

CONSTRUCTION 2020

A Vision for Australia's Property and Construction Industry



CRC Construction Innovation
BUILDING OUR FUTURE



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Year of the Built Environment 2004

EXCELLENCE IN BUILDING

The Structure for each vision

- Define the **Vision**
- Set the **Goal** for 2020
- Define the **Strategies** to be adopted
- Identify **Barriers** to achievement
- Suggest **Research** to be undertaken

Vision 1

Environmentally Sustainable Construction



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Environmentally Sustainable Construction which will minimise waste, maximise recycling and re-use, reduce need for non-renewable resources (especially fossil fuels) and avoid pollution of land water and air – preserving environmental choices for future generations.

The main themes of Rio 1992

Equity

Concern for today's poor and disadvantaged

Futurity

Concern for future generations

Public Participation

Concern that individuals should have an opportunity to participate in decisions which affect them

Environment

Concern to protect the integrity of eco-systems

SUSTAINABILITY



**CONSERVE
AT ALL
COST**

**SEEK
TECHNICAL
'FIX'**

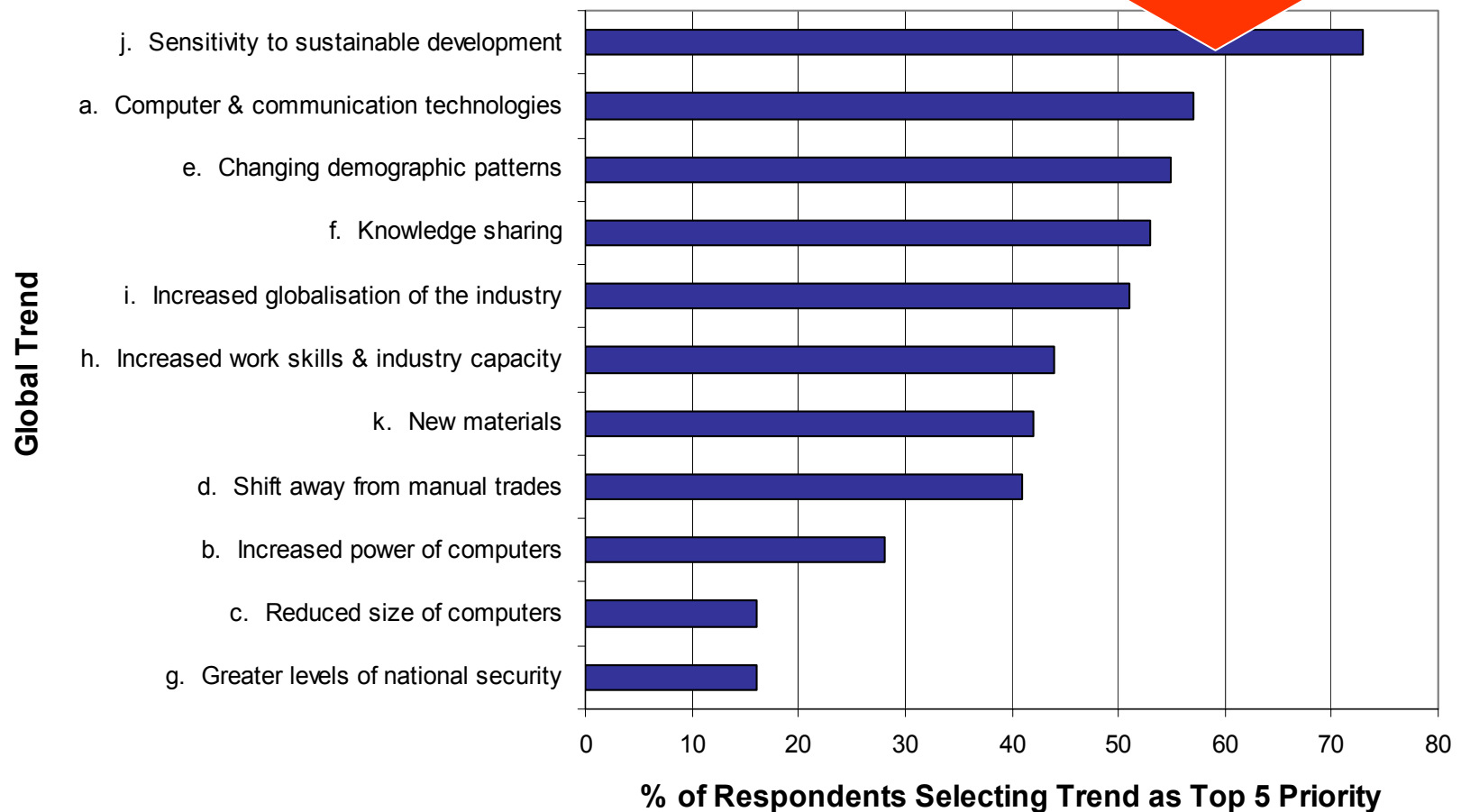
THE SPECTRUM OF VIEWS ON SUSTAINABILITY

The goal for 2020

Industry to have comprehensive eco-efficiency tools for all stages of the construction life cycle to provide ready assessment of environmental performance against international best practice standards and these to be embedded in Australia's National Building Regulations.

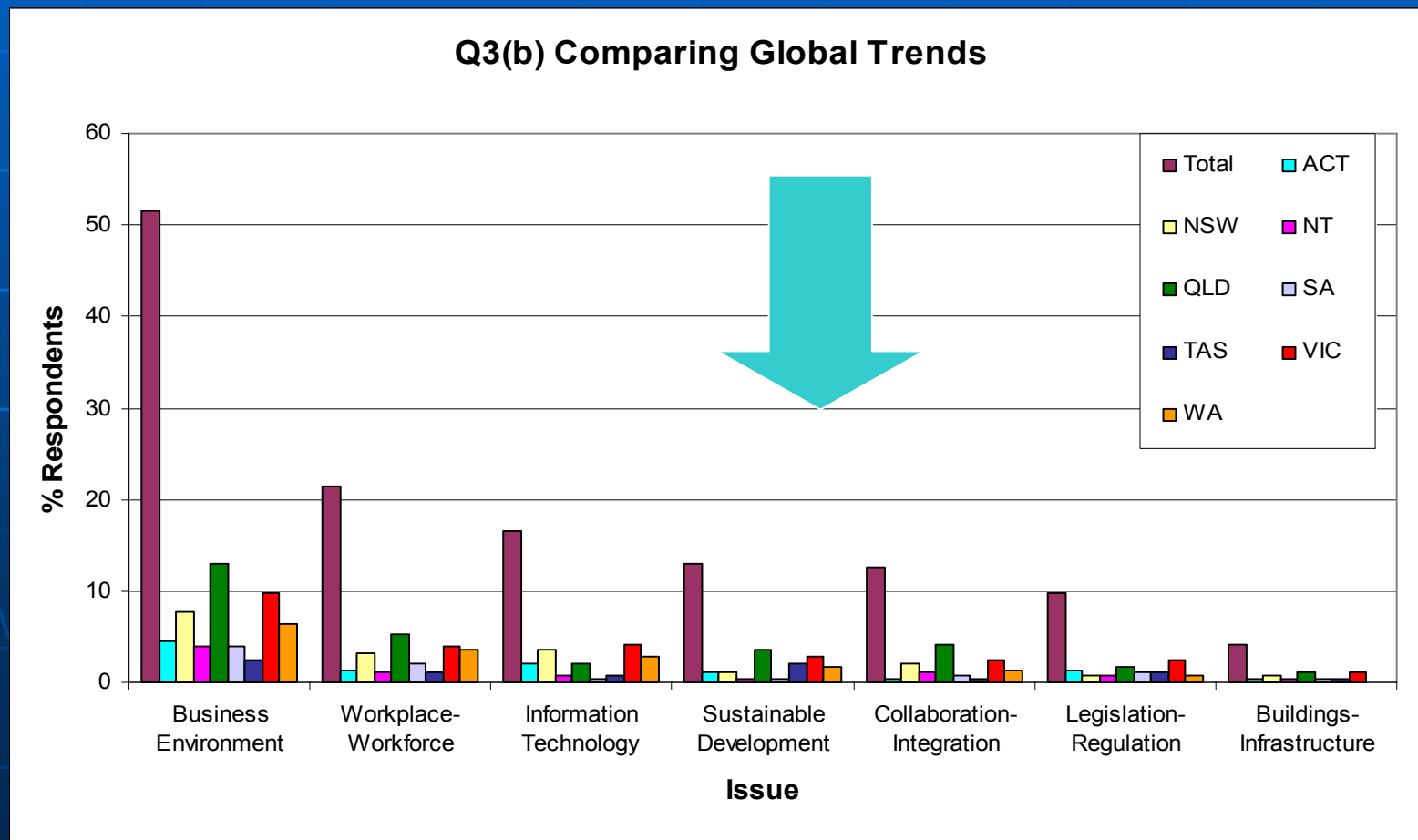
What are the strongest **global trends** that need to be considered?

Q3(a) Global Trends Affecting the Industry



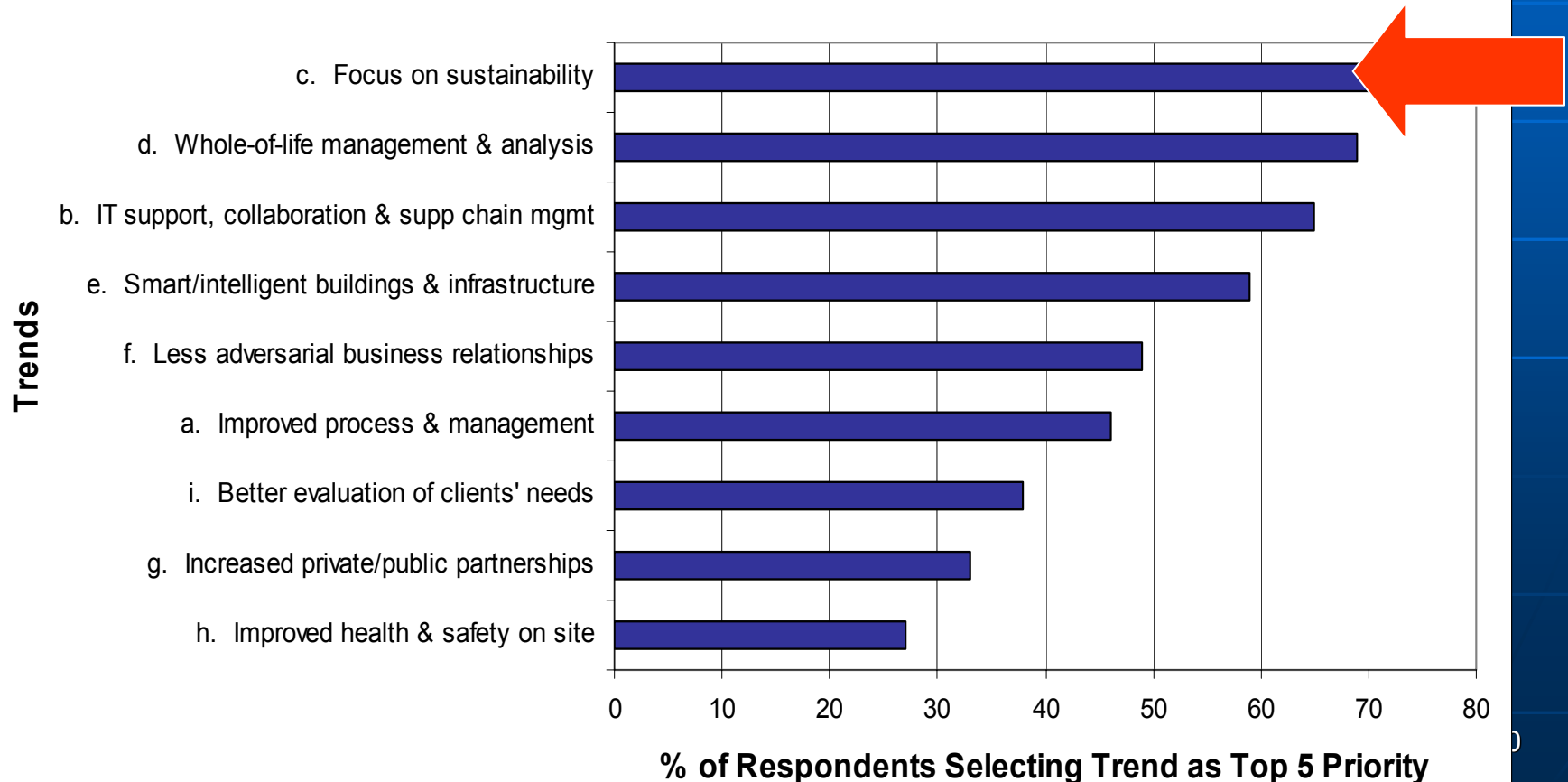
What is distinctive about Australia?

This shows your view of the ranking of sustainable development as a theme needing to be addressed by the Australian industry.



The **trends** you thought were going to have the **most impact** on Australia's property and construction industry

Q3(c) Issues and Technologies

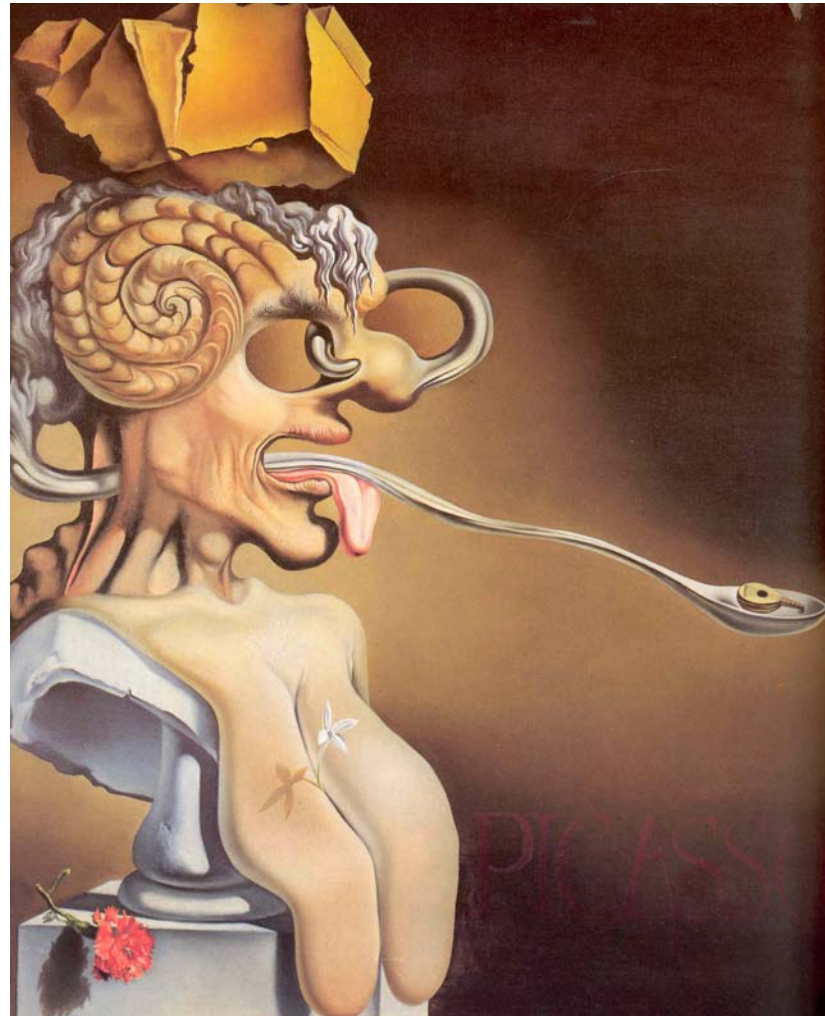


Discussion

- What do you think is attainable by 2020?
- What are the significant industry changes needed to make this vision realisable?
- What priority for the research agenda?
- Anything else you want to comment on?

Vision 2

Meeting Client Needs



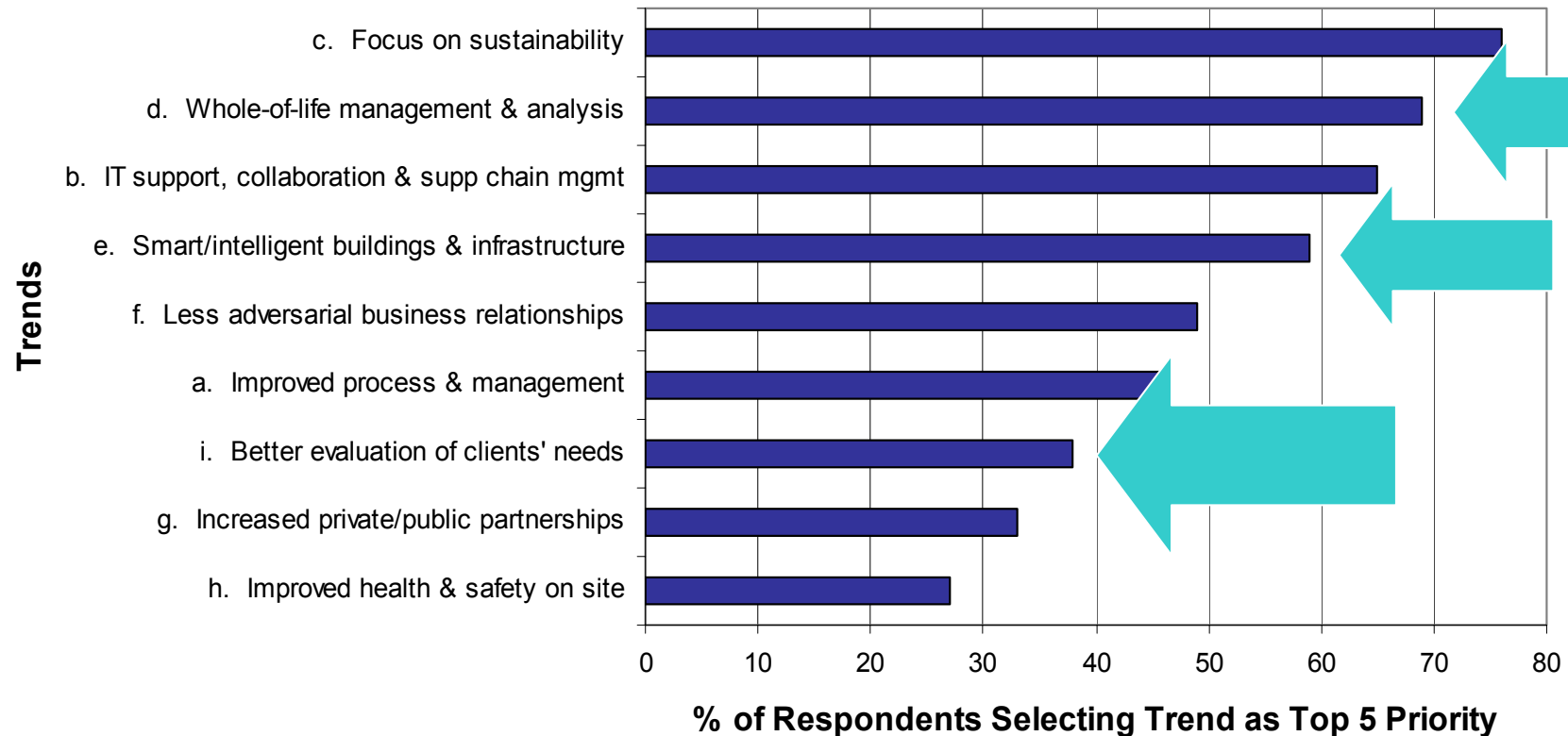
Meeting Client needs for the design, construction, and operation of facilities to truly reflect the present and future needs of the project initiator, owners/tenants, and aspirations of stakeholders. This should take into account the need for improved quality, economic viability and have the flexibility to adapt to future circumstances, technologies and needs of society.

The Goal for 2020

A 10% reduction in defects per year, develop better systems for capturing client requirements throughout the asset life. Future users and beneficiaries of the asset will also be considered and *long life, loose fit, low energy* will be encouraged in all design solutions.

How important did you think it was in terms of impact on the Australian Property and Construction Industry?

Q3(c) Issues and Technologies



Discussion

- What do you think is attainable by 2020?
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Vision 3

An Improved Business Environment

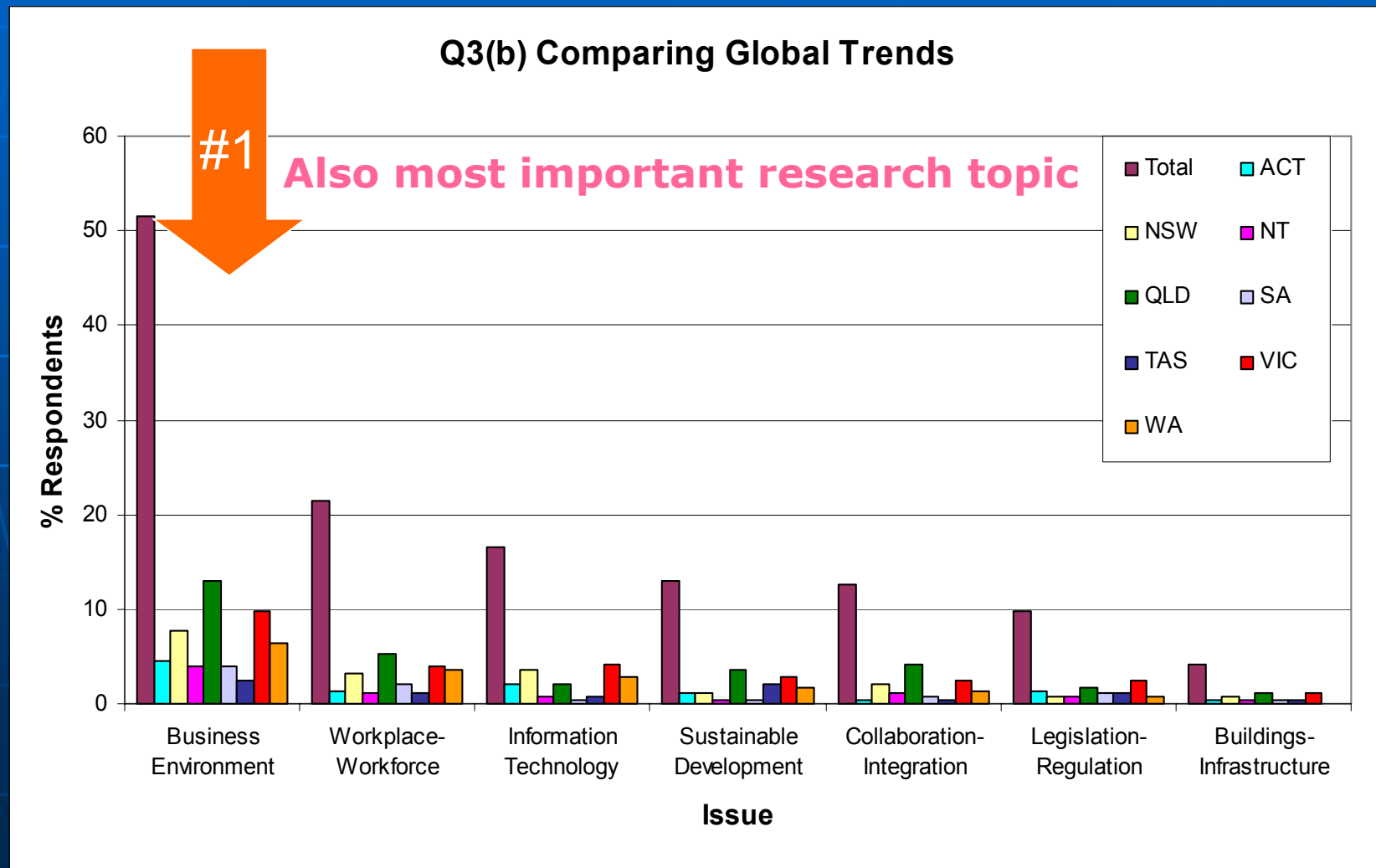


Improved business environment
to provide a regulatory, financial and
procurement framework which
encourages longer term thinking and
returns, a sharing of ideas and
innovation between stakeholders,
and a fair distribution of risk and
returns.

Respondents communicated concern on a number of levels:

1. **Day-to-day** - with convoluted tendering and project administration practices
2. **Mid-term** - through an inconsistent drive to life cycle analysis contrasting with predominance of low-bid tendering
3. **Strategic** - through frustration with poor industry image and inability to secure and retain high-quality, skilled staff

How important is it to Australia?



How important did you think it is in terms of impact on the Australian Property and Construction Industry?

Q3(c) Issues and Technologies



Discussion

- What do you think is attainable by 2020?
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Vision 4

Welfare and Improvement of the Workforce



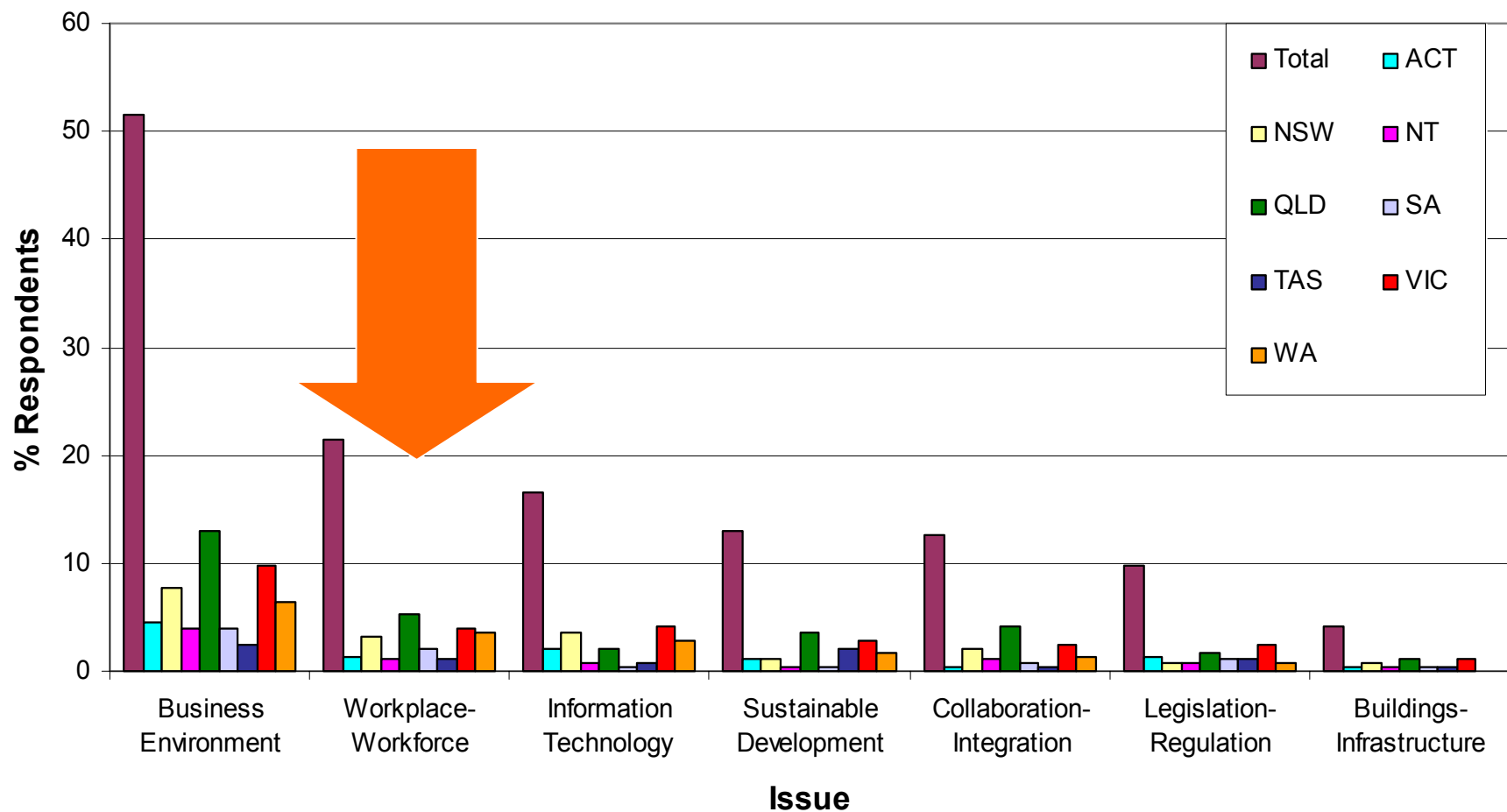
Welfare and improvement of the workforce where the industry is computer literate and highly skilled, showing mutual respect for each other through management and workers acting collaboratively, with improved health and safety conditions on-site

The Goal for 2020

- An ongoing supply of skilled workers to service this vital Australian industry
- A national code of construction safety management
- A more internationally productive and effective labour force operating in a less adversarial industrial relations context

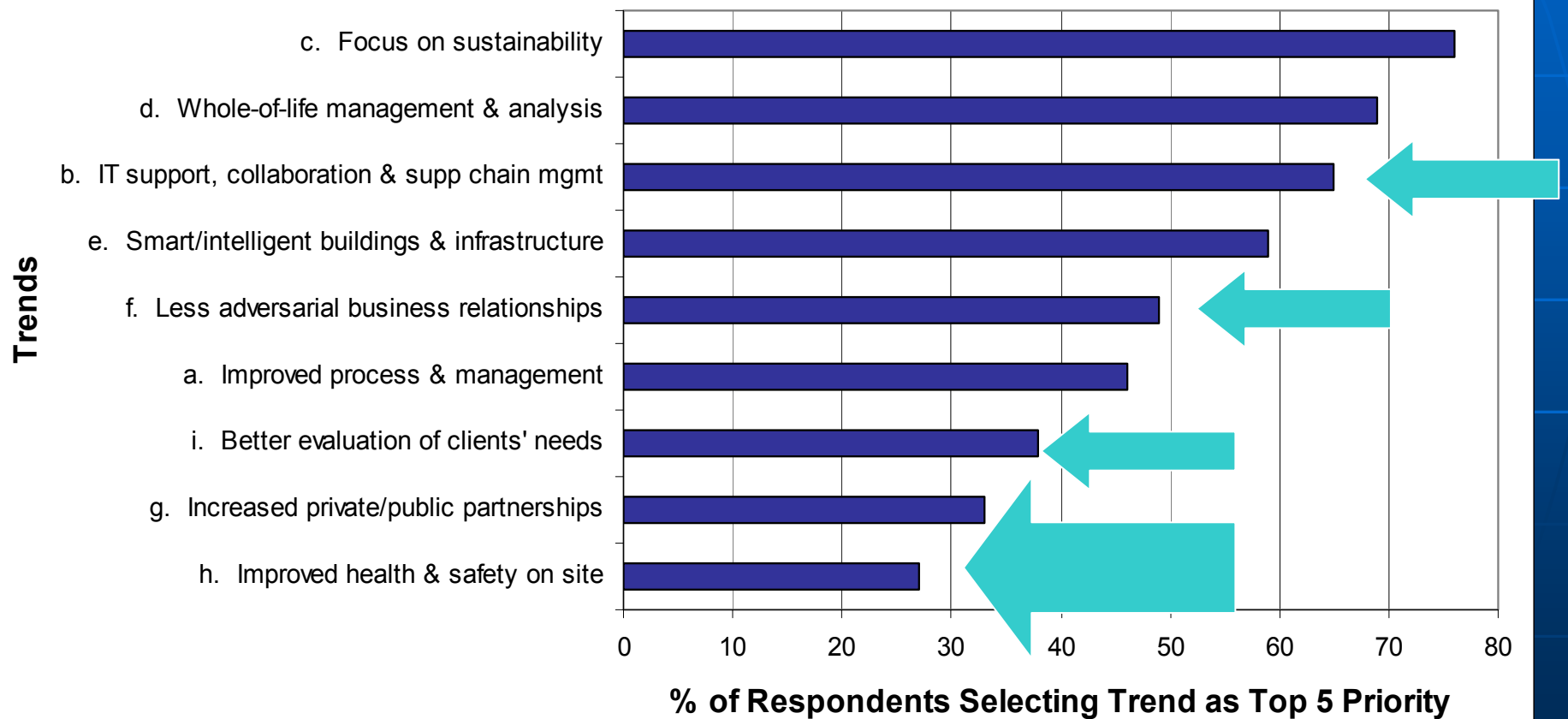
How important is it to Australia?

Q3(b) Comparing Global Trends



How important did you think it is in terms of impact on the Australian Industry?

Q3(c) Issues and Technologies



Discussion

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Vision 5

Information and Communication technologies



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The communication and data transfer infrastructure of the industry to be seamless, enabling transfer without interruption and delay (including the use of mobile devices) within a commercially secure environment.

These technologies will be embedded within construction products and processes to improve efficiency and effectiveness.

“The Tipping Point”

Malcolm Glanville identified this phenomenon in social sciences similar to an epidemic i.e. something that spreads rapidly. He suggests three requirements:

- **Contagious – quickly becomes accepted wisdom**
- **Period where little causes have big effects**
- **Movement occurs dramatically rather than incrementally**

Convergence

Culture

Connectivity

**Common
standards**

**What will tip the balance for the application
of IT in Construction?
'C' for yourself!!**

**Cost
reduction**

Creativity

Content

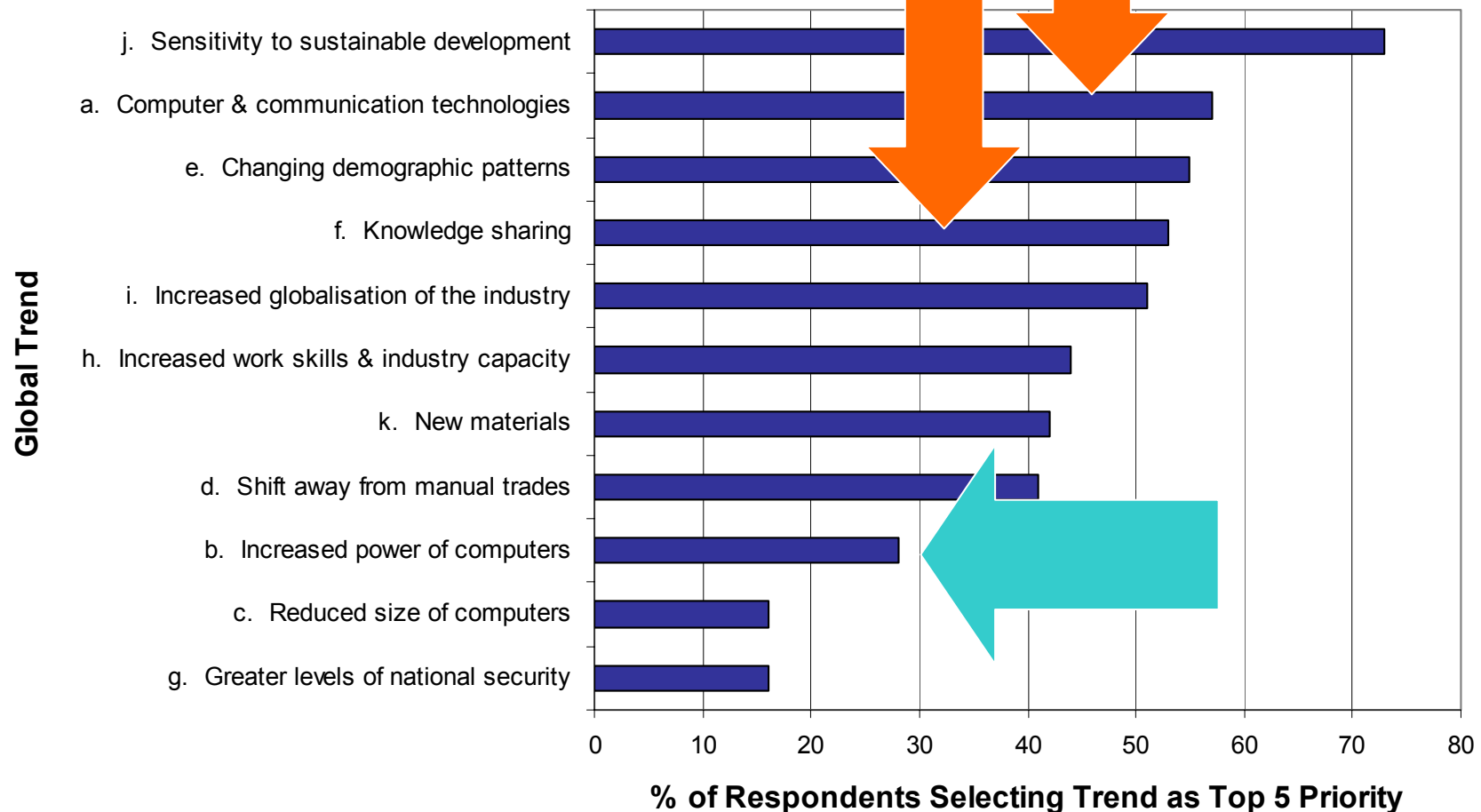
**Collaborative
Working**

The Goal for 2020

- To develop a **seamless web of communication** available to all participants in the development, construction and operational cycle of the project
- Allow **management information to be readily available** to all relevant personnel to monitor performance (remotely if needed), to speed up decision making using shared data models and employing hand held devices to empower individuals achieve corporate objectives

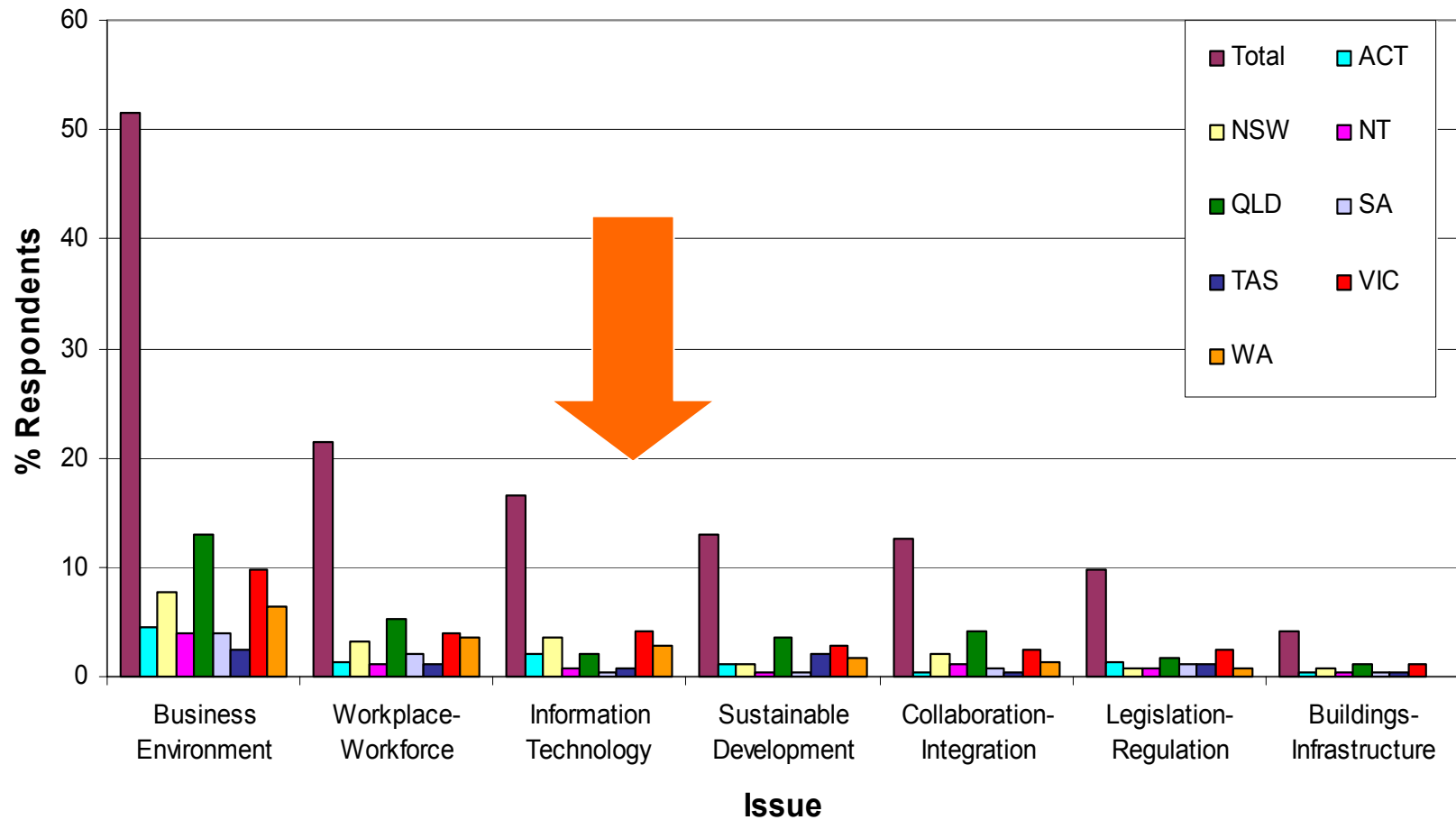
What are the strongest global trends that need to be considered?

Q3(a) Global Trends Affecting the Industry



What's distinctive about Australia?

Q3(b) Comparing Global Trends



The trends you thought were going to have the most impact on Australia's Property and Construction Industry

Q3(c) Issues and Technologies



Vision 6

Virtual Prototyping



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To create a virtual prototype for the whole building/infrastructure to be available which will provide the opportunity to *try before you buy* at all stages of the development cycle.

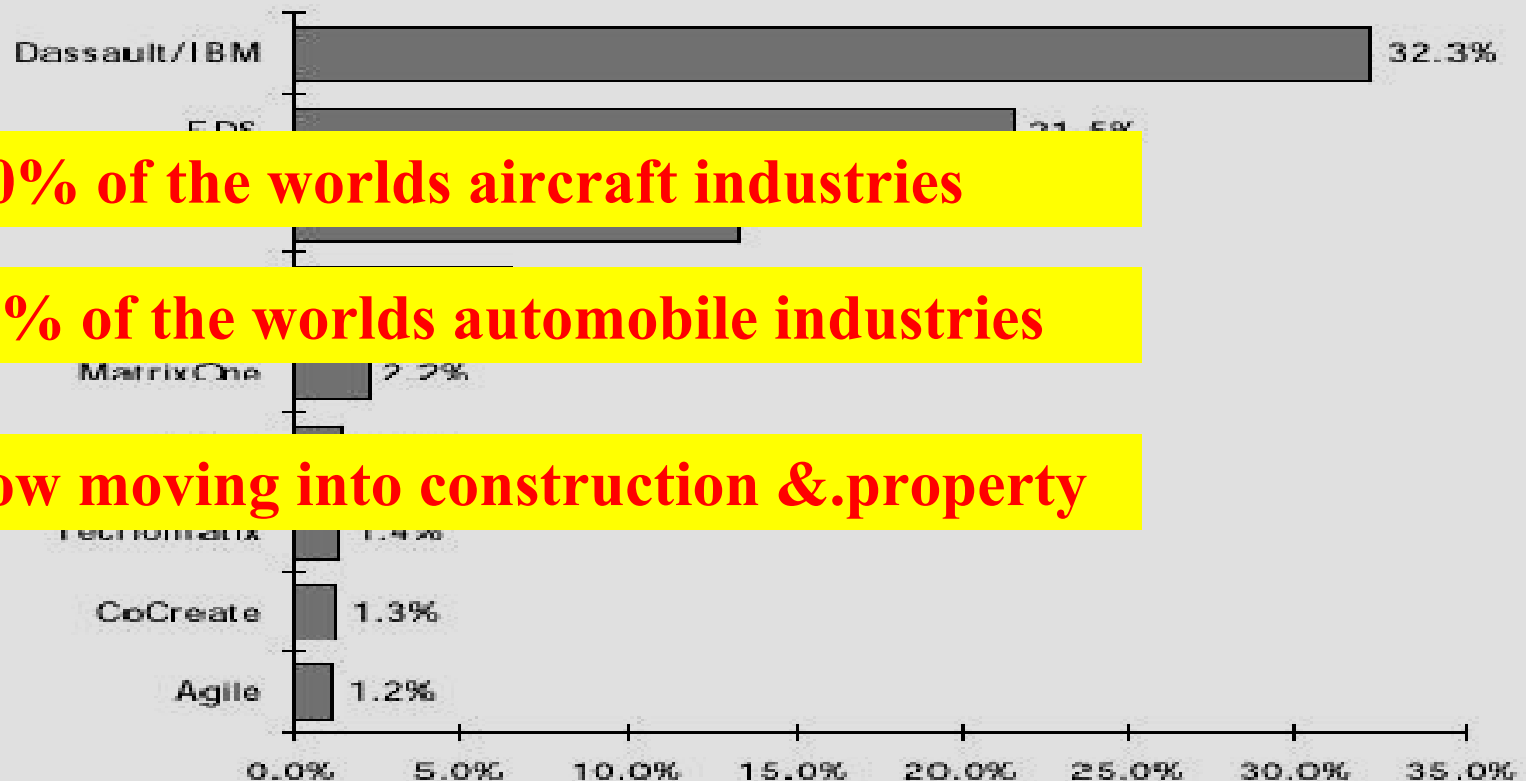
The prototype will be a common model or electronic representation from which all relevant decisions can be made and from which the procurement processes will develop.

The Goal for 2020

- To provide a platform and model from which the constructed facility can be created, to simulate the physical product and the processes by which the product can be managed and to develop 'information rich' management CAD/CAM models to manage the asset throughout its life-cycle.



The leadership of CATIA in project life cycle management



80% of the worlds aircraft industries

70% of the worlds automobile industries

Now moving into construction &.property

Other = 18.8 Percent

Source: John Moore, PLM Worldwide Outlook, ARC, Jan 2003

DIGITAL Automotive, Total Business Transformation

Car – Process – Plant Integration

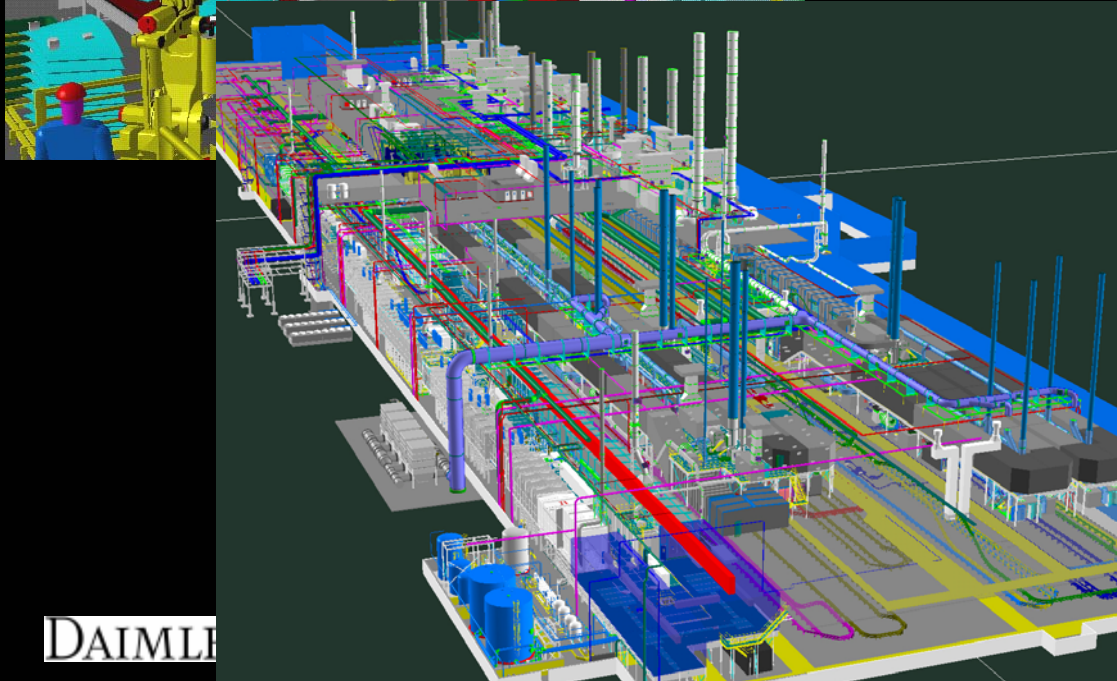
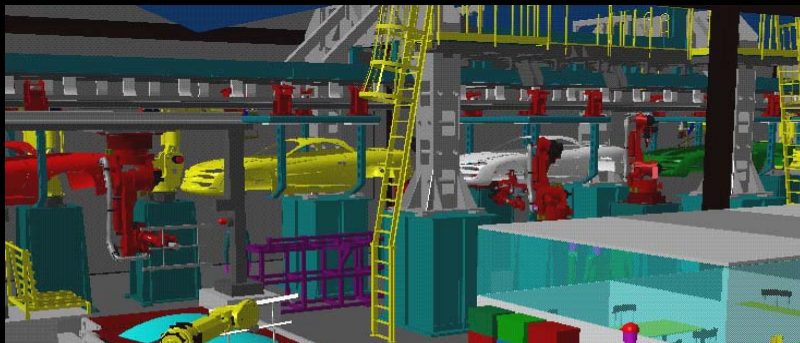
New Jeep Plant / Toledo Plant:

The first ever Integrated Car - Process - Plant Design

- 8 AEC Organizations interacting
- 1,000,000 Sq Ft Plant; > \$1Billion Project

Business Objectives

- Dramatic Time to market reduction
- 39-month 1993;
- 28-month 2000;
- goal 2004 /12 –month
- Error Free Process
- The Best Cars @ Competitive Price



DAIMLER

Discussion

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Vision 7

Off-site manufacture



Off-site manufacture where a majority of construction products are manufactured off-site and brought to the site for assembly. This will enable better quality control, improved site processes including health and safety control, more environmentally friendly manufacture and possible reductions in cost.

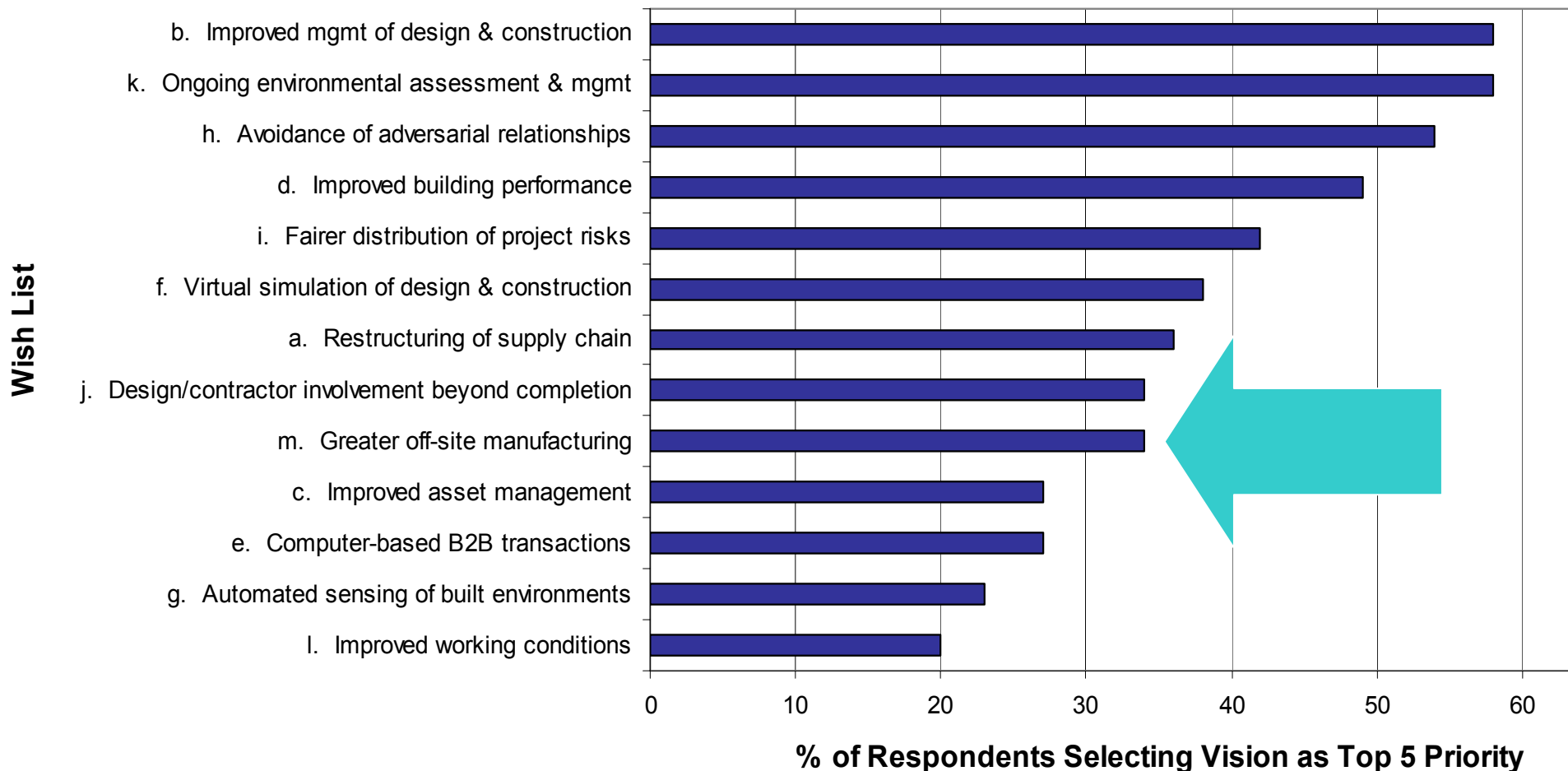
The Goal for 2020

The goal is to establish off-site manufacture as a key component of the construction process.

Respondents considered off-site manufacture to have a very high likelihood of occurrence in the next 5 to 15 years.

Essential to an improved industry in the long term?

Q4 Picture Your Vision



Off-site fabrication drivers

- Economic
- Social
- Environmental
- Construction processes

“I dream of more off-site construction for enhanced quality, safety, timeliness and consistency”

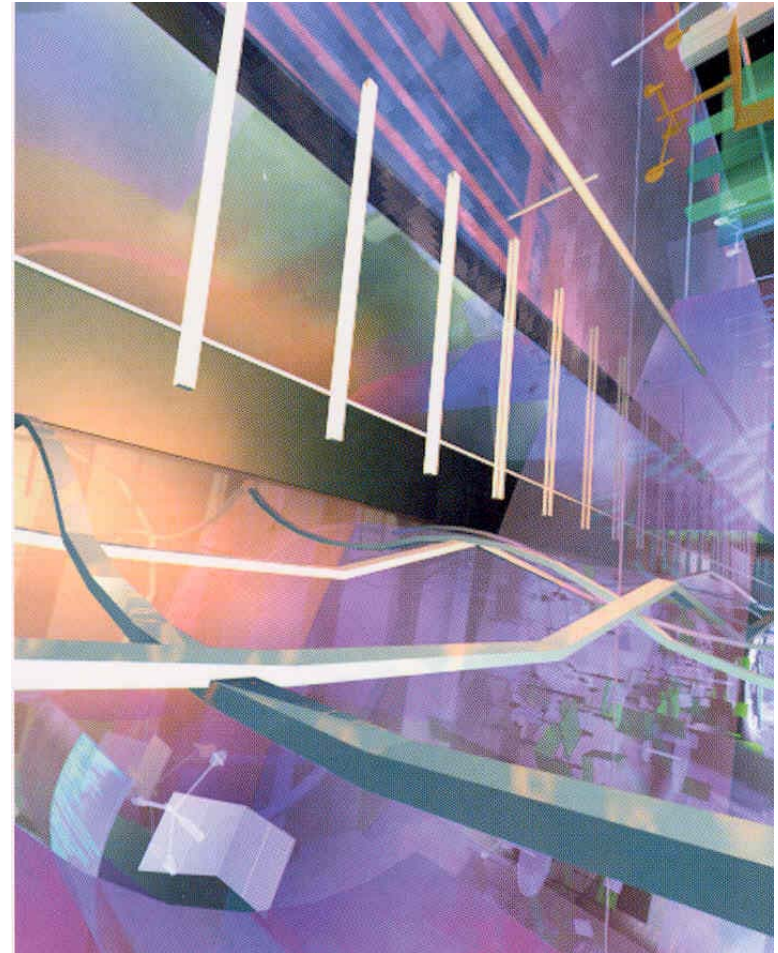
“By 2020 I envisage that building processes will have undergone a transformation in technique and material. Elements requiring a high labour content on-site will have been modified to be constructed off-site in factory-type operations. This will have led to reduced accidents on-site. It will also mean that there will be improvements in product quality, environmental cost and time of site construction.”

Discussion

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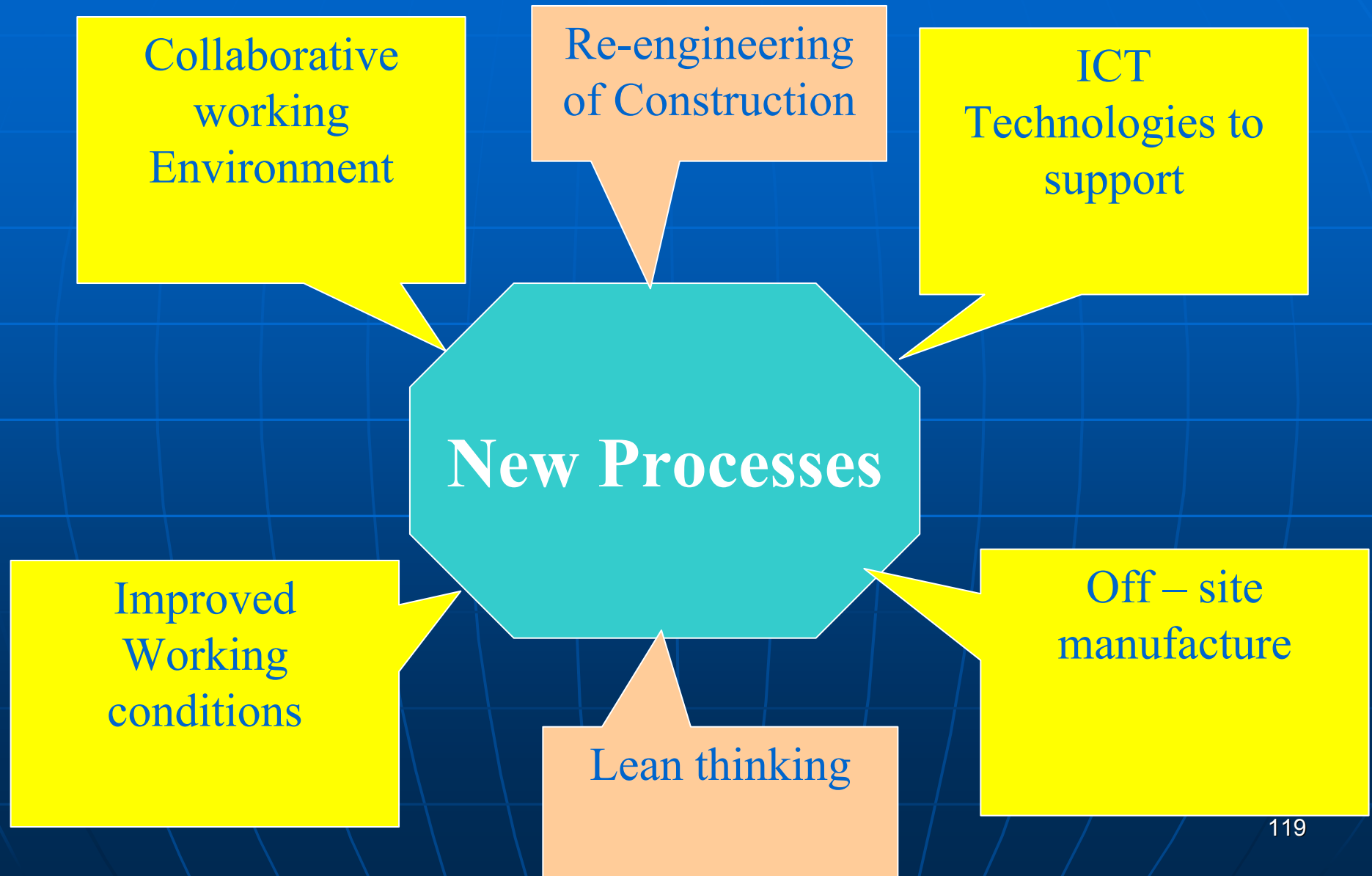
Vision 8

Improved Construction Processes



The development of new processes allowing the industry to work more efficiently and effectively using improvements in ICT's allowing a *lean production environment* where the supply chain is **re-structured** and **integrated, collaborative** rather than **adversarial**, avoiding time and cost over-runs.

Drivers for Process Improvement



Drivers for Process Improvement

Collaborative
working
Environment

Re-engineering
of Construction

ICT
Technologies to
support

**The establishment of new processes
has to be an INTEGRATED
solution**

Improve
Working
conditions

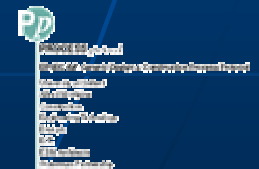
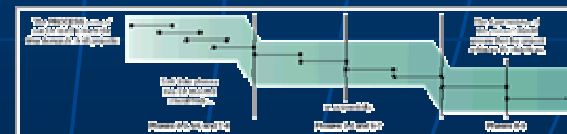
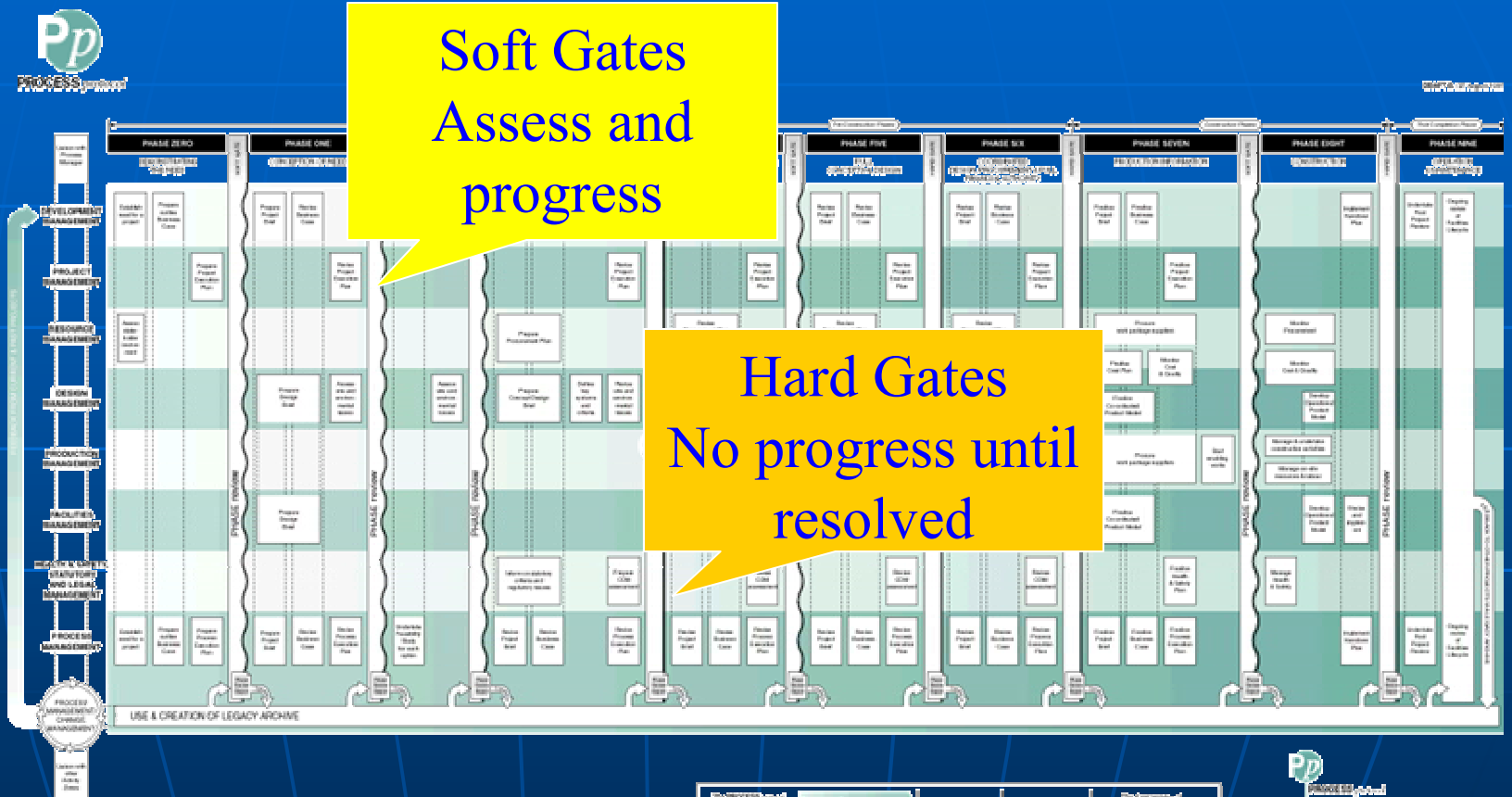
an thinking

on-site
manufacture

The Goal for 2020

- Re-engineer the supply chain in appropriate sectors of the industry to ensure that the process of construction is as lean as possible.
- The industry will use ICT to assist and enhance the value of the product to the client and stakeholders through better quality control, better organisation and management of site activities and improved time management.

Process Protocol Model

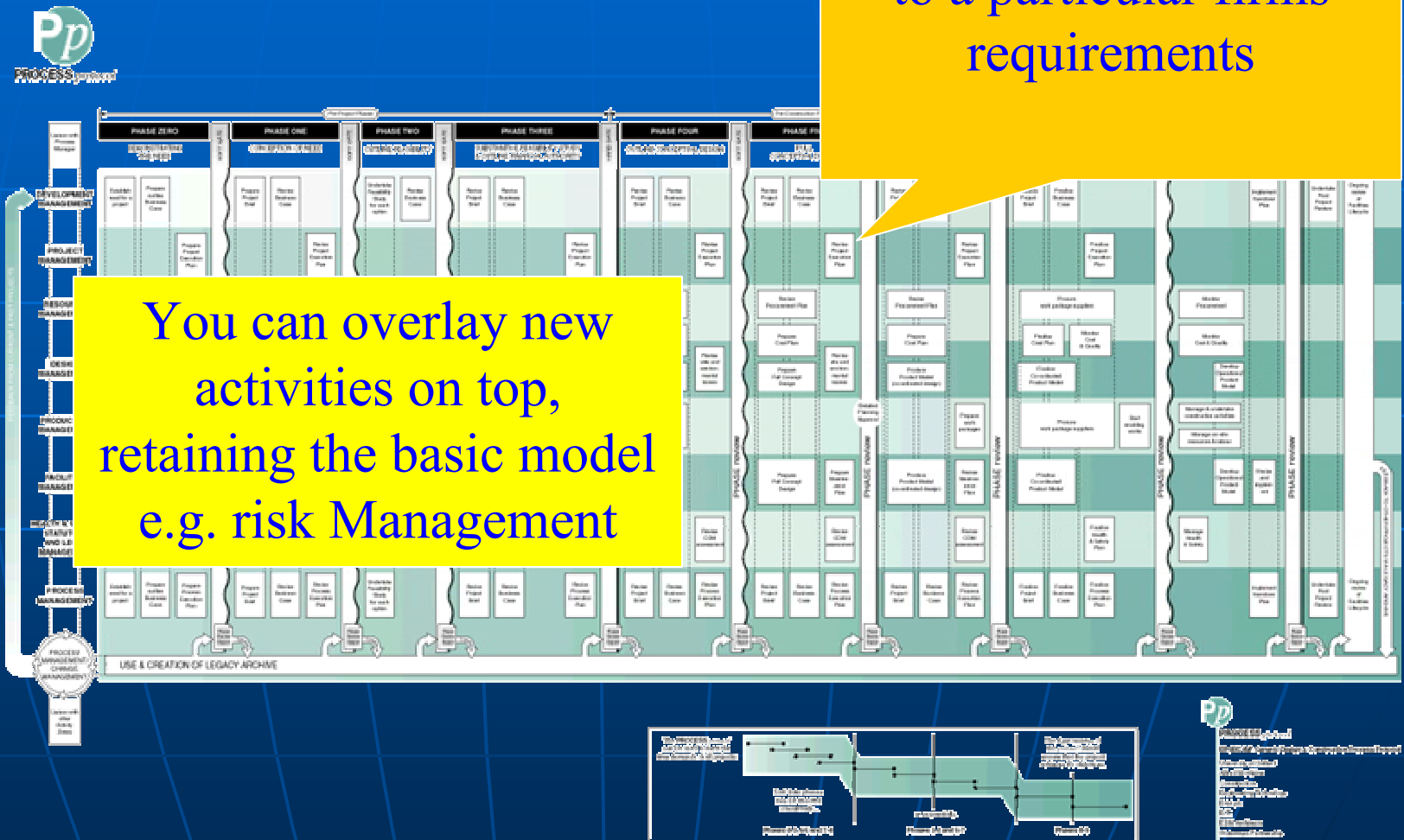


Process Protocol

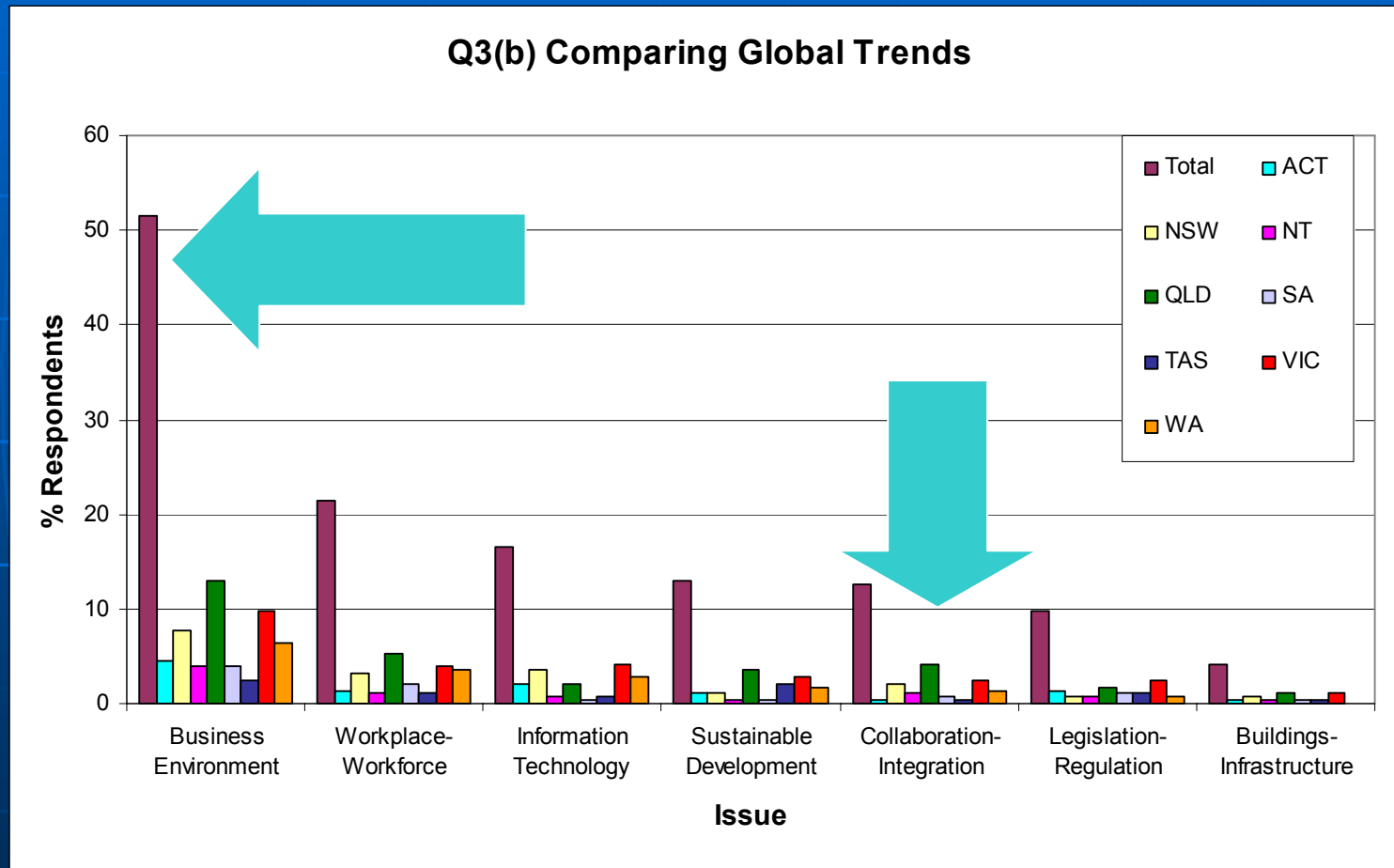
- Provides a base from which we can all develop
- Tested by a number of organisations
- Adopted by other countries
- Can be adapted to the changes arising from technological developments
- Avoids us re-inventing the wheel

Process Protocol Whole Model adaptable

Whole Model adaptable
to a particular firms
requirements

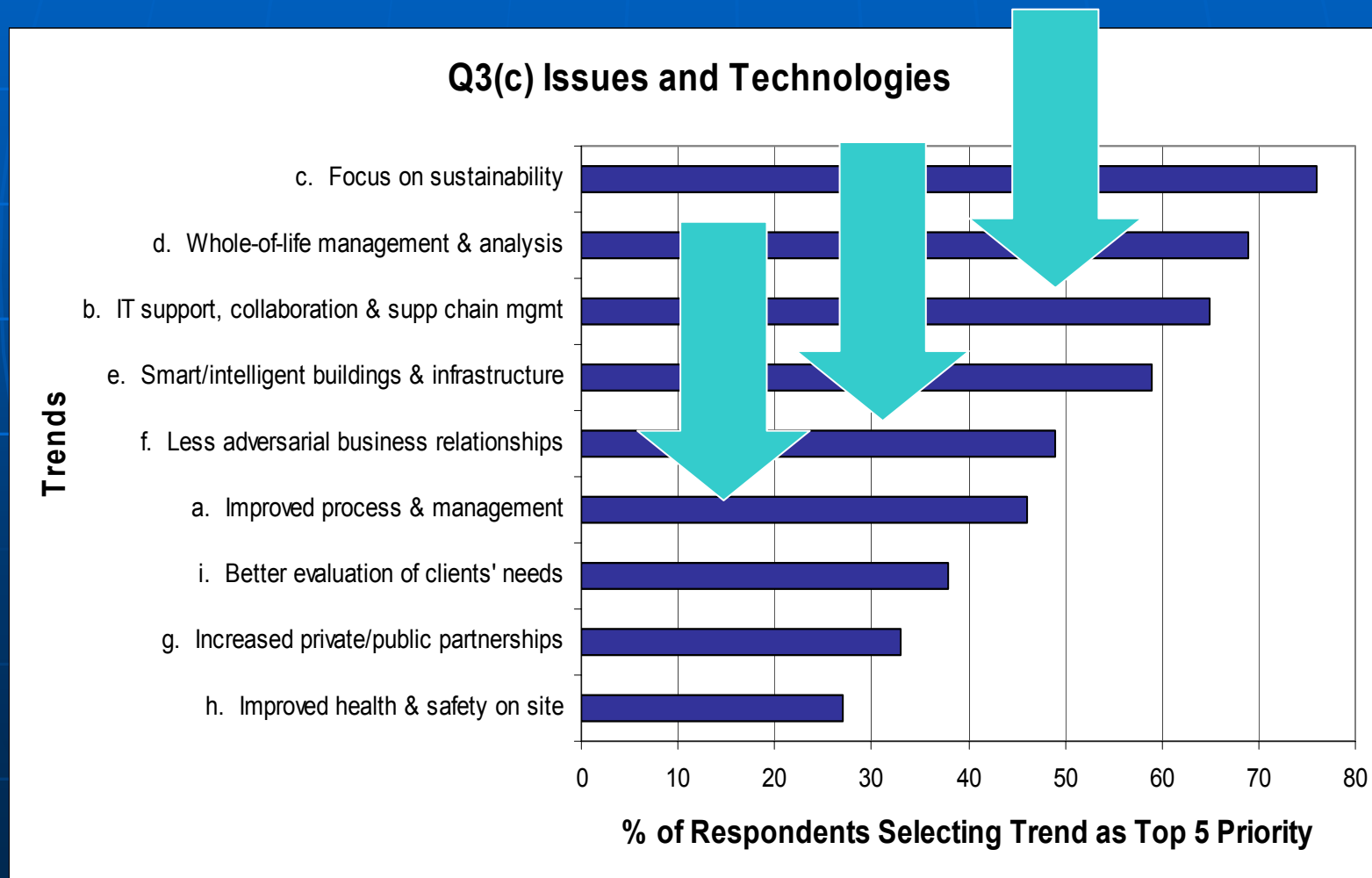


What is distinctive about Australia?



It's ranking as a theme that the industry needs to address

The trends that you thought were going to have the most impact on Australia.

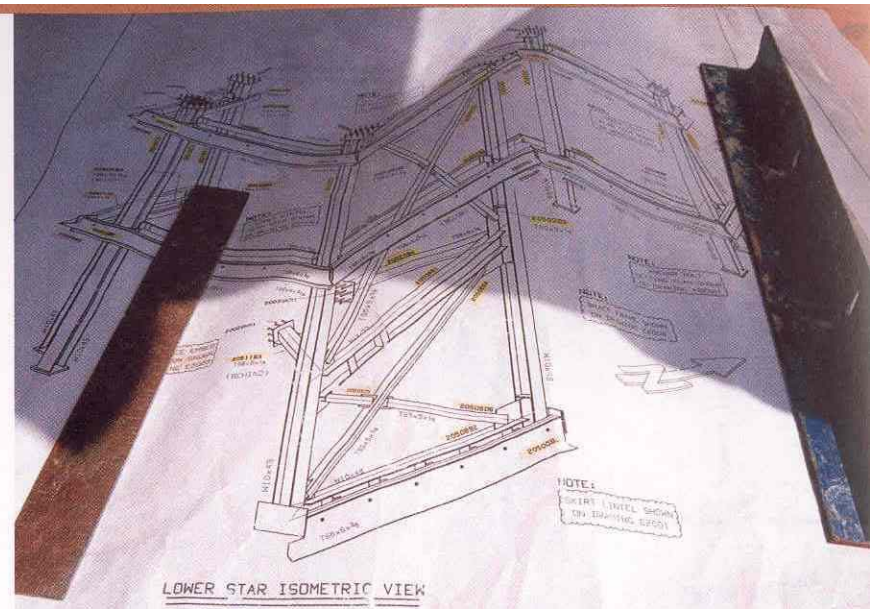


Discussion

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Vision 9

Australian leadership in research and innovation for the construction industry



For industry, government and research communities to work together to develop a culture of self improvement through research and innovation to advance the effectiveness and competitiveness of the Australian Property and Construction industries

This vision permeates all others

“Australia has the ability to set best-practice standards for the rest of the world through credible and renowned R&D channels.”

“We need more communication and collaboration between industry and researchers so we know what is really going on in each other’s patch.”

Industry must achieve real business benefits, while researchers need ongoing commitment and funding to achieve research outcomes.

General discussion

- What messages do you want us to take away from this workshop concerning the realisation of these visions?
- If you were making the investment for 2020 where would you put your money?
- Where do you think Australia can be a winner?

Facilitating the visions through research and innovation

- Thank you for your significant contribution in bringing the report together
- Thank you for your contribution today
- Let's make sure this consultation continues as the goals are refined
- Please work with the CRC to make sure YOUR visions are realised

Where to from here?

- National C2020 workshops NOW!
- CRC Construction Innovation Board will establish policy
- Refine and confirm goals with industry
- Determine research agenda to achieve goals
- Engage research community in delivering those goals

First International Conference - Gold Coast, 25-27 October 2004

Clients Driving Innovation ...

- Supported by CIB and ICALL
- Focus for public and private sector clients, consultants and constructors to explore opportunities and compare experiences for stepping up to the next level

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The beginning not the end!!

Further information from www.construction-information.info



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