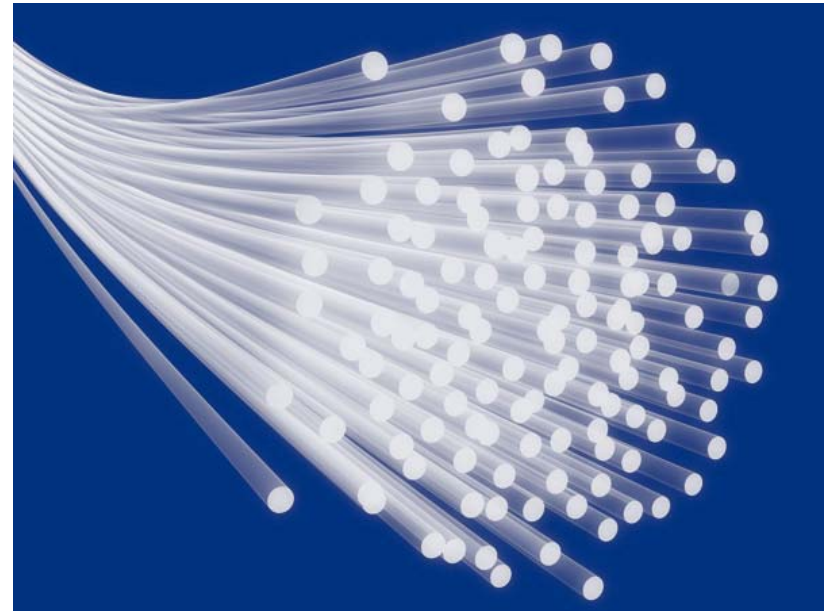


Dynamic Migration Planning of Broadband Fixed Access Networks subject to CAPEX and OPEX

16. ITG Fachtagung - Kommunikationskabelnetze

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Stefanus van der Merwe, Kai Grunert

15/12/2009



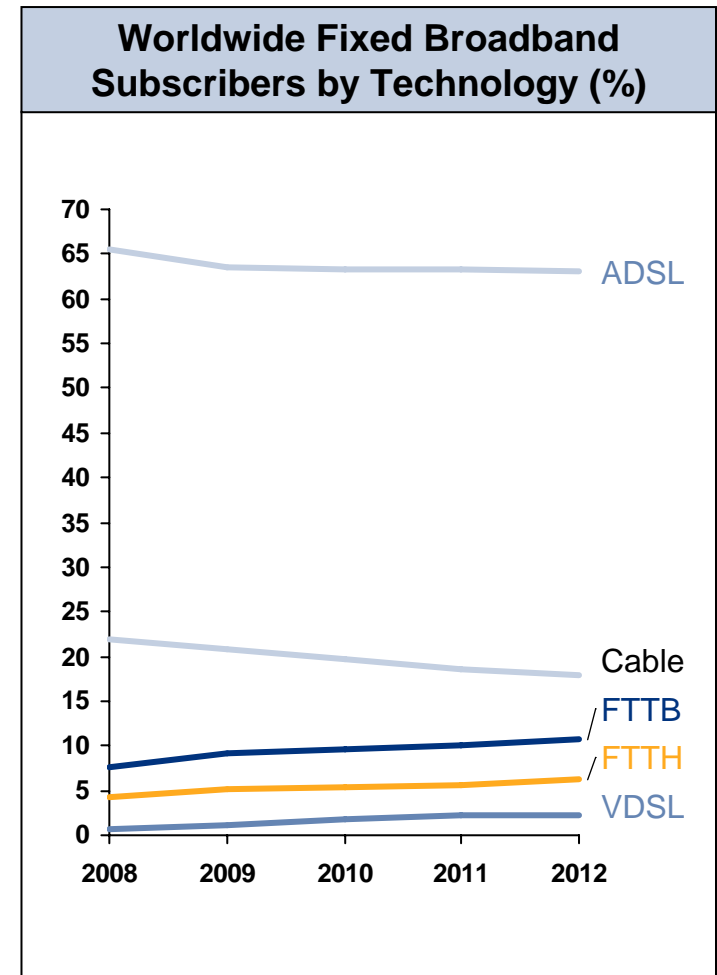
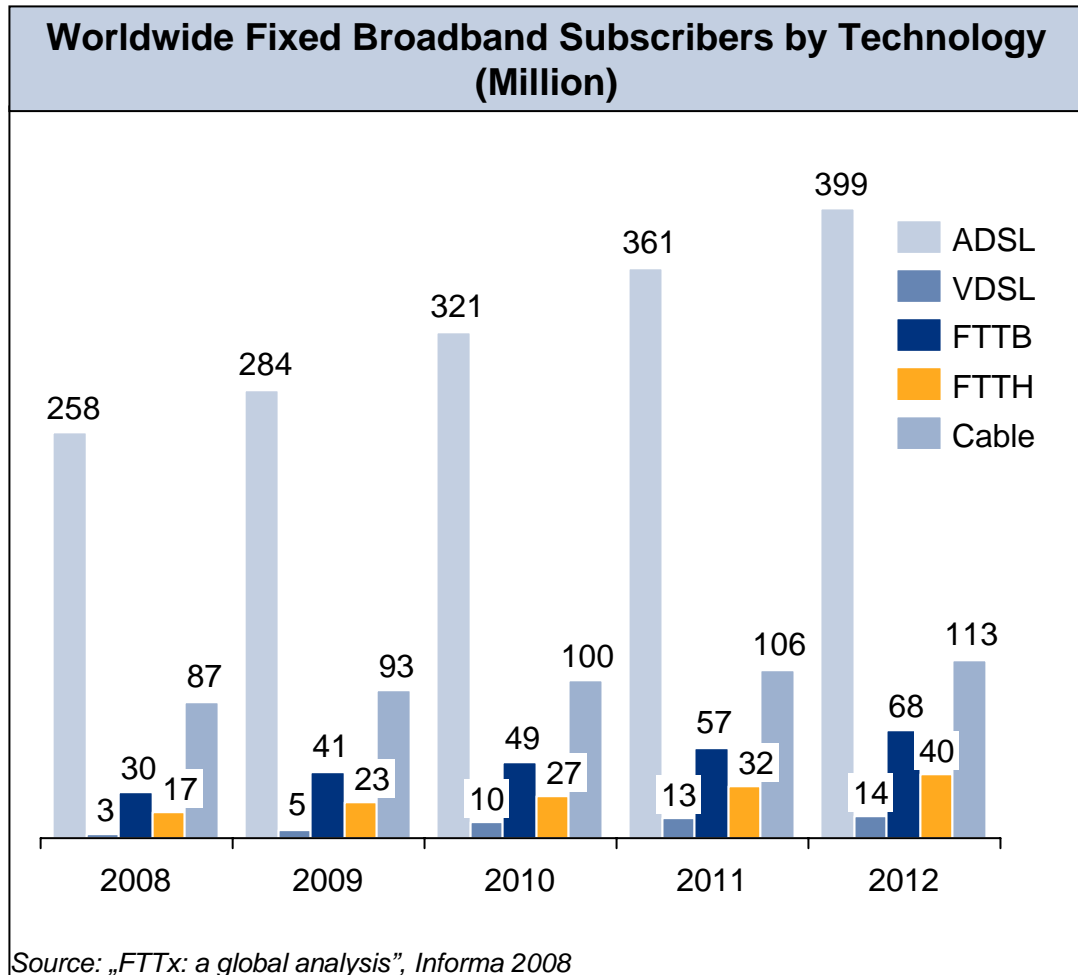
Content

- 1. Motivation**
- 2. General xDSL / FTTx Infrastructure**
- 3. PON and AON**
- 4. Dynamic Migration Strategy**
- 5. Migration Planning Tool**
- 6. Scenarios and Sensitive Parameter Study**
- 7. Conclusions**

Motivation

Fixed access technologies – World market overview

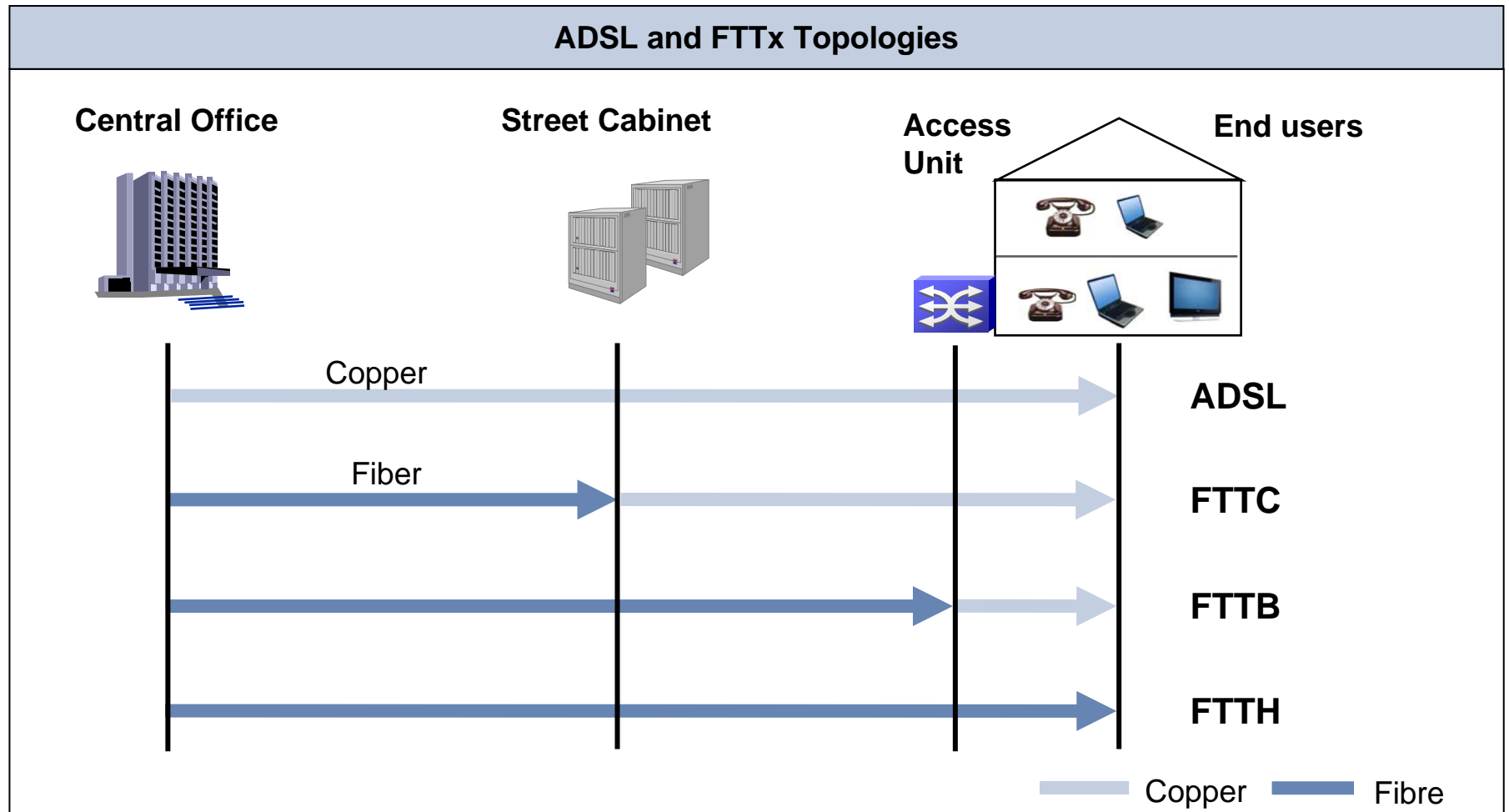
The DSL and Cable subscribers are dominating, but show a decreasing trend, while FTTx subscribers are increasing.



General xDSL / FTTx Infrastructure

Overview

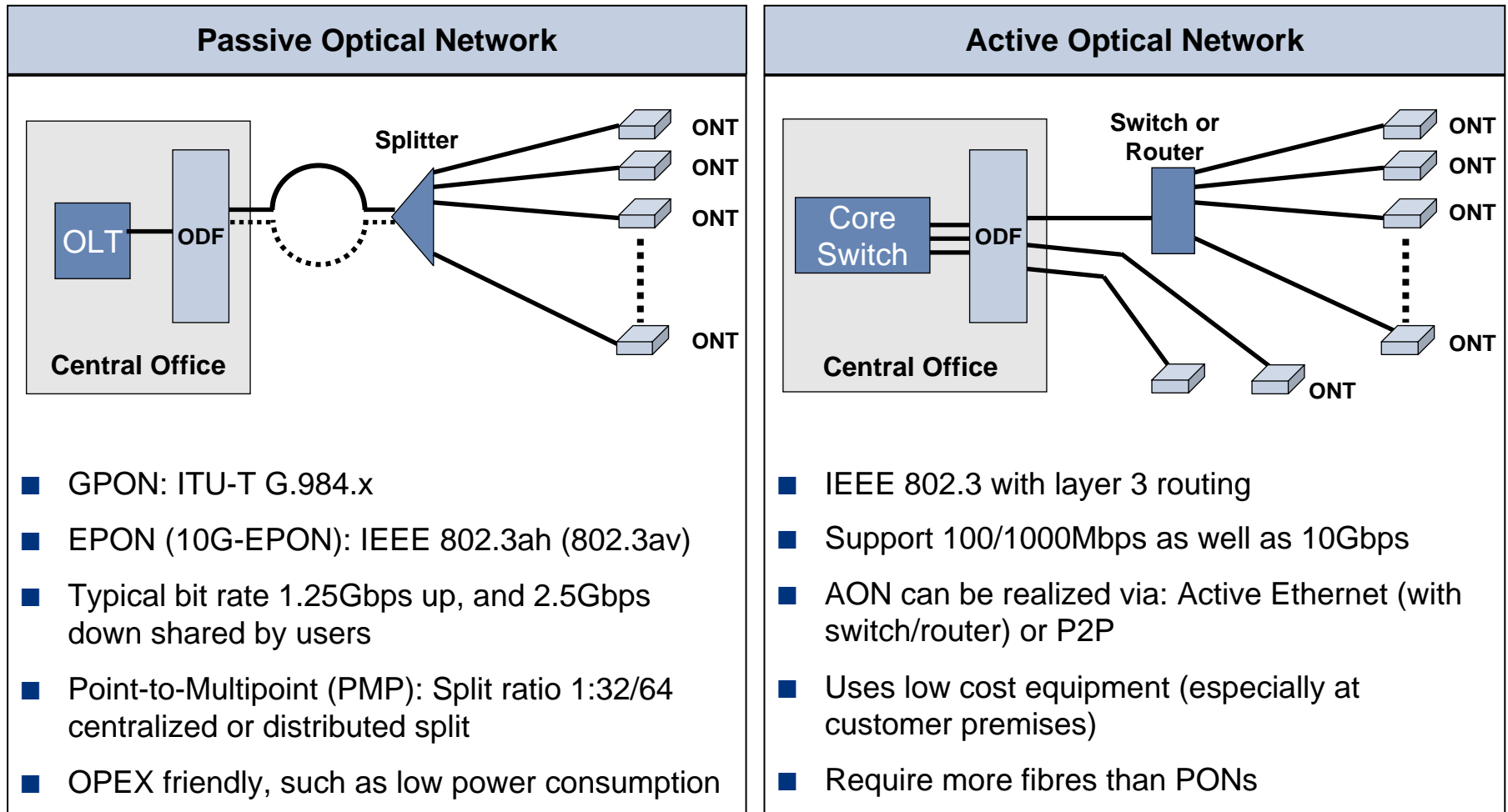
The infrastructure of ADSL and FTTx makes the stepwise migration possible, where the existing canalisation can be reused and the fibre installation is closer to End Users.



PON and AON

Technical View

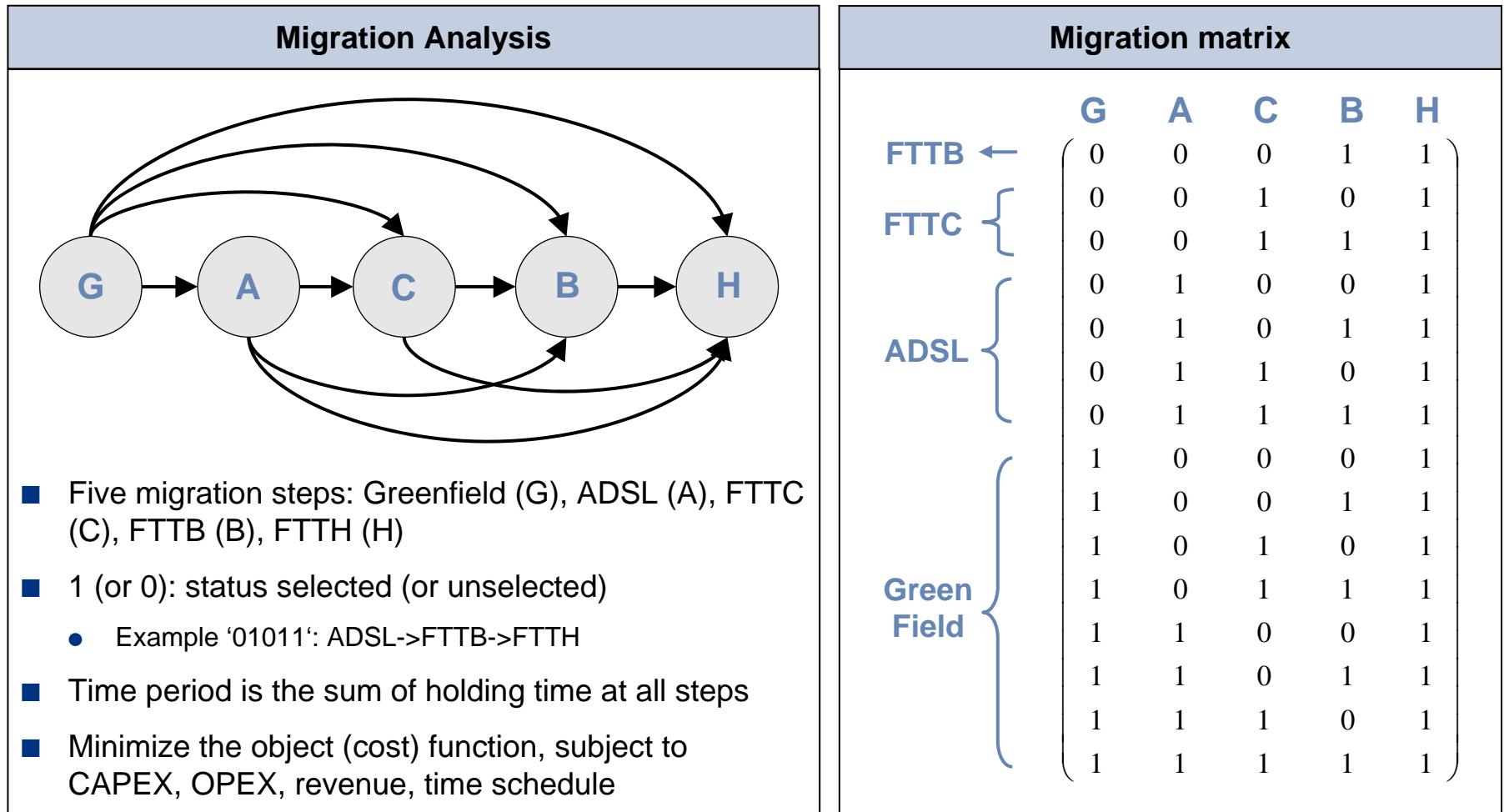
Passive Optical Networks (PON) and Active Optical Networks (AON) are connected by optical cables, but with different passive/active equipments and topologies.



Dynamic Migration Planning

Strategy and optimization analysis

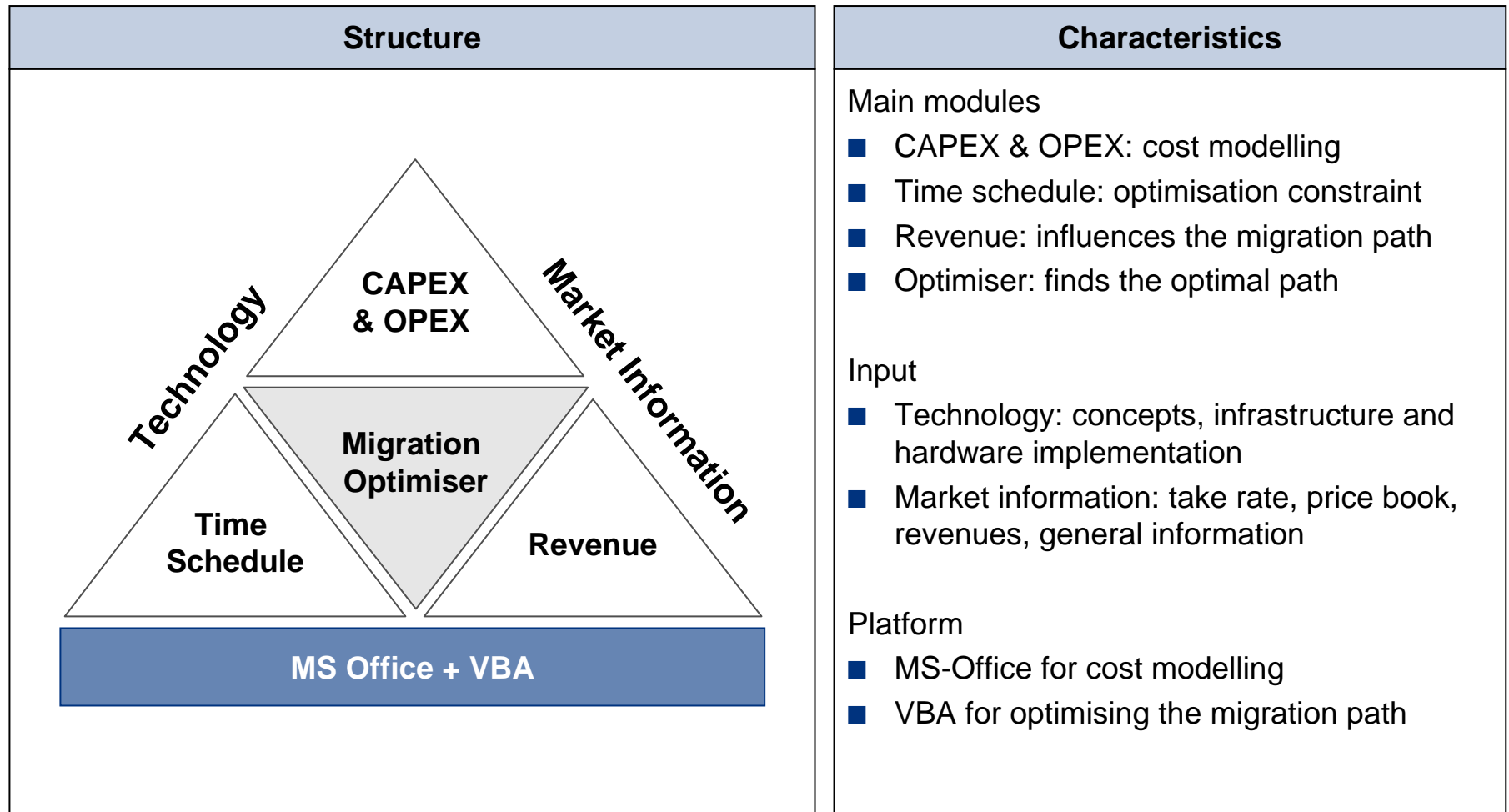
Based on the current status, the optimal migration path can be found, subject to one/multi-steps migration strategy and optimisation constraints.



Migration Planning Tool

Overview

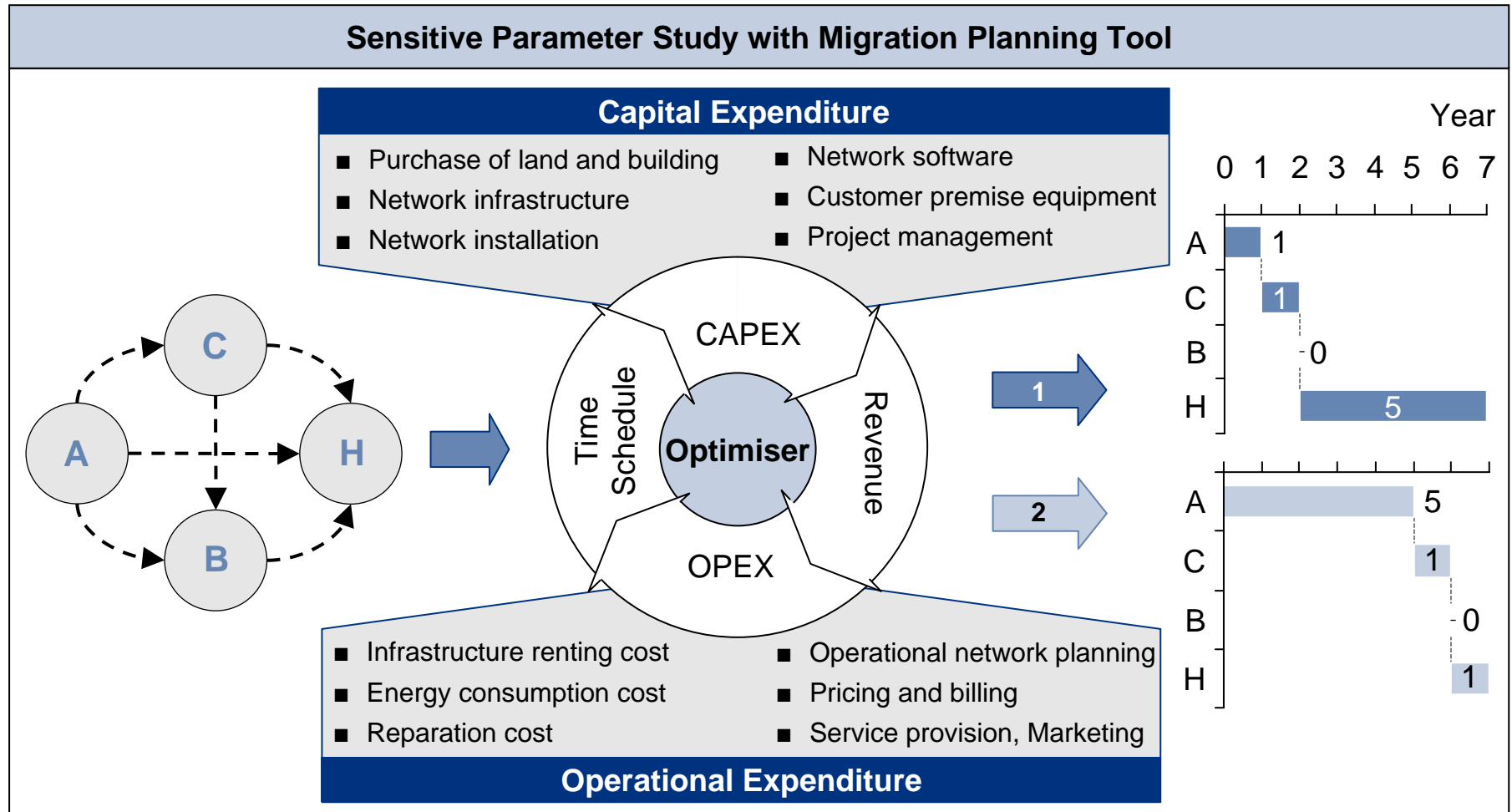
A planning tool based on MS-Excel and VBA is developed to optimise the migration path, subject to CAPEX, OPEX, revenue, and time schedule.



Scenarios and Sensitive Parameter Study

Multi-dimensional optimisation

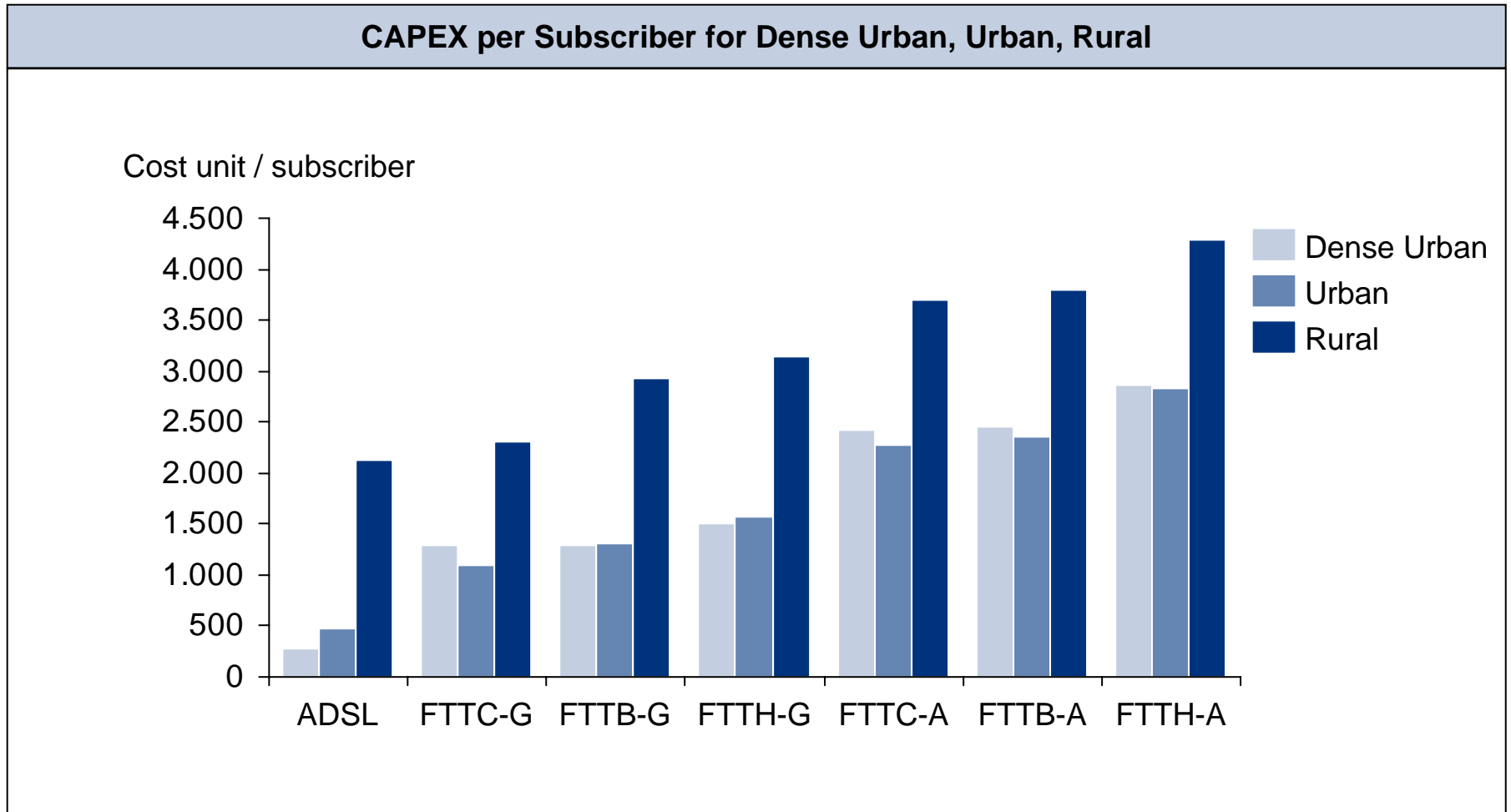
Sensitive parameters play an important role in finding an optimal migration path and holding time, which make the optimisation process challenging.



Case study

Dense Urban, Urban, and Rural

The CAPEX for rural areas is generally higher than dense urban or urban areas with selected fixed technologies, where three scenarios come from different countries.



Conclusions

The study involved a comprehensive set of methods, such as technology- and cost-modelling, and migration strategy, to find the optimal migration path to FTTH.

Current Development Status

- CAPEX and OPEX models of xDSL/FTTx
- Study on Green field, xDSL/FTTx migration to FTTH
- Comparison between GPON and AON
- Analysis and implementation of dynamic migration planning strategy
- Sensitive parameter study
- A tool based on MS Excel with VBA for a challenging optimization problem

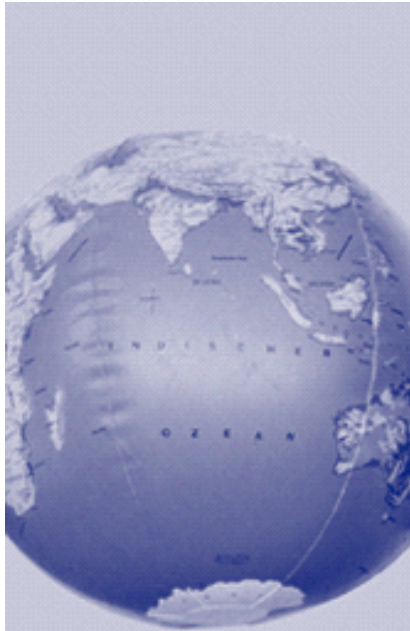
Potential Extensions

- This cost model can be further extended to other types of network, such as core network, wireless network, etc.
- Migration planning strategy can be applied for other migration problem or projects
- MS Excel with VBA can enable us to solve some complicated non-linear optimization problems

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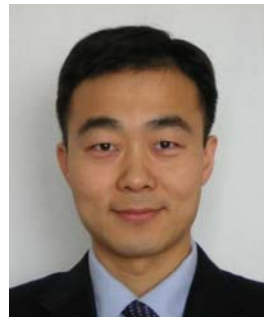
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