



UK view of space Public Private Partnerships



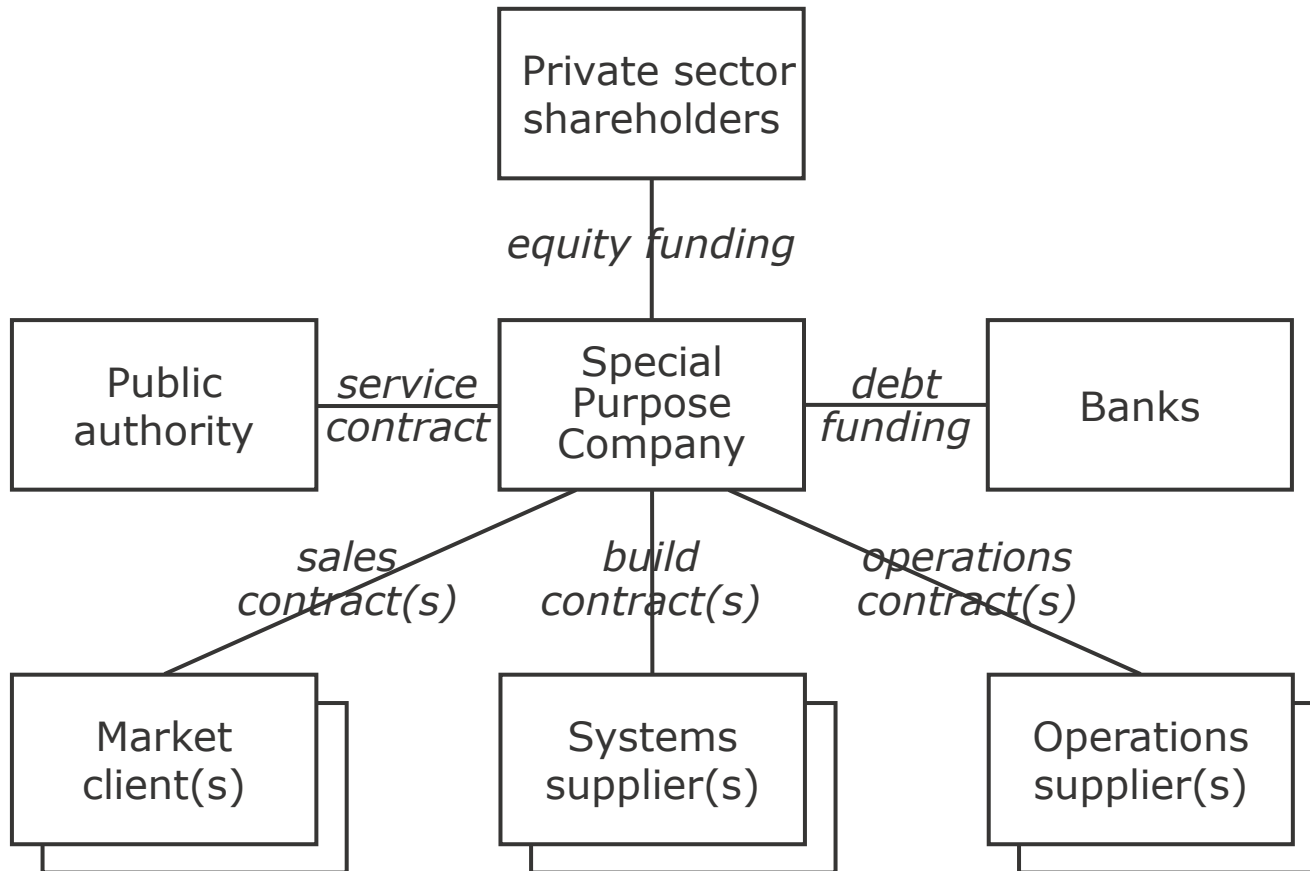
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Background

- Commercial resources for delivering public benefit
- Public Private Partnerships – PPP
 - Risk sharing
- Private Finance Initiative – PFI
 - Design, Build, Finance, Operate – DBFO
 - Investment risk
- Road toll concessions – France 1970's
- Channel Tunnel – UK/France 1980's
- PFI – UK 1990's
 - >£100Bn, >1,000 projects
 - Transport, hospitals, schools, IT services, defence/aerospace
- Aim is higher financial efficiency for project build + operate

Contract arrangements



Space examples

- Skynet 5
 - UK military satellite communications
- Galileo
 - EU satellite navigation
- NASA COTS & CCDev
- Public/private collaborative R&D
 - NASA Ames Space Portal
 - UK ISIC (International Space Innovation Center)

Advantages & disadvantages

● For

- Unlimited money supply
 - Provided returns justify risks
- Balance of build & operating costs
- Alignment of interests
- Government focus on outputs
 - Simpler specification
- Better risk allocation
 - Better financial prediction
- More delivery flexibility
- Allows for longer commitments

● Against

- Higher cost of money
- More complex to negotiate
 - Greater time
 - Greater skill
 - Higher cost
- Needs greater certainty of output
 - Government clarity of aim
 - More difficult to change
- Political/social resistance
- Must have longer commitments

Further requirements

- Lower cost of commercial capability
 - Management ability, flexibility & access to resources
- Value decisions not cost decisions
 - Output value net of input cost
 - Discounted for risk
- Manageable regulatory issues
- Low cost debt funding = government commitment
- Multiple use technology
- Demand is key

Exploration opportunities <15 years

● Services

- Repeater comsats
- Uncrewed transport
- Mini landers/rovers
- Exploration results
 - Science & downstream applications

● Products

- Transport/orbital systems
 - Propulsion
 - Power
 - Docking
 - Comms
 - Navigation
 - Spacesuits
- Surface robotics subsystems
 - Vehicle control
 - Sample handling
- Science instruments

Exploration opportunities >15 years

● Services

- Crewed transport
- Orbital survey
- Robotic explorers
- ISRU
- Fuel depots
- Power generation & storage
- Tourism

● Products

- Landers & subsystems
 - Eg entry, descent & landing
- Surface vehicles & subsystems
- ISRU systems
- Habitat subsystems
- Planetary protection
- EVA support
- Biotechnology products
- Laboratories