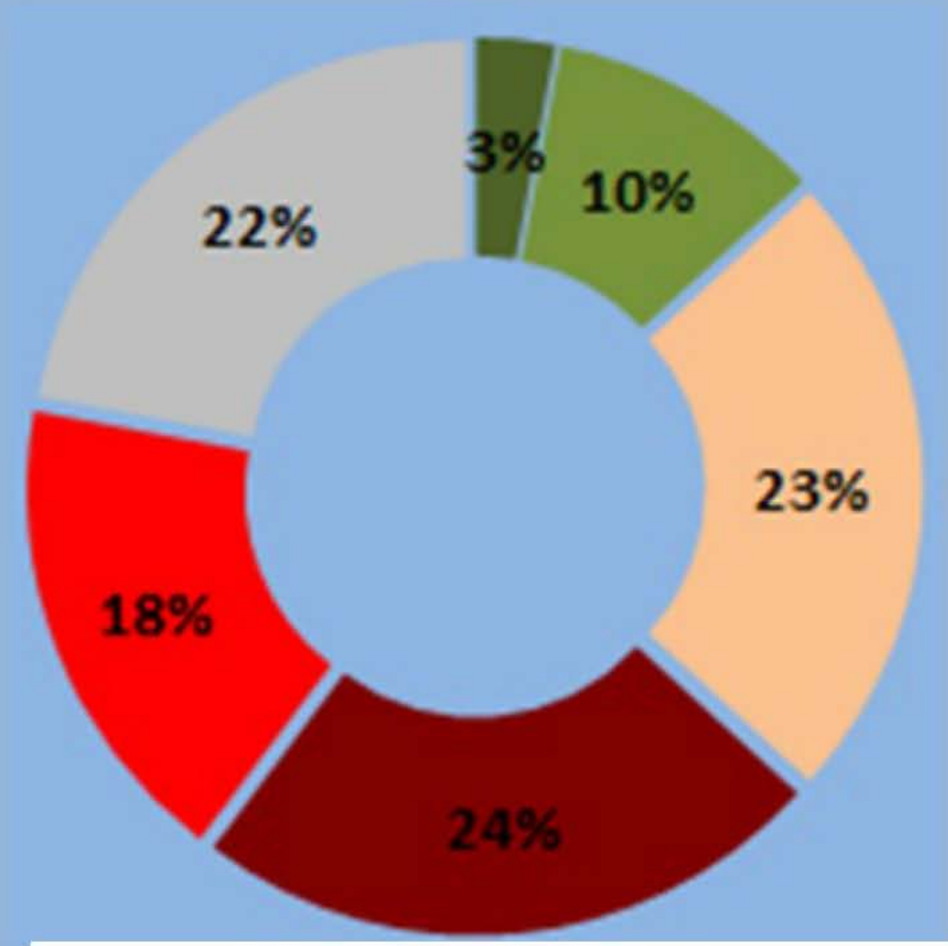
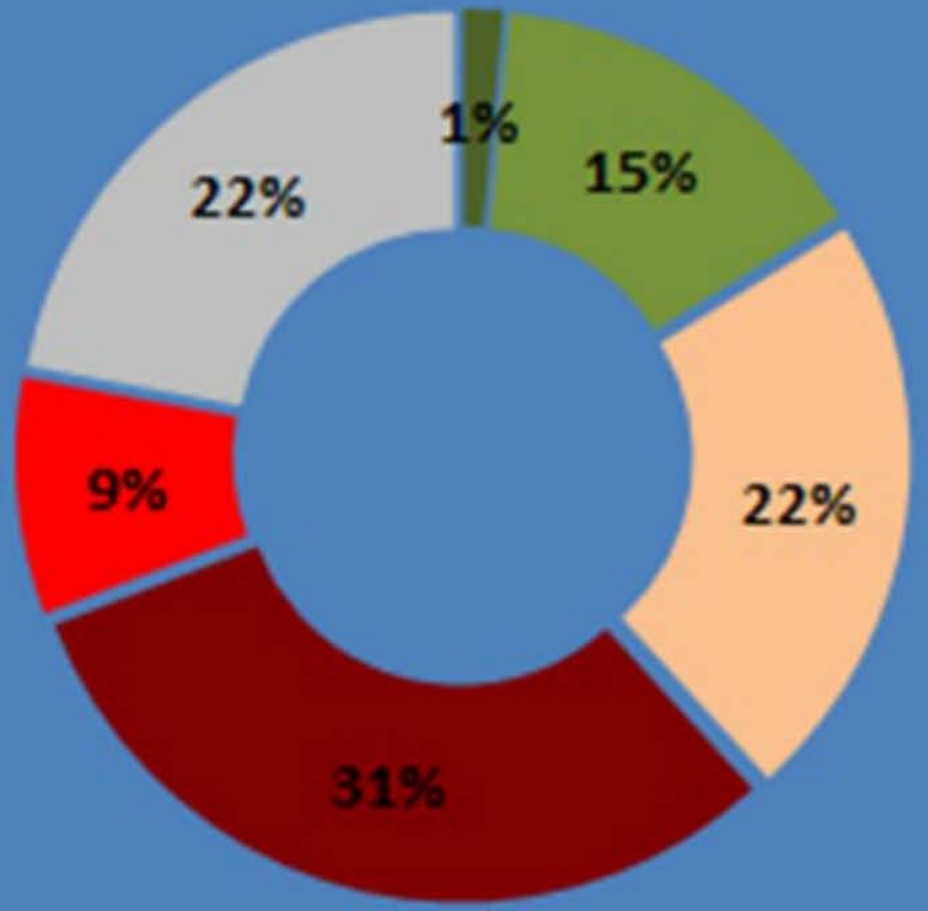
BIM is a design tool only



BIM is only useful in complex projects



Strongly Agree | Agree | Neither agree or disagree | Disagree | Strongly disagree | Don't know/ No opinion

Strongly

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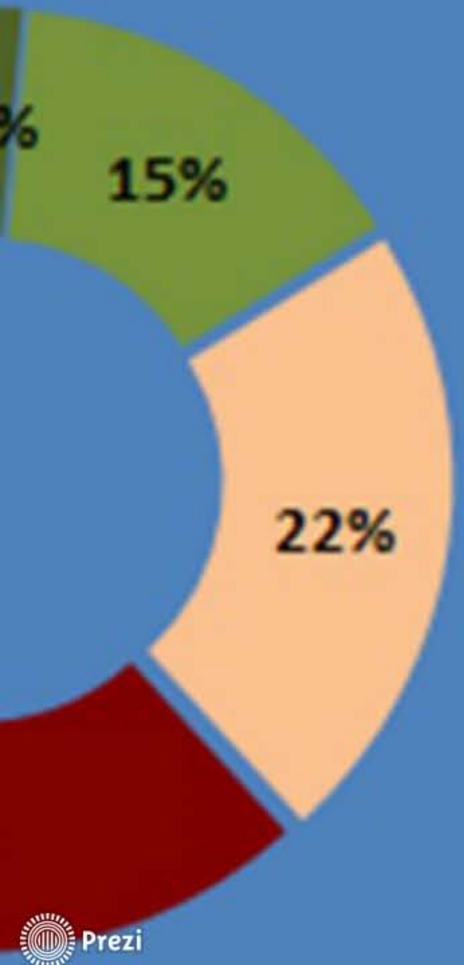
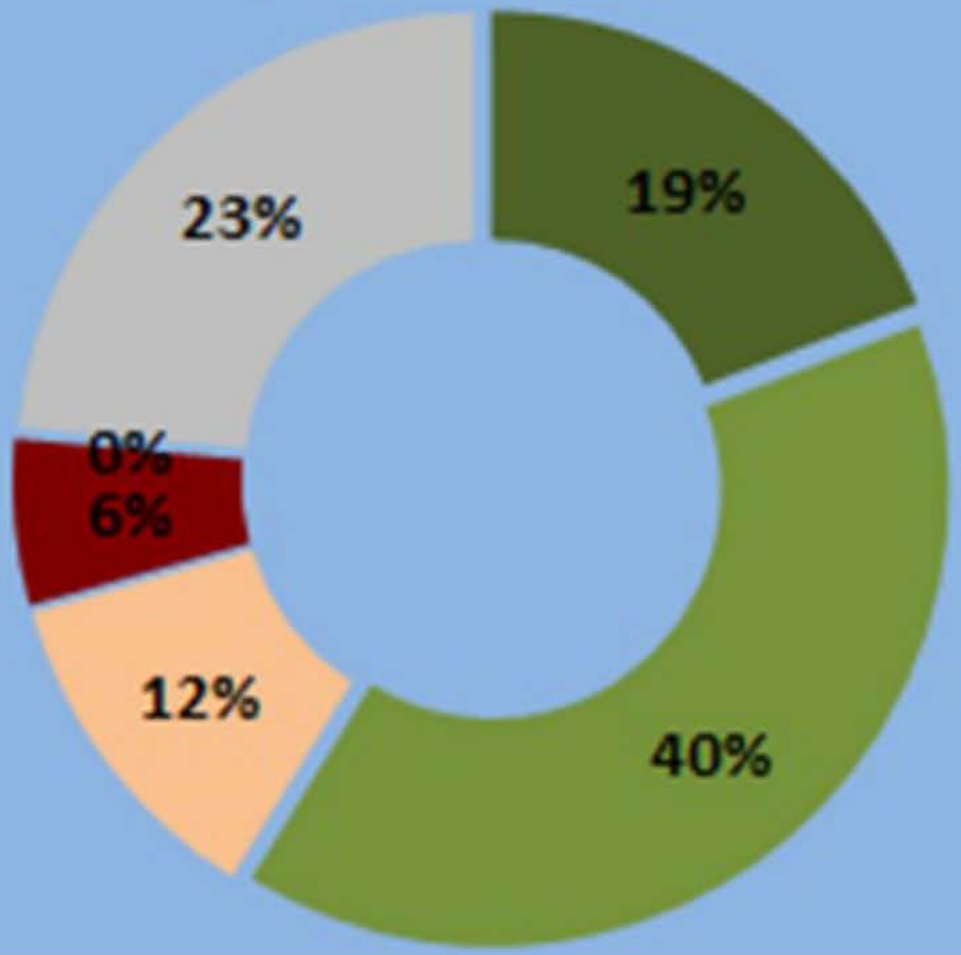
y useful in projects



Don't know/ No opinion

BIM is a process change rather than a software purchase



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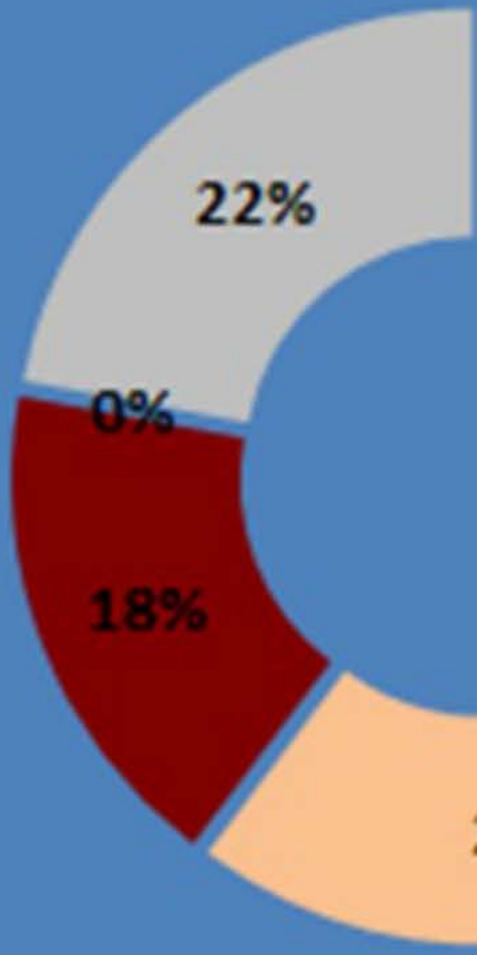
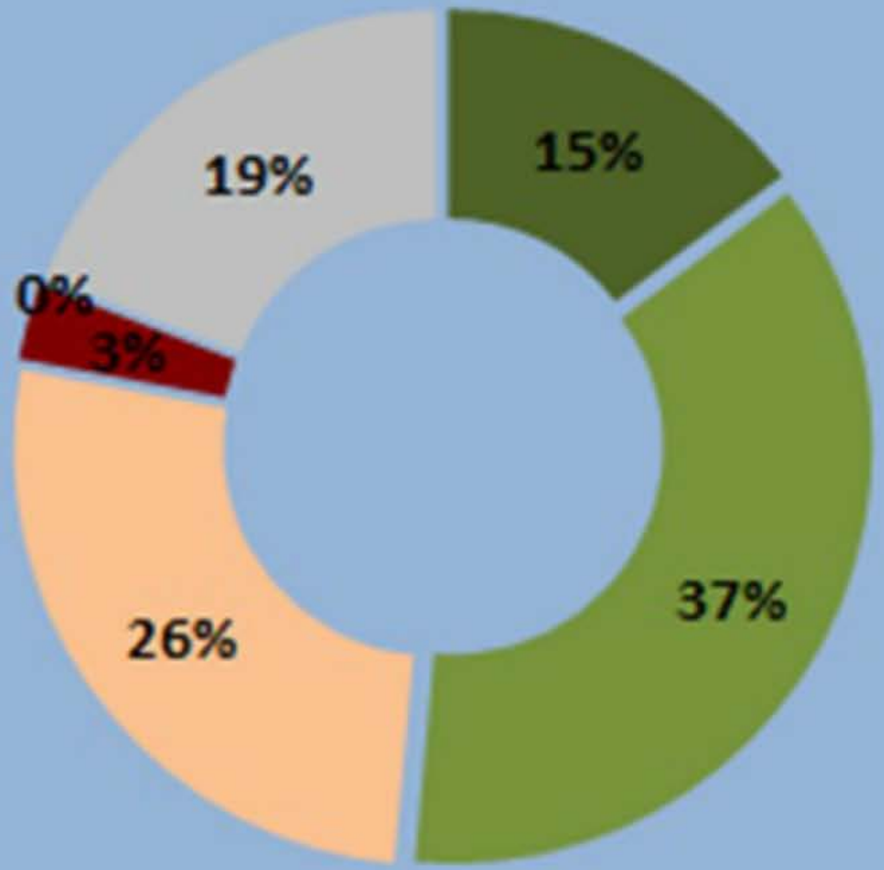
BIM requires of technolo

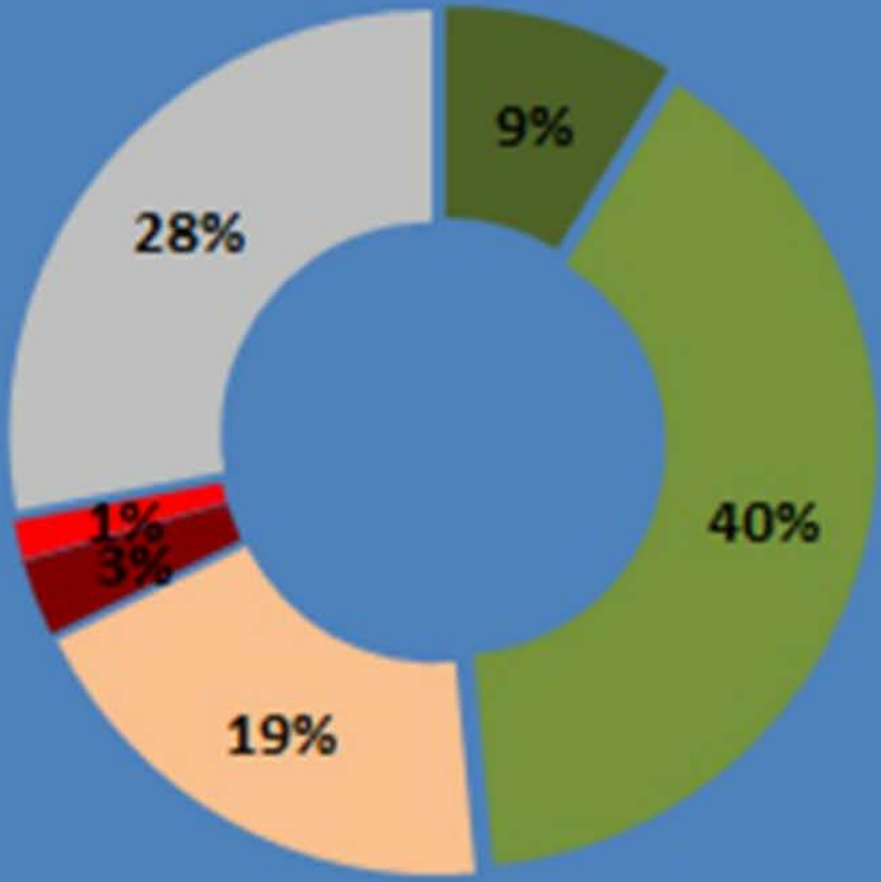


Prezi

BIM adoption will be beneficial for the rail industry



Procurement strategy is crucial for effectiveness in BIM

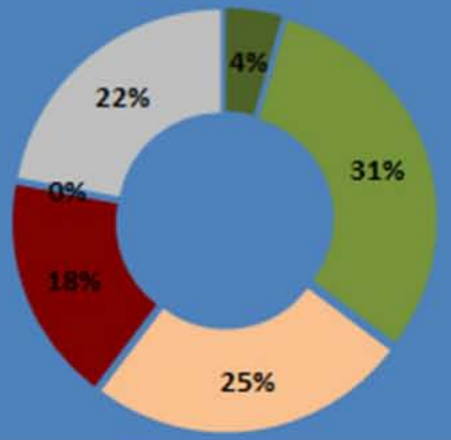


Strongly Agree | Agree | Neither agree or disagree | Disagree | Strongly disagree | Don't know/ No opinion

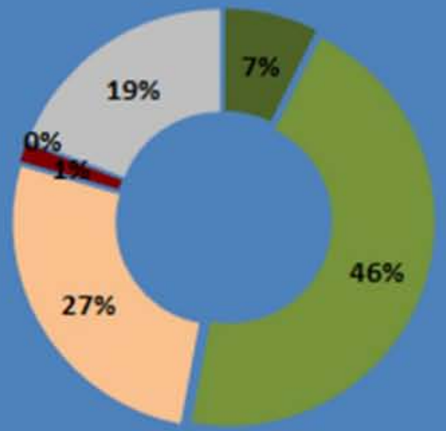
Prezi

‘Micro-environment’

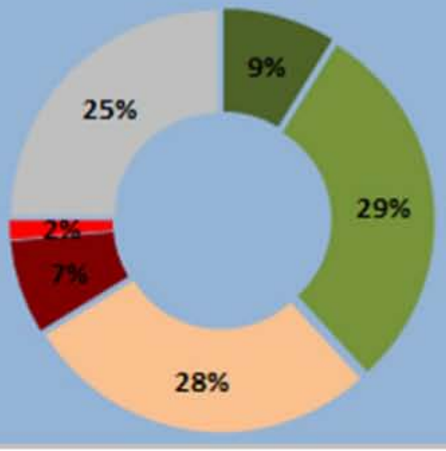
BIM requires a high level of technological skills



BIM can be a useful tool for SMEs

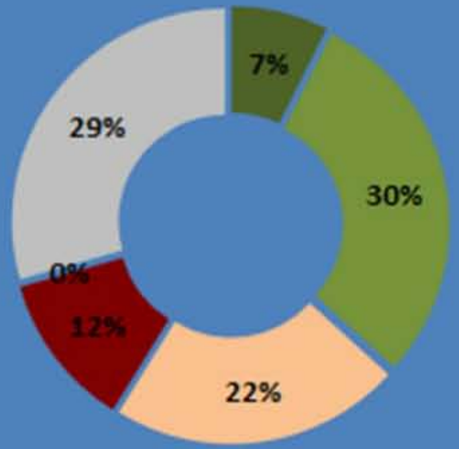


BIM adoption will be beneficial for my company

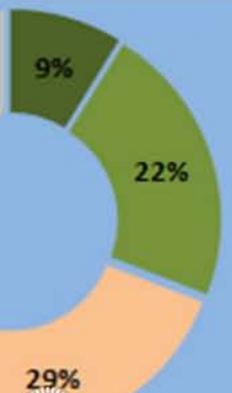


Strongly Agree | Agree | Neither agree or disagree | Disagree | Strongly disagree | Don't know/ No opinion

My company is able to adopt BIM



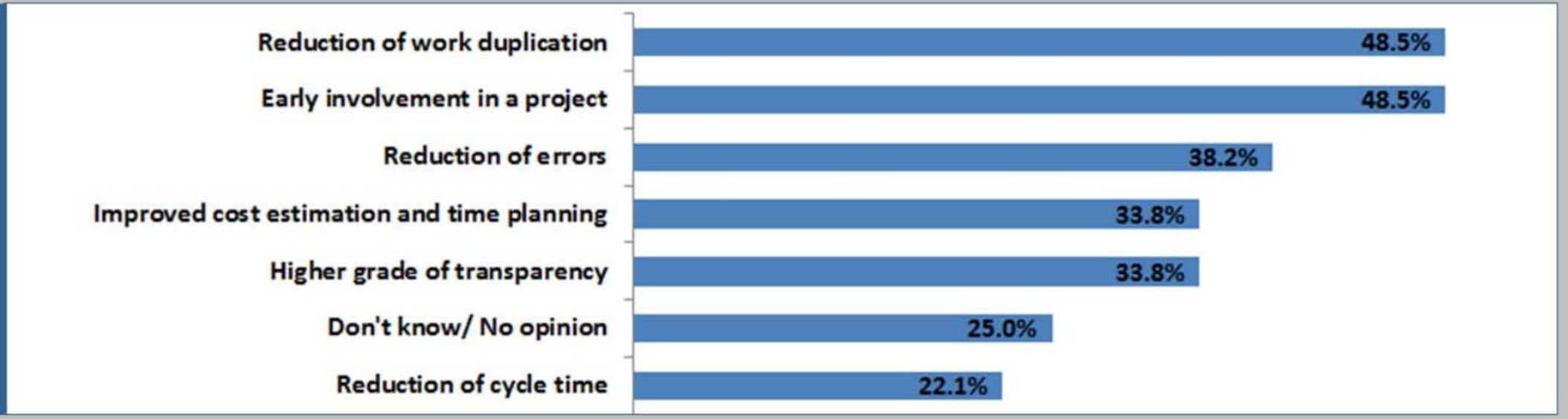
ey factor for ic growth



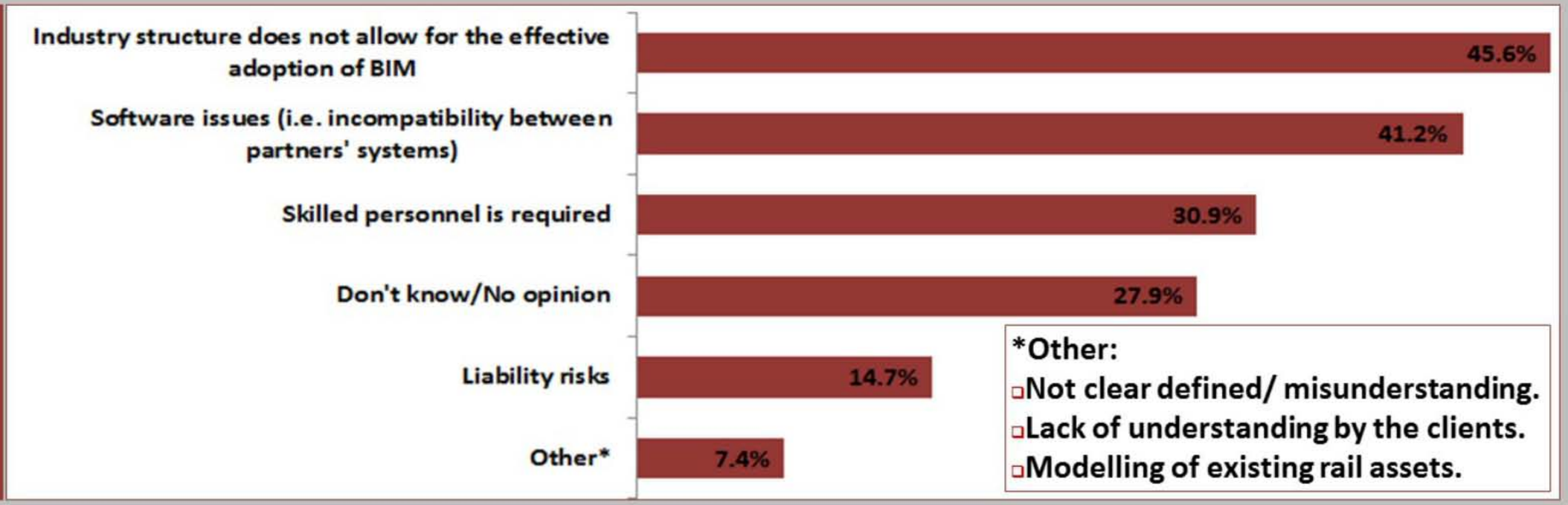
Prezi

BIM SWOT

Major Strengths



Major Weaknesses



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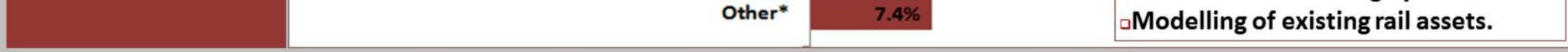
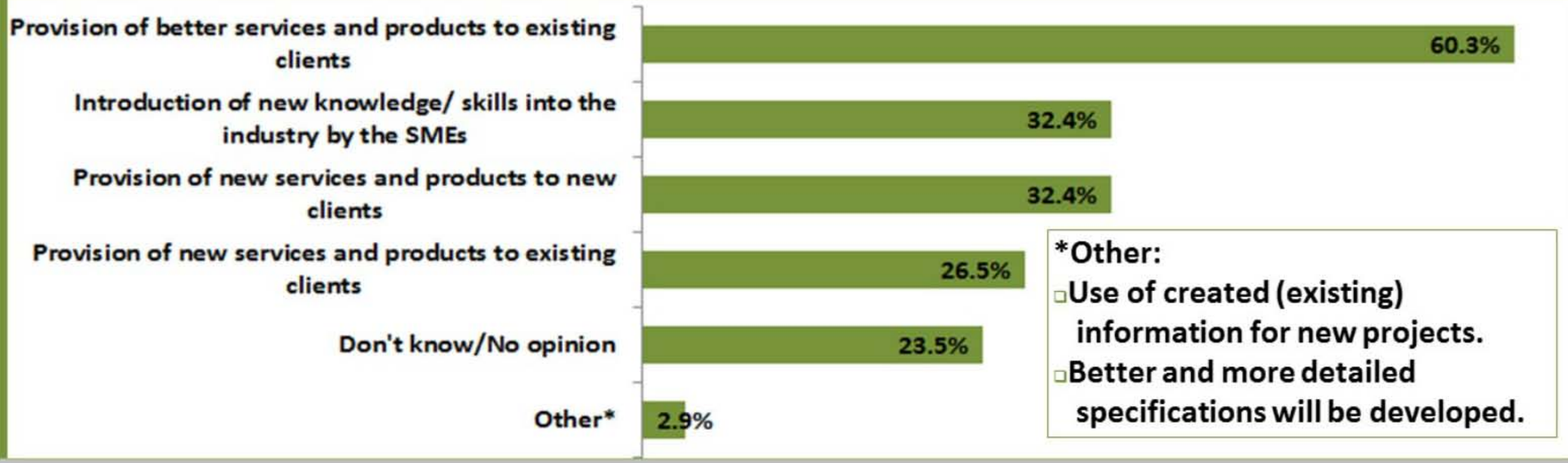


- Modelling of existing rail assets.

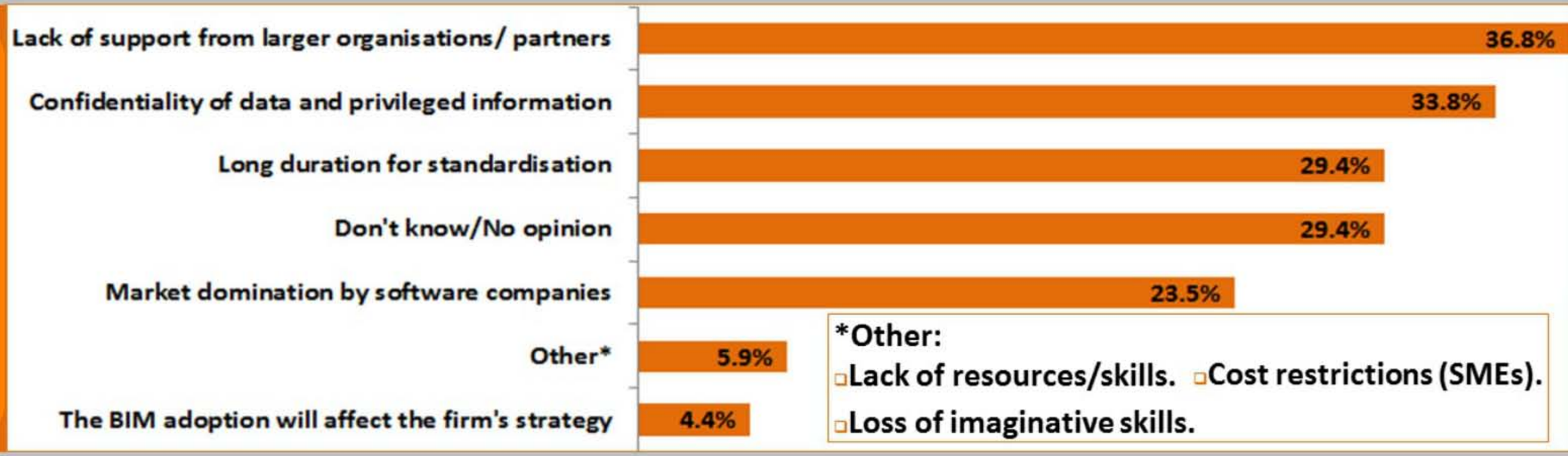
Major Opportunities



*Other:

- Use of created (existing) information for new projects.
- Better and more detailed specifications will be developed.

Major Threats



*Other:

- Lack of resources/skills.
- Cost restrictions (SMEs).
- Loss of imaginative skills.

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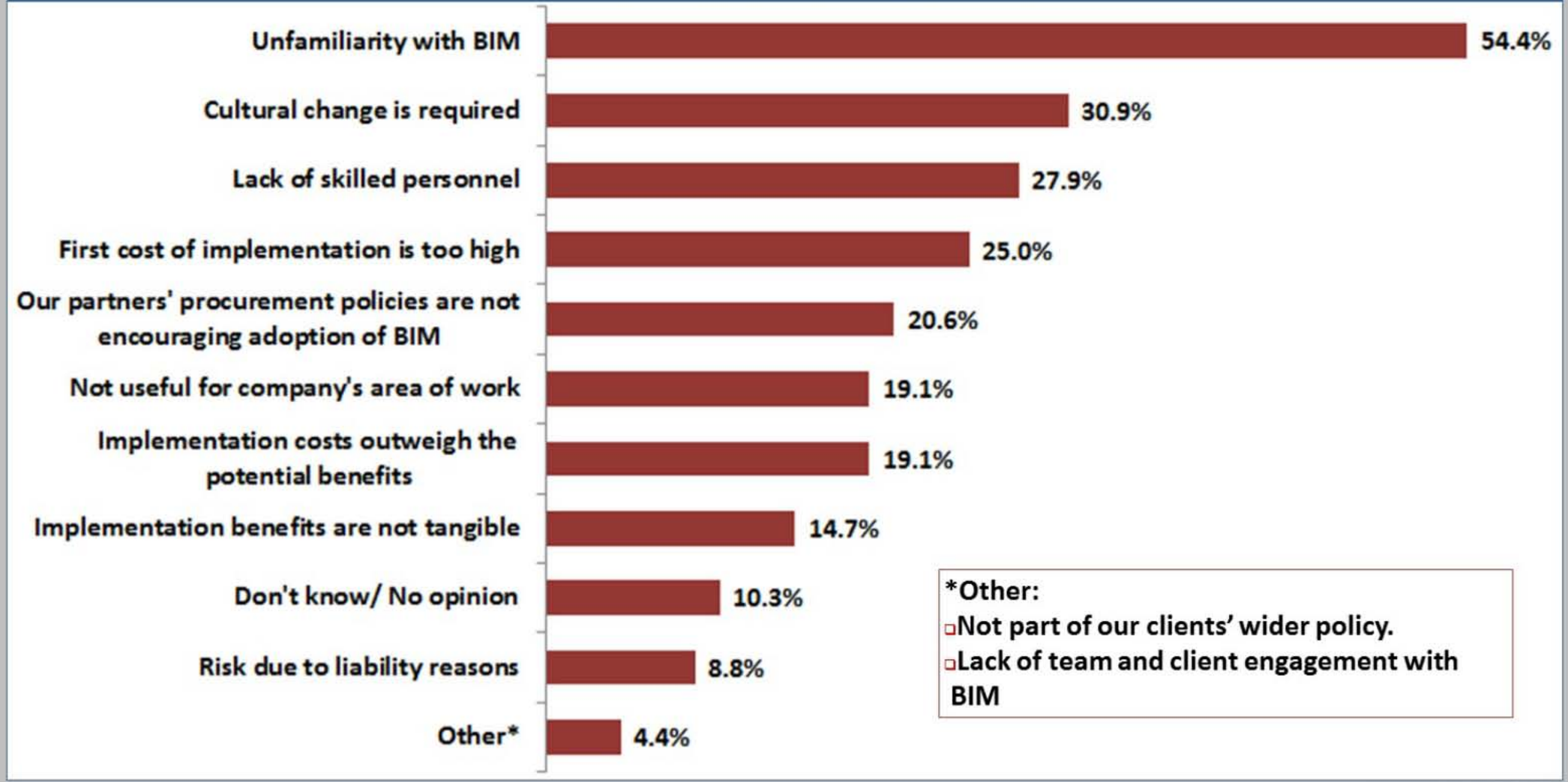
BIM barriers

In your opinion which of the following are the main barriers for the BIM adoption by your company?



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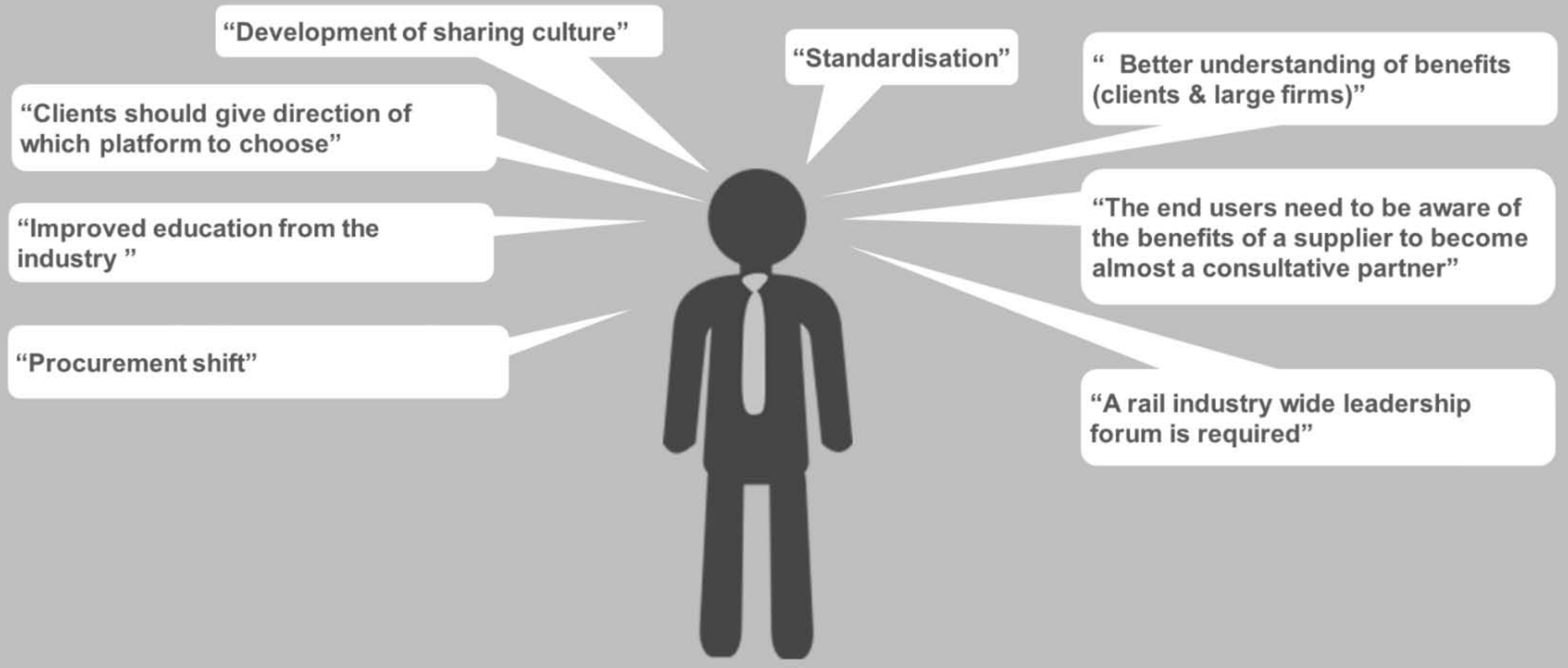
Other* 4.4%

Ways to overcome the barriers



Conclusion

long-term change

technology

interoperability
software/ BIM Railway platform
skilled personnel

culture/mentality

sharing culture

collaboration & trust

financial + commercial

better definition + understanding
invest in BIM
large firms + clients support SMEs
standardisation

process

'BIM friendly' procurement
non-adversarial contracts
flexibility
reassessment of confidentiality

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Recommendations

- **Further investigation of the firms' innovative/BIM capabilities**
- **Comparative study** (BIM in Railway vs BIM in AEC)
- **Standardisation and regulations + clearer definition of BIM** (Asset management + collaboration)
- **Development of a BIM strategy for the industry - achievable & measurable targets**
- **Development of a collaborative 'BIM friendly' culture**
- **Creation of a multi-professional and cross-sectoral BIM panel**
- **Protection - Hazard of domination by software companies**
  development of a common BIM railway platform widely available at low cost
  (BIM Task Group – supporting BIM software (COBie) is available for free)
- **'Crossrail Academy' paradigm**

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further opportunities

- **New business area - SMEs opportunity**
  creation and management of information models for the existing UK railway assets

- **BIM for Asset Management**
  information for the end-users (citizens, TOCs, FOCs), the network owner (NR) and the suppliers.

- **'Smart'/ Digital UK Railway**
  Smart City concept, Digiital Built Britain

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Thank you!!