

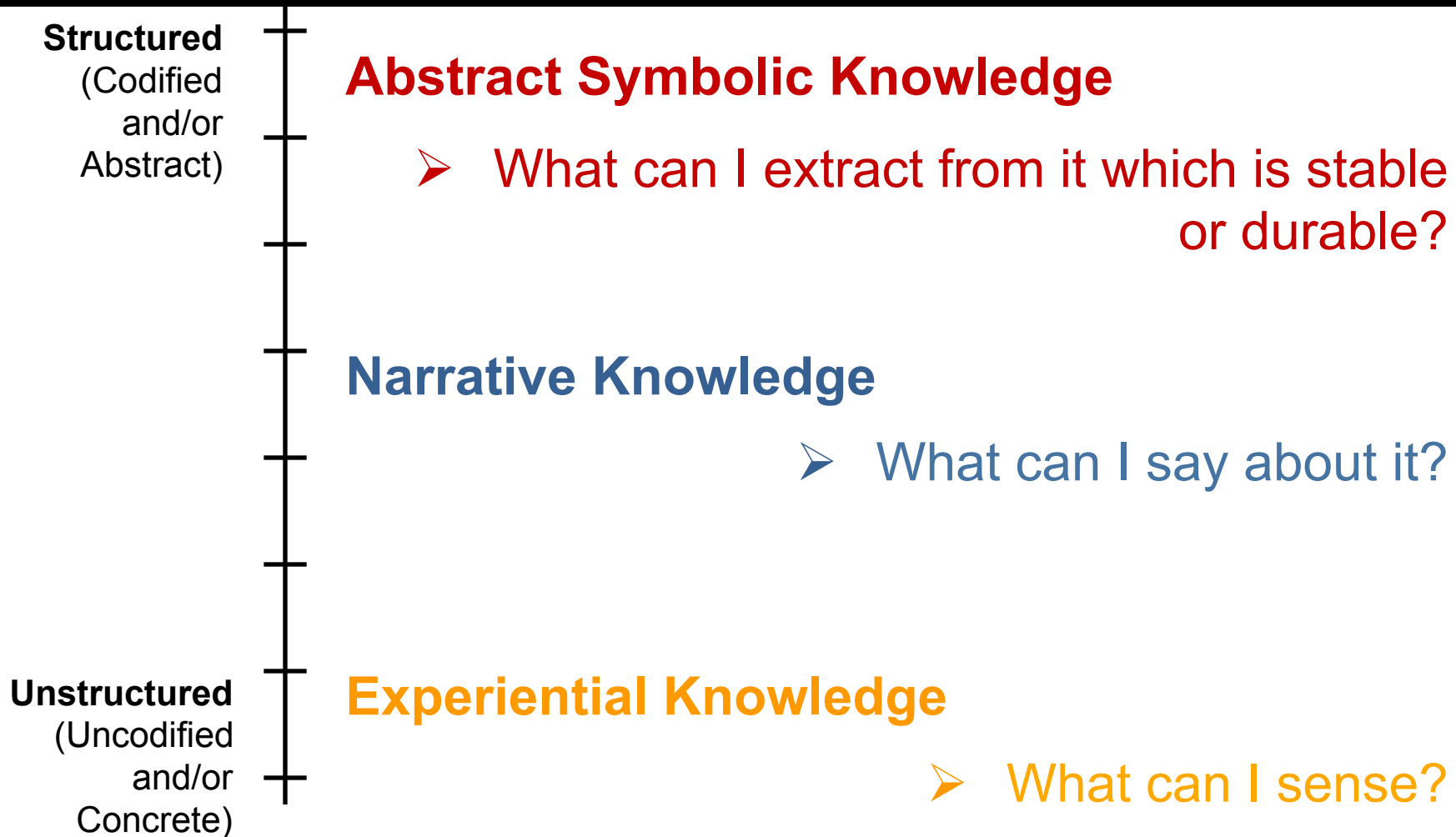
Lessons learned from the ATLAS Experiment at CERN



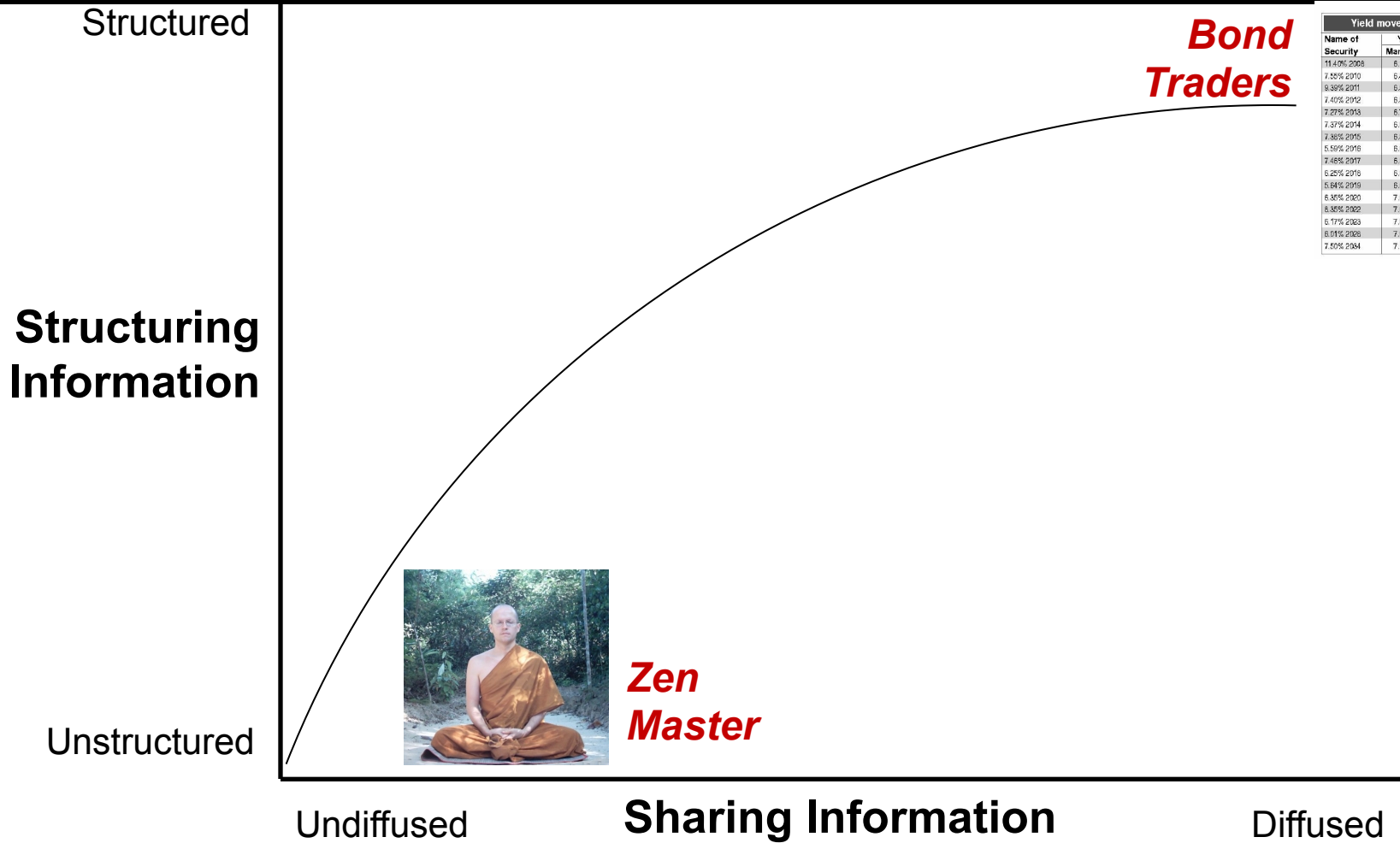
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- How to *identify* the knowledge assets that underpin the performance of ATLAS?
- How to *locate* them in the I-Space?
- How to *interpret* the resulting map in value creation and strategic terms?
- How to *lead* knowledge exchange more effectively across networks?

Three Kinds of Knowledge



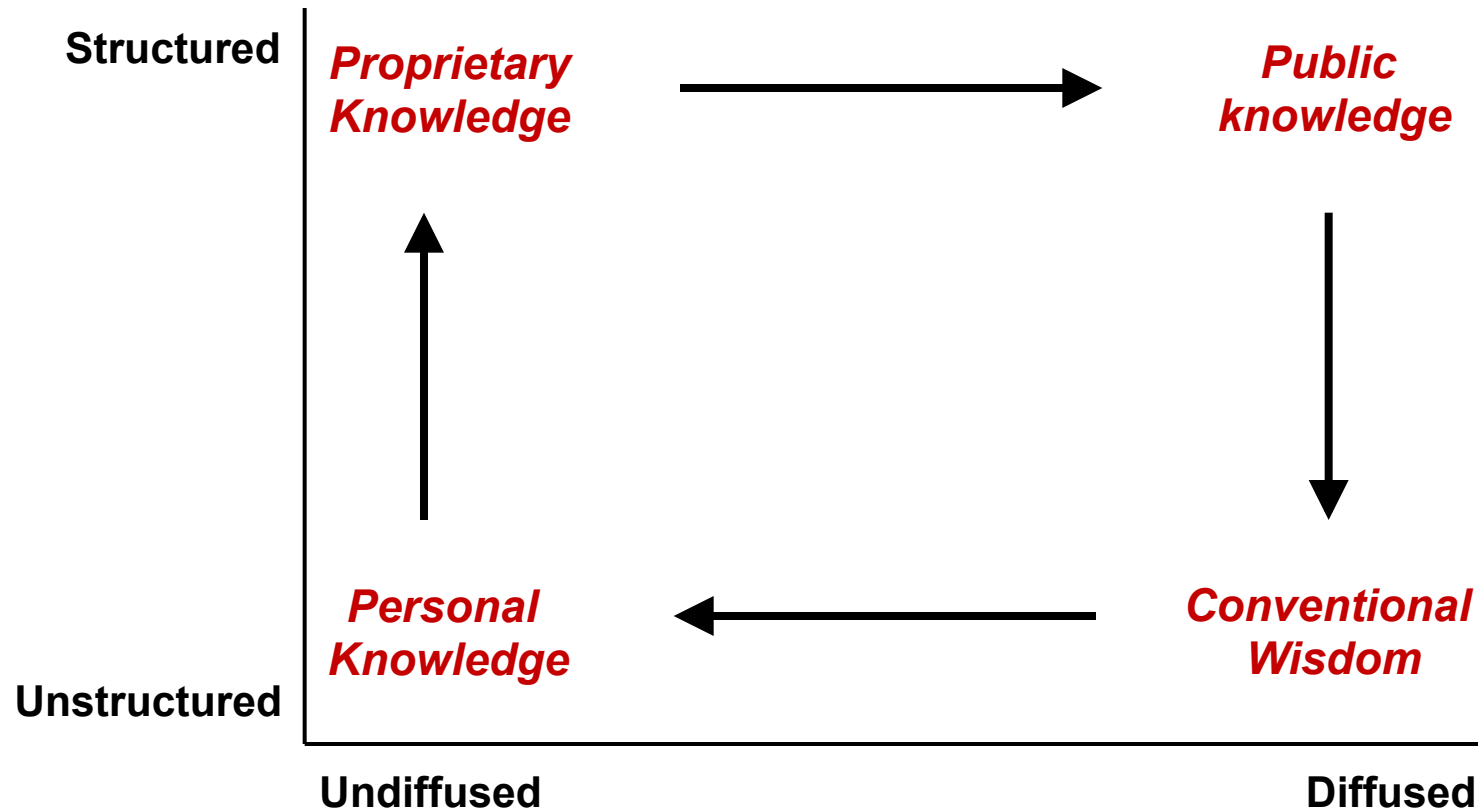
The Information-Space (I-Space)



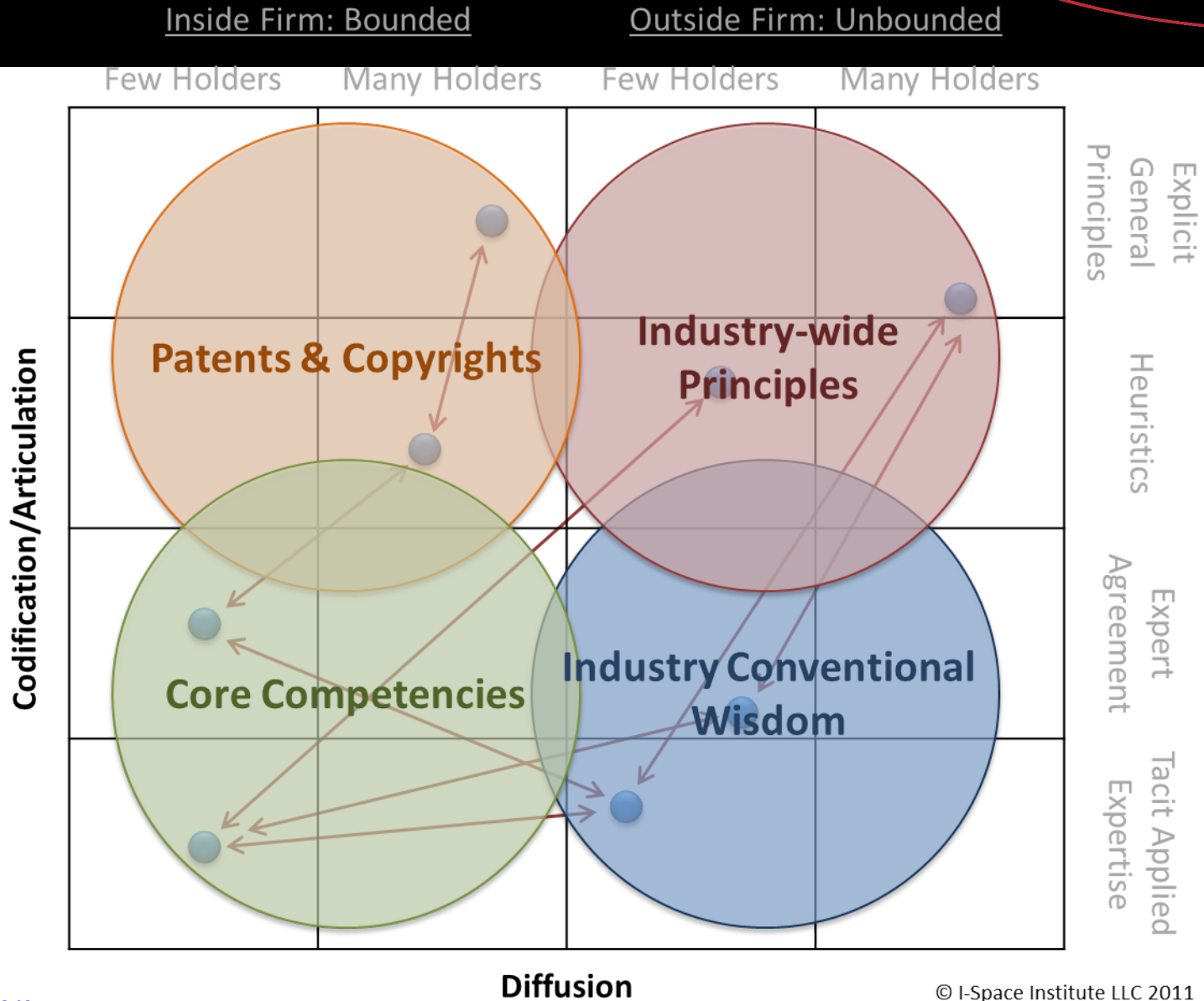
(%) per annum

| Name of Security | Yield movement | |
|------------------|----------------|-------|
| | Mar 11 | Mar 4 |
| 11.40% 2028 | 6.17 | 6.18 |
| 7.50% 2010 | 6.26 | 6.39 |
| 9.30% 2011 | 6.54 | 6.57 |
| 7.40% 2012 | 6.59 | 6.61 |
| 7.27% 2013 | 6.71 | 6.70 |
| 7.37% 2014 | 6.64 | 6.66 |
| 7.36% 2015 | 6.58 | 6.61 |
| 5.50% 2016 | 6.69 | 6.71 |
| 7.48% 2017 | 6.65 | 6.68 |
| 6.25% 2018 | 6.69 | 6.91 |
| 6.64% 2019 | 6.63 | 6.99 |
| 6.36% 2020 | 7.00 | 7.14 |
| 8.30% 2022 | 7.61 | 7.16 |
| 6.77% 2023 | 7.03 | 6.95 |
| 6.01% 2025 | 7.04 | 7.05 |
| 7.50% 2034 | 7.17 | 7.34 |

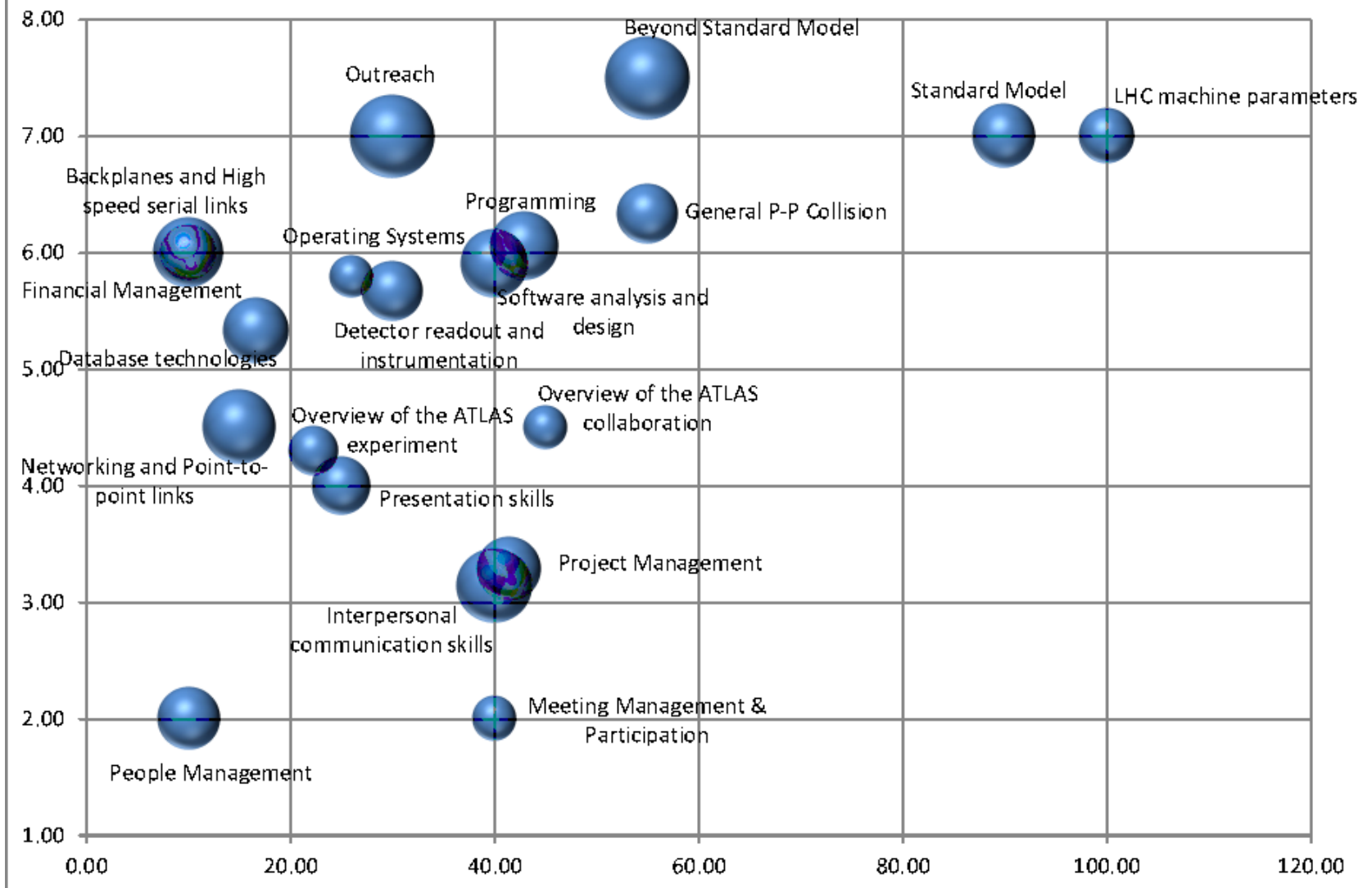
Knowledge Creation



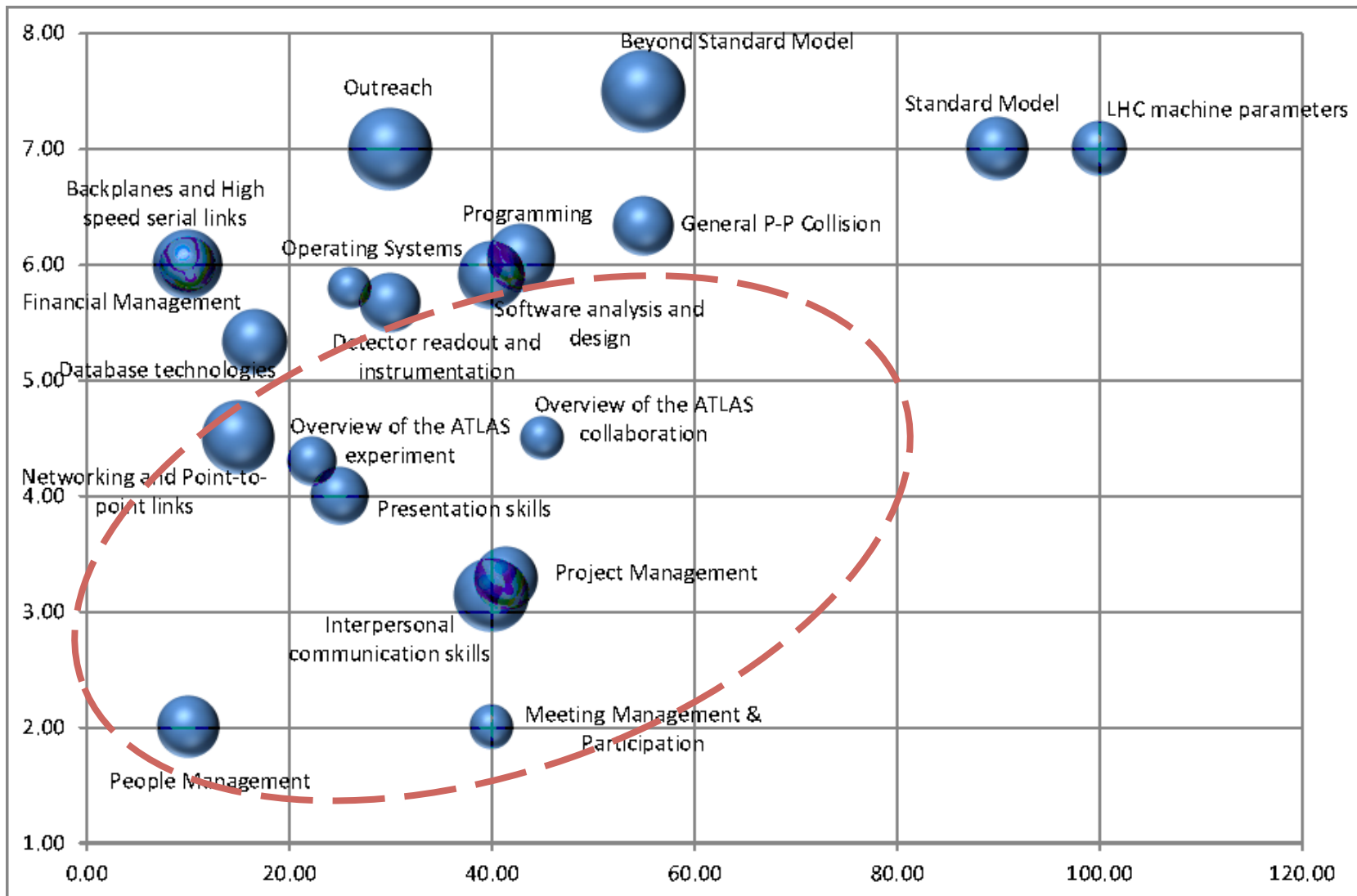
Strategic Knowledge Mapping



ATLAS-TDAQ Knowledge Map



The Importance of Management Skills



Implications for the ATLAS Leadership

Strategic knowledge issues

- What are the critical strategy choices implied by the maps?
- How to strategically develop value (competitive advantage)
- People development in High Energy Physics
- Managing the flow of people in and out of projects and between home institutions and ATLAS

Stage 2: Research questions

- 55 semi-structured interviews
- Non-participant observation
- Documentary data
- Validation workshop
- Case study of 'Calorimeter upgrade' project
- *How is knowledge leadership exercised?*
- *Does place matter?*
- *Are the dynamics of knowledge leadership discriminatory*

Lessons for us about Trust

Paradox 1: the more knowledge is managed, the less likely valuable knowledge will be exchanged

- Shared goals r/t personal portfolios
- Professional peer pressure r/t corporate compliance
- Long-term legacy r/t quick wins

Lessons for us about Leadership

Paradox 2: the more democratic knowledge sharing is desired, the stronger leadership is required

- Spontaneous exchange of implicit knowledge requires explicit leadership
- Leadership of place r/t leadership from position

Lessons for us about Leadership

Paradox 3: the more knowledgeable the professional the less likely s/he is able to lead

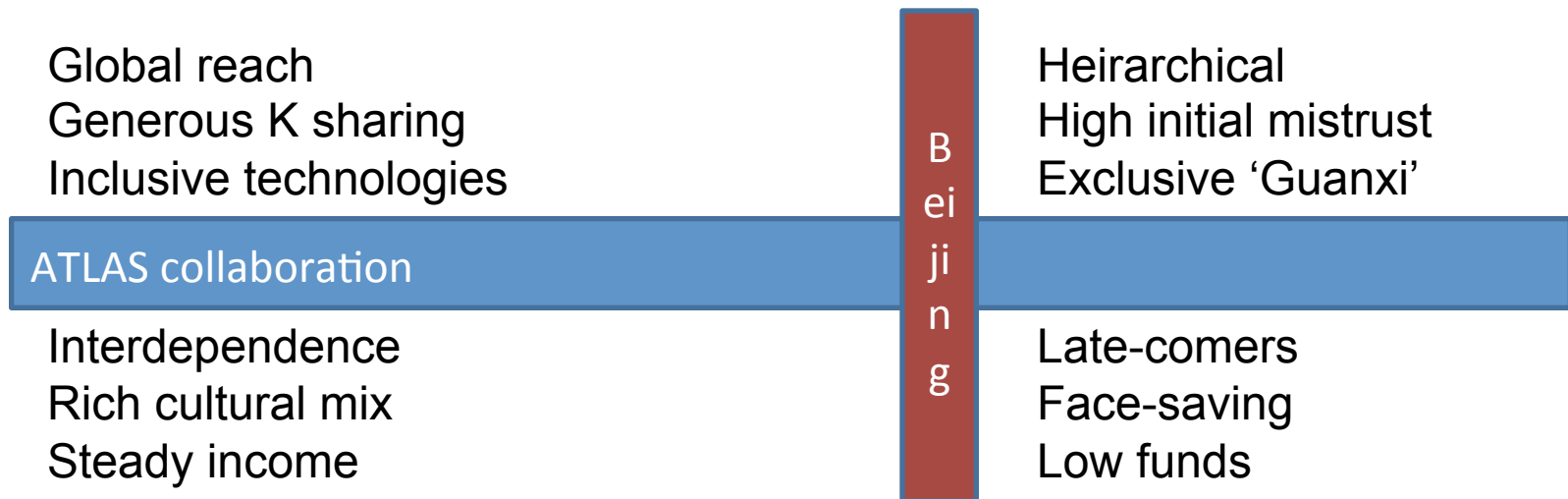
- Specialist vs boundary scanner
- Reliance on trusted sources vs other perspectives
- Precious knowledge vs application
- Emphasis on output vs process
- Solo success vs collaborative commitment

Lessons for us about social capital

Paradox 4: the more informal knowledge sharing is, the more likely discrimination will occur

- Tyranny of structure-lessness
- Virtual + F2F

Global partnership vs regional mind set



Recommendations

Foster bridges of trust

Light-touch leadership

Build communities of practice

- *Knowledge Leadership* will be important for corporate & public sector decision makers to master the challenges of the 21st century.
- Future projects with partners from industry, government and academia
-

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ATLAS, examples of technology transfer

- Large number of infra-red sensors installed at experiment site
- Precision optical image processing to measure and align each of 16K individual silicon detectors in the semi-conductor tracker
- **Personnel location**
Low cost system for emergency location of people in eg mines
- **Sound reproduction**
Measuring shape of the groove on phonographic discs eg reproduction of hi-fi sound on damaged or delicate recordings

ATLAS, examples of technology transfer

- Small pixel semi-conductor detectors for tracking proton collisions
- Silicon micro-strip detector technology
- ATLAS uses 600 special computing devices, configured by s'ware to operate as application-specific hardware processors
- **Digital radiography**
X-ray imaging in radiography, protein crystallography & mat. science
- **Neural biology**
Study of how neural systems (retina) process & encode info...artificial sight for blind?
- **Software technology**
Lo-cost, high quality industrial image processing, eg real-time control of laser welding in car manufacture