

The Genesis of an Innovation Paradigm

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September 18, 2007

The Story from my Perspective of Innovation in the Oil & Gas Industry

(Heavily biased from 40 years with the industry)

- ◆ **One view of the Innovation Paradigm**
- ◆ **Innovations always happen – but at what time?**
 - *The “I” factor*
- ◆ **Some lessons for those brave and naive enough to be actively engaged in innovation**

Basis of my Perspective on Innovation

Part One (The doing phase)

1965 – 1978

Involvement with Many Innovations

- Drilling engineering
- Water flooding
- Steam flooding
- Shale oil and underground nuclear stimulation

1978 – 1994

Being a Naive Innovator

- Directional drilling
- Engineering Simulator
- Real time operations for drilling
- Slim hole drilling

Basis of my Perspective on Innovation

Part Two (The understanding phase)

1994 – 2001

Trying to Understand Innovation

- Learning systems thinking and systems dynamics
- Reflecting on innovation outcomes
 - My academic and consulting years

2001 - present

Being an Innovator Again

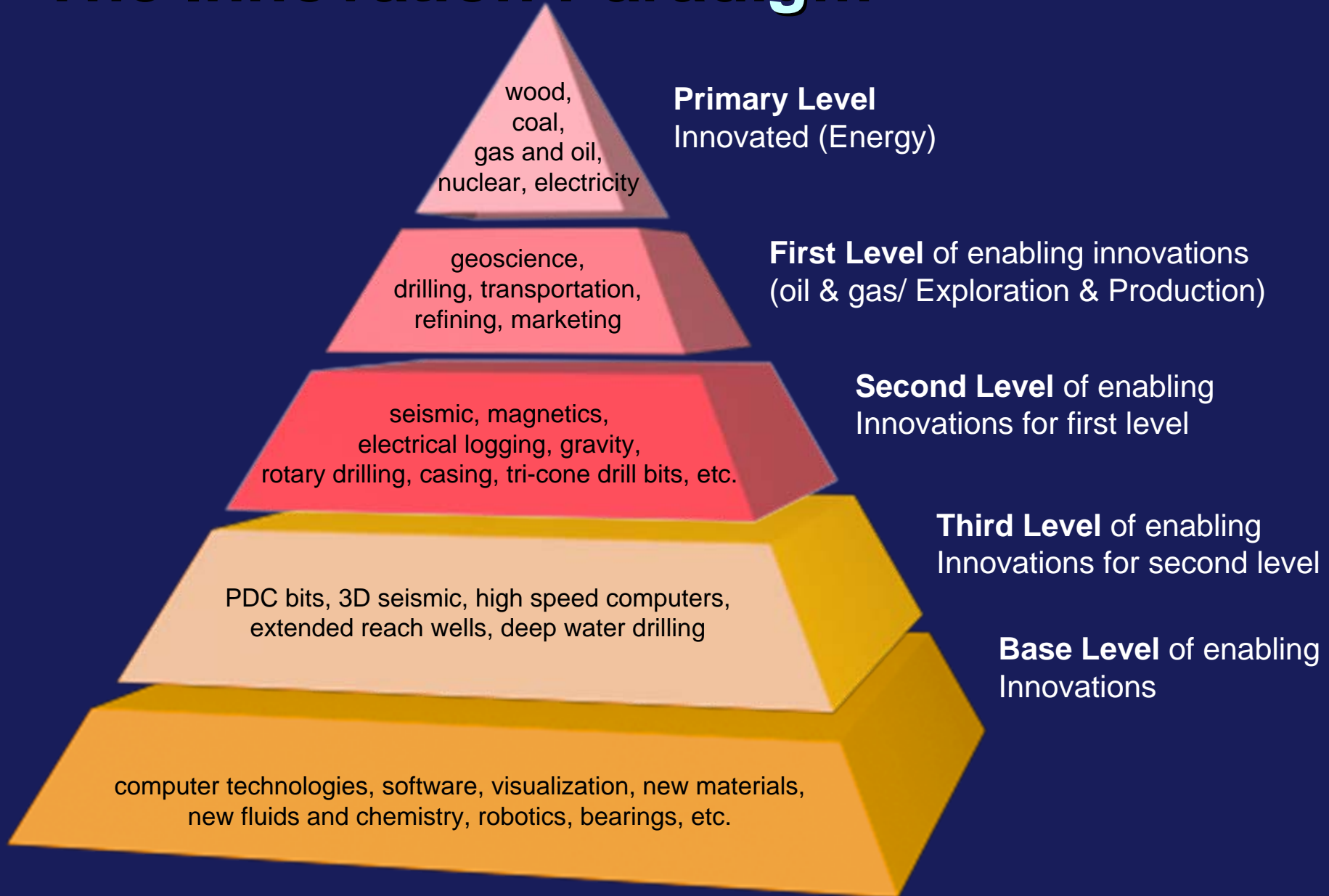
(my epiphany about innovation)

- Solving an environmental problem for drilling and operations in environmentally sensitive areas
- New way to do deep water exploration and production

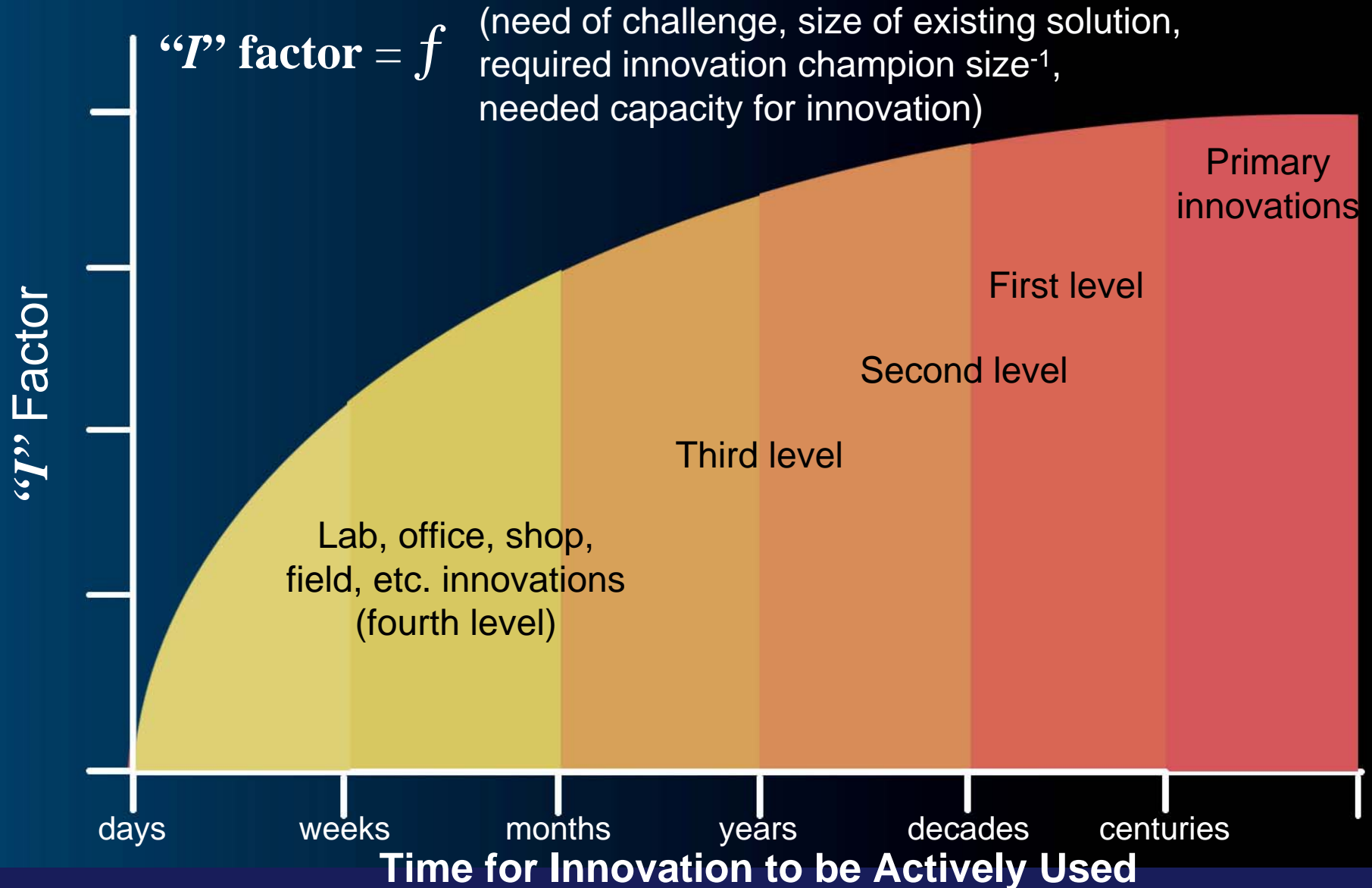
Arctic Drilling Platform



The Innovation Paradigm

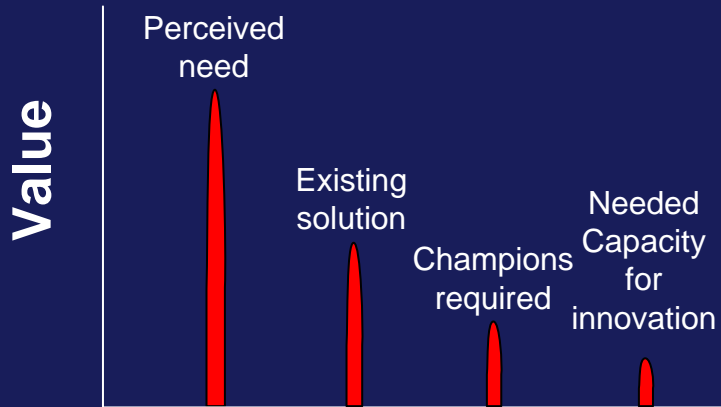


Dynamics of Innovation Paradigm

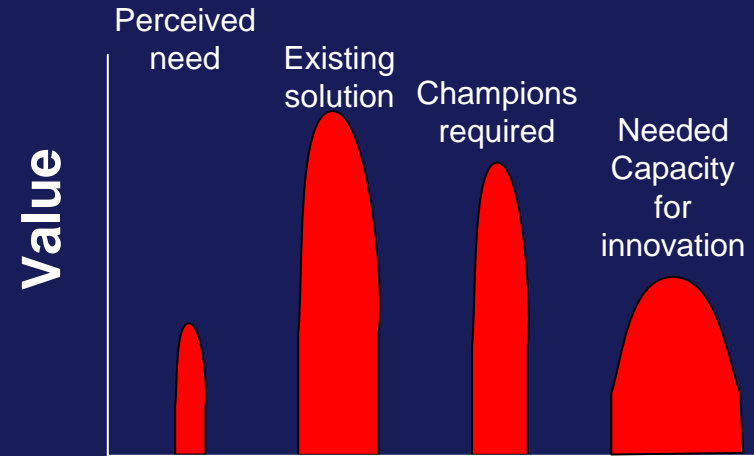


Examples of “I” Factor

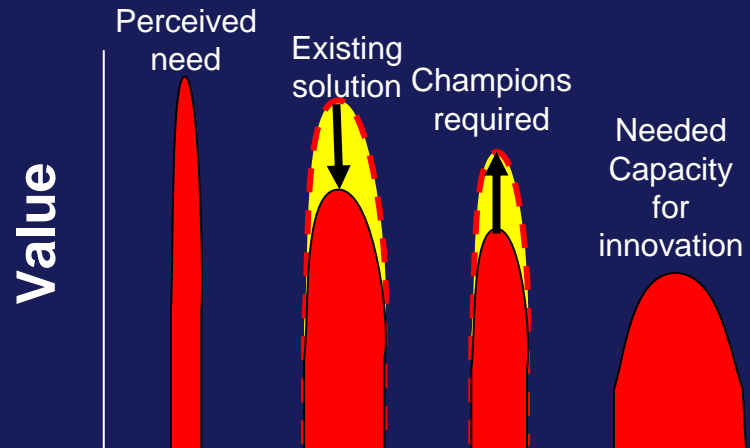
Easy Success in Short Period of Time



Early Perception for Innovation Ahead of it's Time



Innovation Take-up



Some Insights for Those Interested in Managing Innovation

◆ First and Foremost – Learn the “I” Factor

- *Can I solve the problem alone?*
- *Am I ahead of my time?*
- *Is the existing solution to the problem too strong for the innovation?*
- *Will I need help with the resources to make the innovation work?*
- *Is there capacity for the innovation to be practically realized?*

Additional Insights

- ◆ Realistically estimate the time to bring innovation into play
- ◆ Develop enough resources to succeed
- ◆ Manage expectations - months – years – decades
- ◆ Be prepared to lose, and to fight again another day