



Techno-economic analysis and business model validation

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Goal of the work

... and deadlines



Main ideas (identification of all the stakeholders and the cash flows)

- *Sometimes, the first beneficiary of the introduction of 5G might be outside of the Project partners. As an example (i.e. Comau use cases). As an example in the Comau case, the first beneficiary is the Comau's customer (i.e. the car manufacturer), rather than Comau itself.*
- *The treasury of this car manufactures is to be split among the car manufacturers itself, Comau and the Telecom Operator. Then part of Telecom Operator gain is transferred to Manufacturer for the purchase of new equipment*
- *In principle, the cash flows is from car manufacturer directly to the Operator for the connectivity.*

Main ideas (refined and to be refined)

- *Evaluate in percentage terms what the benefits that the adoption of case studies could be. E.g. +12% of the pieces produced, -6% of those rejected, OPEX decrease of 7%, ... in the most rigorous and detailed way possible. This evaluation is comprehensive of both 5G benefits and specific 5Growth introduced gain. **At this point we get the "treasure" obtained thanks to 5G / 5GROWTH.***
- *This "treasure" must be divided among the various stakeholders (primarily vertical, operator and manufacturing). It is therefore possible to understand what the potential (economic) advantages would be for everyone. Of course is not possible to have precise gain sharing, impossible to evaluate, but it is essential to calculate the big amount of this gain in order to demonstrate the economic viability of 5G*
- *This result, in addition to having a high intrinsic value, especially when compared with the financing of the project, could be exploited to understand the amount of investments that operator and manufacturing could put into new technologies.*

Methodology

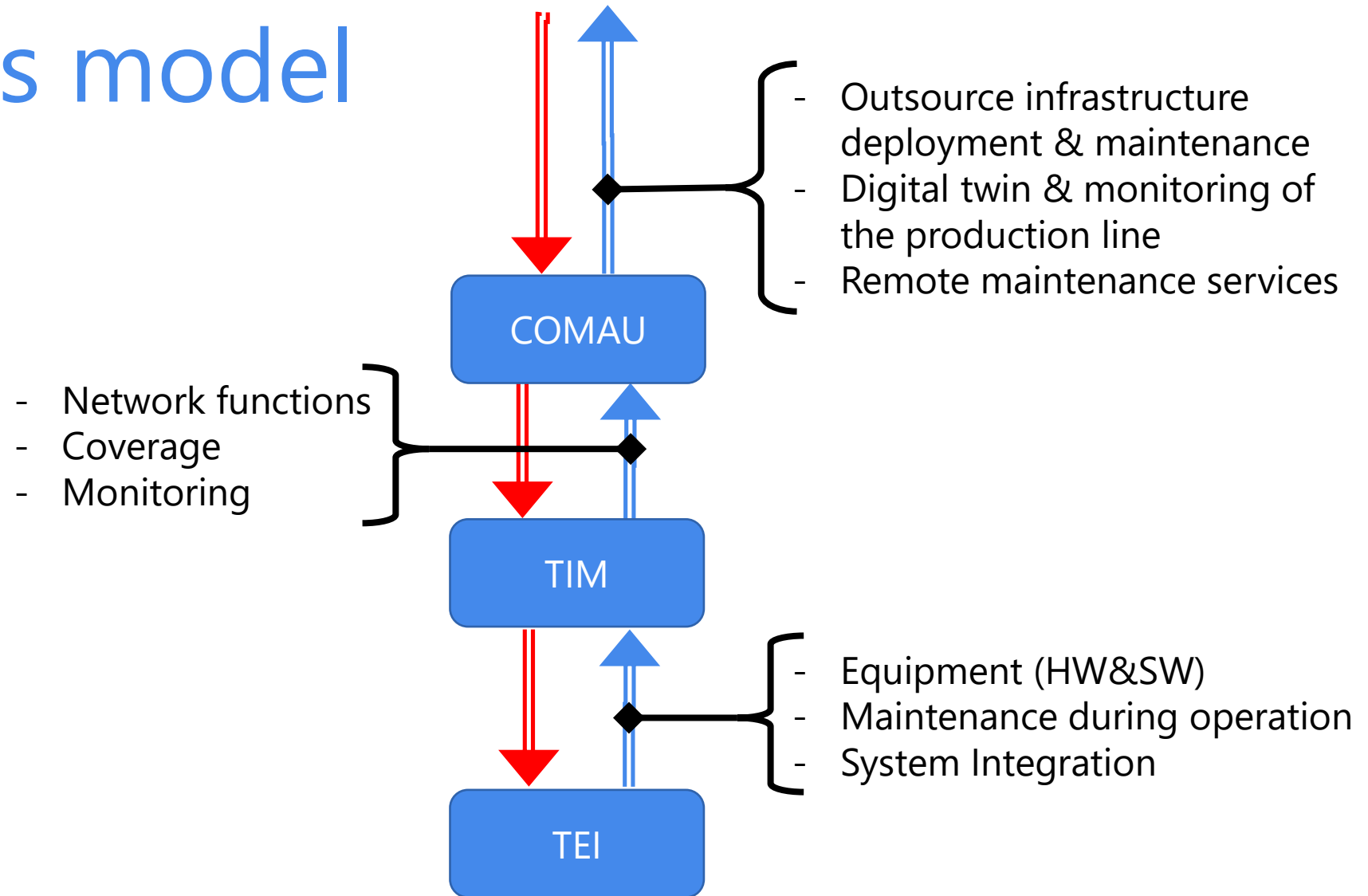
Yearly Total Value (YTV), which is the parameter that will allow us to compare between legacy and new solution networks:

$$YTV = \sum_{i=1}^N \frac{CAPEX_i}{AP_i} + \sum_{j=1}^M OPEX_j + \sum_{k=1}^R RE_k$$

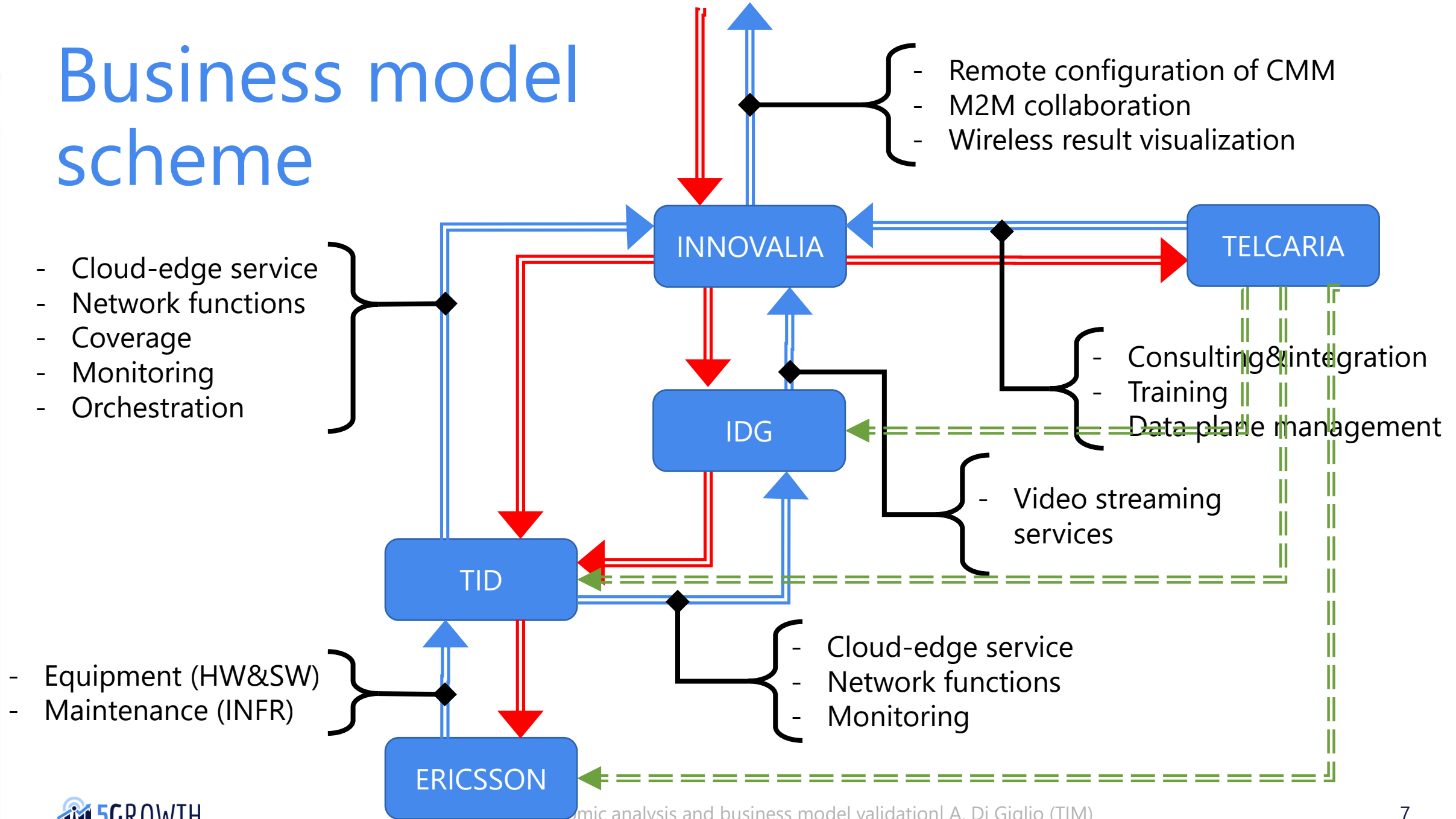
where:

- $CAPEX_i$ is the i -th component of the N identified items of Capital Expenditures, i.e. the amount of cash flow that a company uses to purchase, maintain or implement its operating assets, such as buildings, land, plants or equipment.
- $OPEX_j$ is the the j -th components of the M identified items of the Operational Expenditures, i.e. operating, maintenance and management costs.
- RE_k is the component of new revenues.

Business model scheme



Business model scheme



Economic evaluation - Innovalia Pilot

Economic item	Type	Difference (cable vs 5G) [k€]	Multiply factor		Total EU [k€]	Amortization time [years]	Total EU (yearly) [k€]	% 5G Growth contrib.	Total Europe (yearly) [k€] 5G Growth contrib.
			What	#					
Travel Reduction	SO	100	# customers adapted	60	6,000	1	6,000	100	6,000
Experts Availability	SO	95	# customers adapted	60	5,700	1	5,700	100	5,700
CMM Maintenance cost	SO	50	# customers adapted	60	3,000	1	3,000	100	3,000
CMM Maintenance response time	SO	0.5	# customers adapted	60	3	1	3	100	3
CMM Usage Optimization	SO	85	# customers adapted	30	2,550	1	2,550	100	2,550
Lot Size Reduction	GR	50	# customers adapted	30	1,500	1	1,500	100	1,500
Edge Device Maintenance	SO	1.2	# customers adapted	60	72	1	72	100	72
Spectrum	GR	-	-	-	-5	20	-0.25	20	-0.05
Network Slices	GR	-1	# customers adapted	60	-63.5	1	-63.5	20	-12.7
Edge computing	GR, SC, SO	-29	# customers adapted	60	-1,740	1	-1,740	60	-1,044
Video platform network	GR	-1.3	# customers adapted	60	-78	1	-78	100	-78
TOTAL							16,913.25		17,690.25

Economic evaluation - Comau Pilot

Difference (cable vs 5G) [k€]	Multiply factor		Total EU	Amortization time [years]	Total EU (yearly) [k€]	% 5G growth contrib.	Total Europe (yearly) [k€]
	What	#	[k€]				5G growth contrib.
-5	# (new) production lines in EU	25	-125	20	-6.25	20	-125
-100	# (new) production lines in EU	25	-2,500	1	-2500	0	0
86	# (new) production lines in EU	100	8,600	10	860	0	0
40	# (new) production lines in EU	25	1,000	20	50	0	0
5	# (new) production lines in EU	100	500	1	500	20	100
400	# (new) production lines in EU	25	10,000	4	2,500	20	500
363.5	# (new) production lines in EU	25	9,087.50	1	9,087.50	50	4,543.75
					10,491.25		5,018.75

Economic evaluation - EffacecE Pilot

Economic item	Type	Difference (cable vs 5G) [k€]	Multiply factor		Total EU [k€]	Amortization time [years]	Total EU (yearly) [k€]	% 5G growth contrib.	Total Europe (yearly) [k€] 5G growth contrib.
			What	#					
QoS – SAIDI LV	SO	NA	Secondary Substations	3M		1			
QoS - ENS	SO	0.5 to 1.2	households	195M	150	1	150	0	0
Control of non-authorized access	SC	NA	Secondary Substations	3M					
Local Maintenance cost	SO	2.7	Secondary Substations	3M	8	1	8	0	0
Remote Maintenance cost	SO	1.7	Secondary Substations	3M	5	1	5	0	0
Spectrum	SC	-60	Secondary Substations	3M	-180	20	-9	20	-1,8
Network Operational cost	SO	0,3	Secondary Substations	3M	0.9	1	0.9	20	0.18
Network resources optimization	SC	1,8	Secondary Substations	3M	5.4	1	5.4	80	4.32
Edge Computing	SC	4	Secondary Substations	3M	12	10	1.2	80	0.96
Consultancy	GR	6	Main European DSOs (> 100k customers)	190	1.1	10	1.1	20	0.22
TOTAL							110,6 to 244,6		3,88

Economic evaluation - EffacecS Pilot

Economic item	Type	Difference (cable vs 5G) [k€]	Multiply factor		Total EU [k€]	Amortization time [years]	Total EU (yearly) [k€]	% 5G growth contrib.	Total Europe (yearly) [k€] 5G growth contrib.
			What	#					
Train accidents	SO	683	# (new) 5G Level Crossing in EU	60,000	41,000,000	20	2,045,000	10	205,000
Installation Cost	SC	40	# (new) 5G Level Crossing in EU	60,000	2,400,000	20	120,000	10	12,000
Installation time	SC	10	# (new) 5G Level Crossing in EU	60,000	600,000	20	30,000	0	0
Maintenance cost	SO	0,2	# (new) 5G Level Crossing in EU	60,000	12,000	1	12,000	20	2,400
Cable cost	SC	6,4	# (new) 5G Level Crossing in EU	60,000	384,000	20	19,200	0	0
Spectrum	SC	-0.02	# (new) 5G Level Crossing in EU	60,000	-1,200	20	-60	20	-12
Network Operational cost	SO	0,3	# (new) 5G Level Crossing in EU	60,000	18,000	1	18,000	80	14,400
Network resources optimization	SC	1,8	# (new) 5G Level Crossing in EU	60,000	108,000	10	10,800	80	8,640
Edge Computing	SC	4	# (new) 5G Level Crossing in EU	60000	240,000	10	24,000	20	4,800
Consultancy	GR	6	# (new) 5G Level Crossing in EU	10	60	10	6	20	1.2
Total		751,68					2,278,946		247,229.20



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