AtlanticKET MED

A perspective on Innovation using Key Enabling Technologies

Value chain analysis

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Interreg Atlantic Area
European Regional Development Fund
EUROPEAN UNION

Outline of presentation

- AtlanticKETMed

- Introduction –Scalable innovation using KETs
- Identifying stakeholders

- Analysing / scoring the value chain

- Developing a system model

- Wrap

Introduction to the AKM consortium

AtlanticKET MED

INTERNATIONAL IBERIAN NANOTECHNOLOGY LABORATORY

bionow®

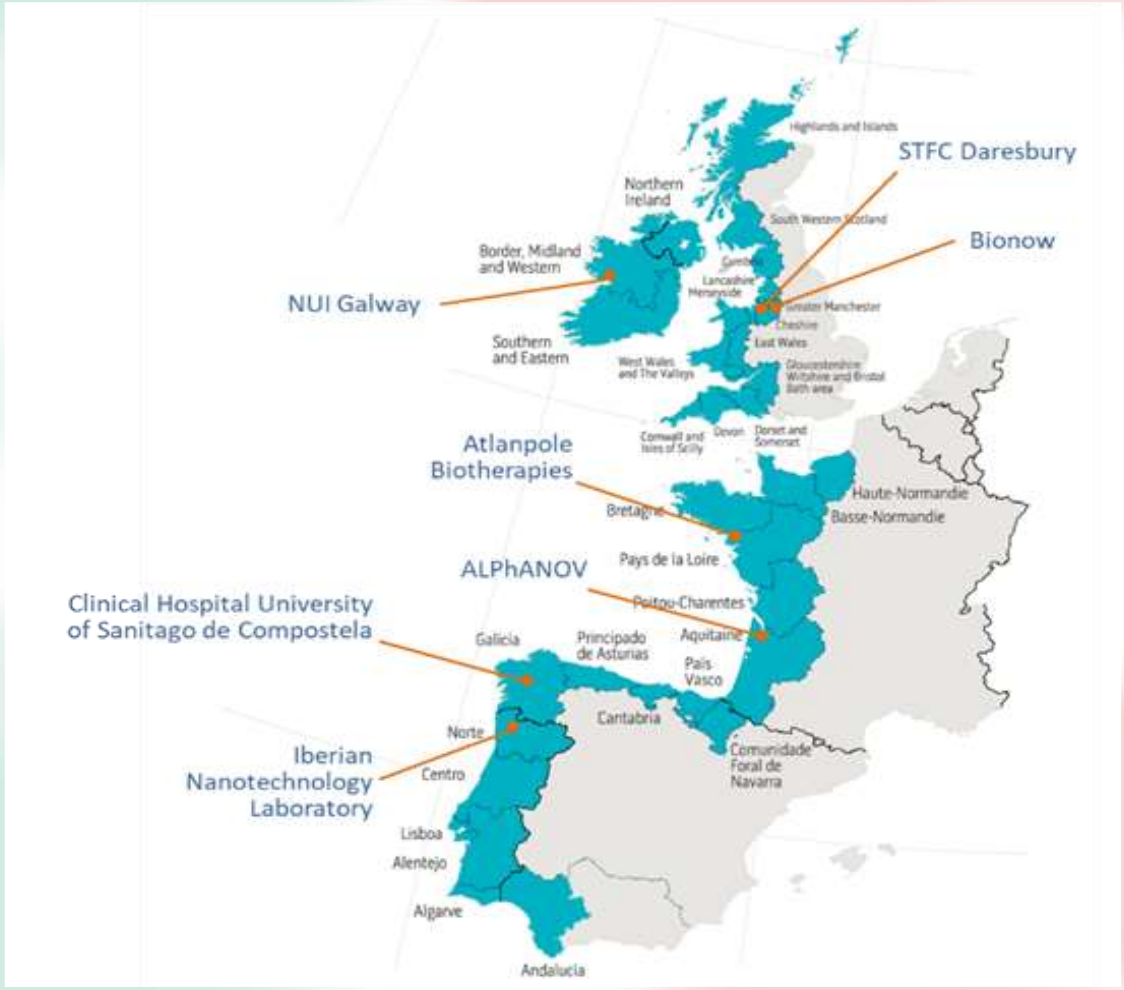
ALPhA NOV
Centre Technologique Optique et Lasers

NUI Galway
OÉ Gaillimh

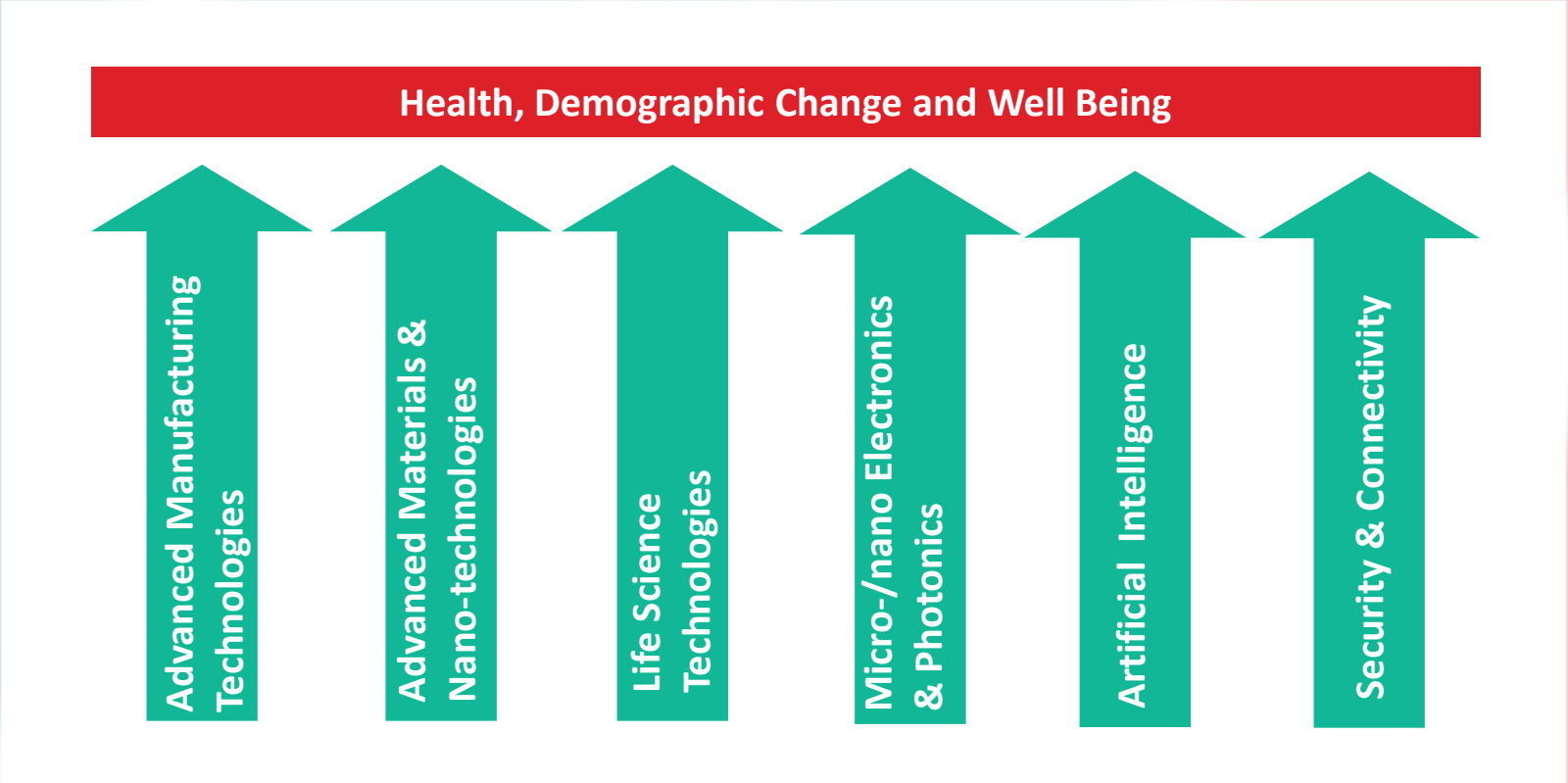
fidis

Science & Technology Facilities Council

ATLANPOLE biotherapies
Thinking up tomorrow's medicine

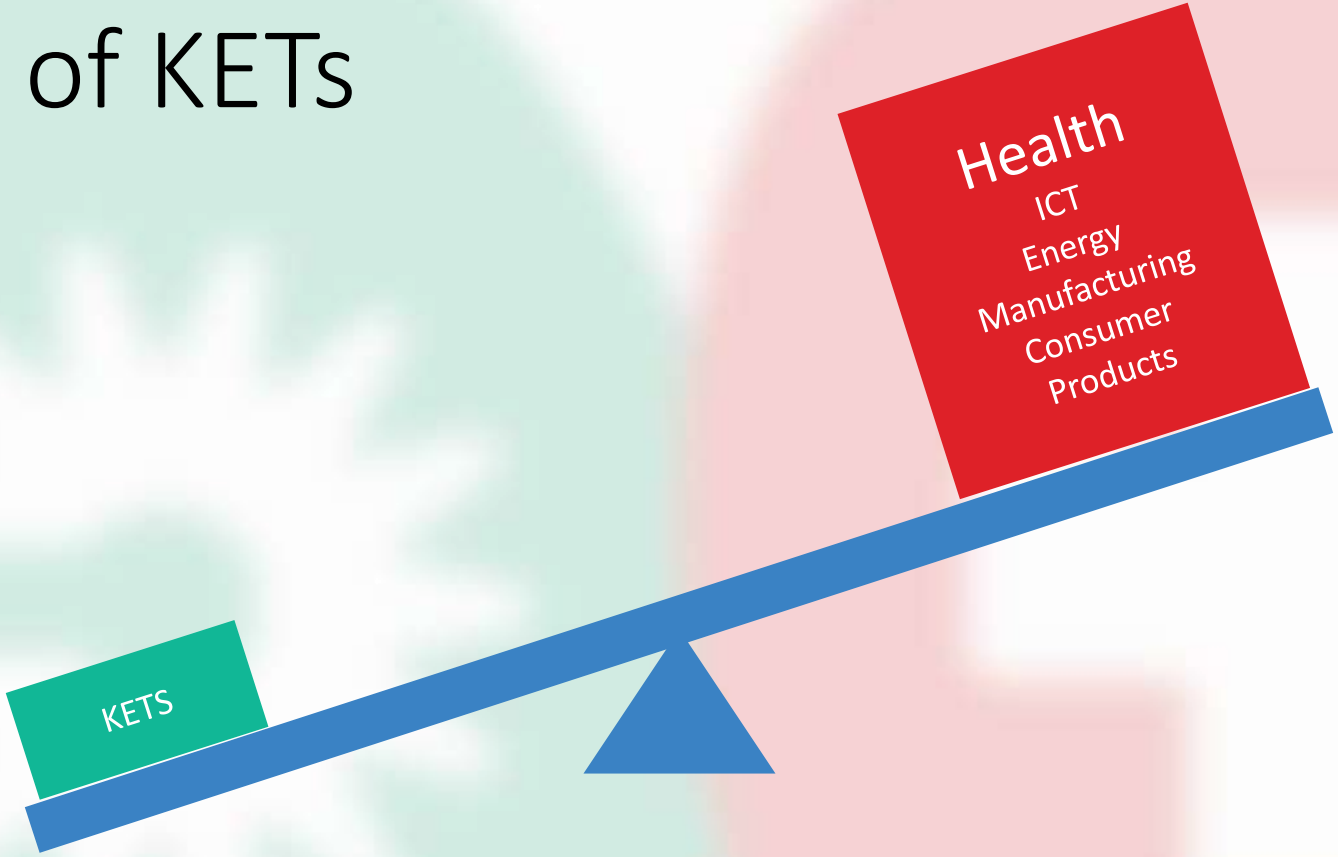


Key Enabling Technologies (KETs)



The leverage effect of KETs

Key enabling technologies have significant leveraging effect in different sectors



Developing KETs for different sectors

- Technology push: How do I get to know the new field of application ?
- Technology pull: What is the potential for KETs in the field of application ?

Part 1: Introduction

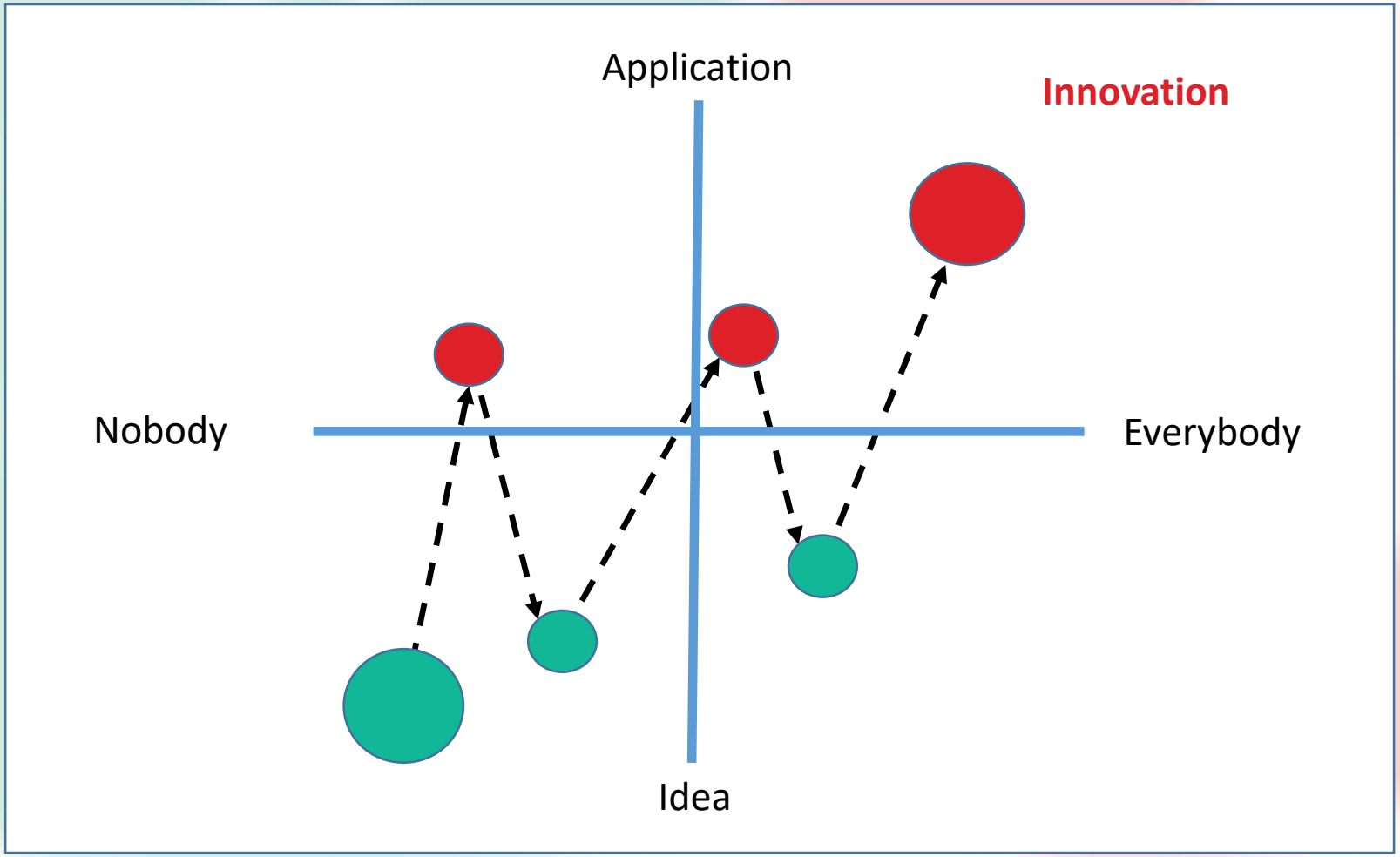
KETs & Scalable Innovation

What is innovation?

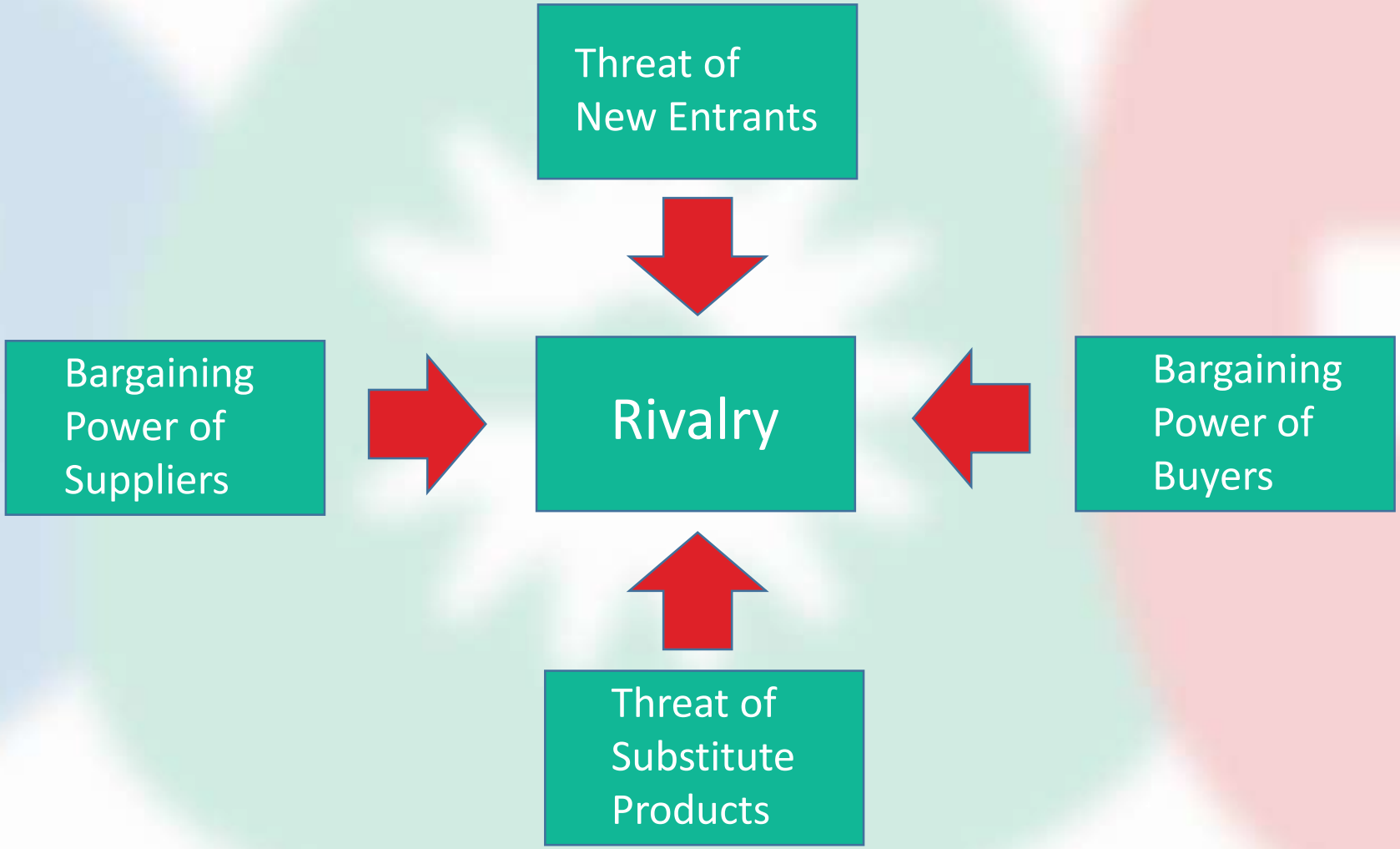
- “To realise its full potential, an invention has to turn into something that works everywhere for everybody”

This is innovation

It is an iterative process



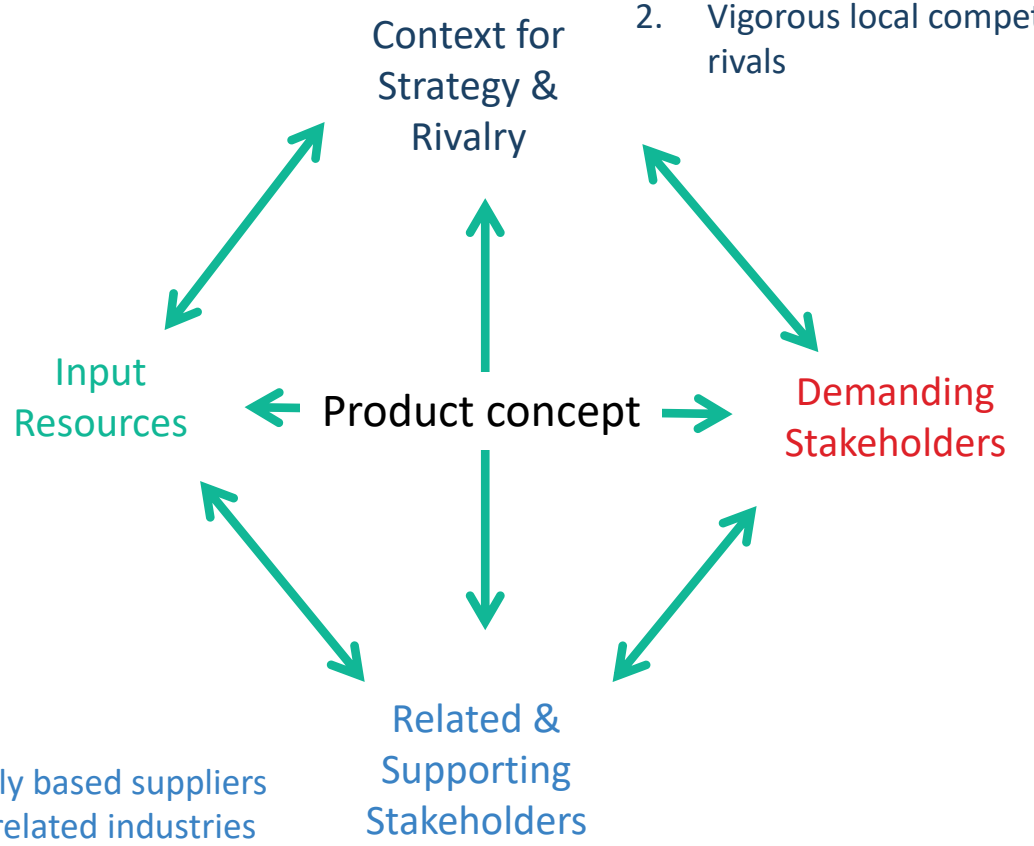
How competitive is the innovation ?



On competition, Porter, 2008

What is the regional motivation for innovation?

1. Local resources
    1. Natural
    2. Human
    3. Capital
2. School Infrastructure
    1. Physical
    2. Administrative
    3. Information
    4. Scientific Technological
3. Quality
4. Specialisation



1. Local context that encourages investment and sustained upgrading
2. Vigorous local competition among locally based rivals

1. Sophisticated & demanding customers.
2. Local Customer needs that anticipate global needs elsewhere
3. Unusual local specialised needs which are global

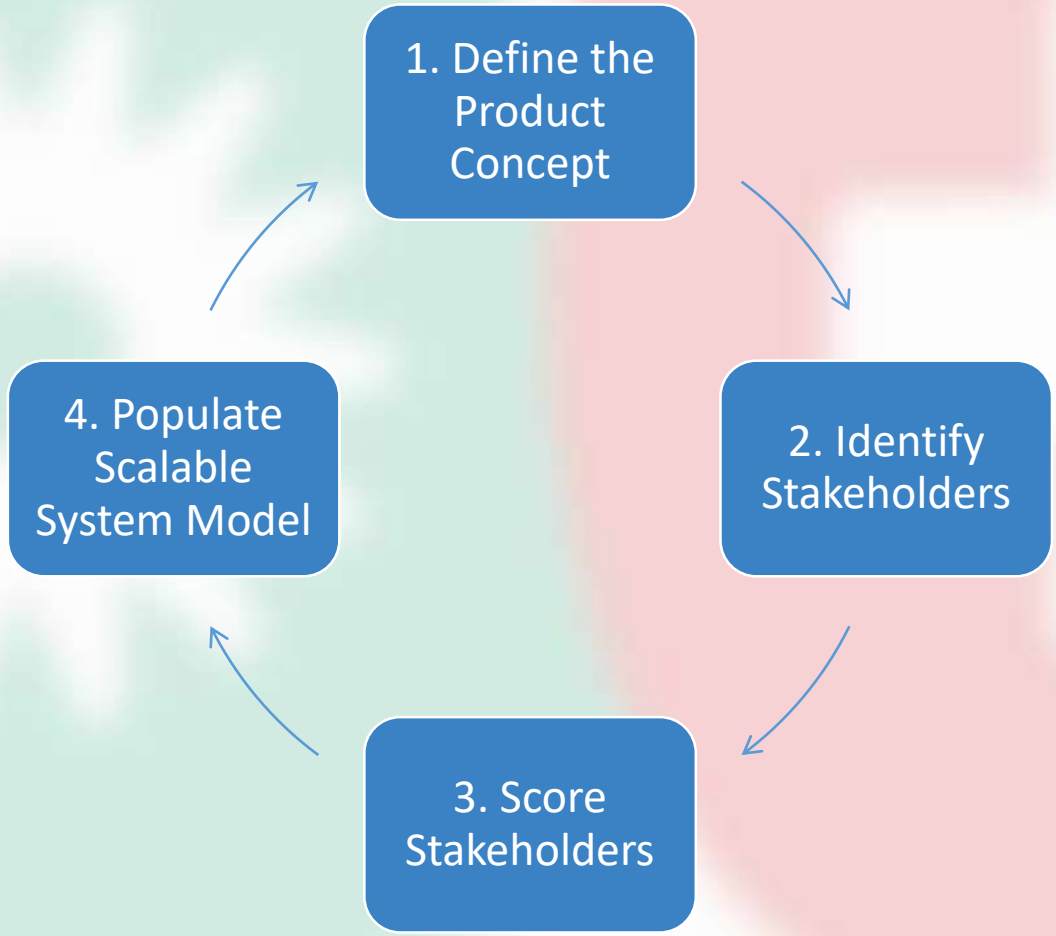
1. Presence of capable locally based suppliers
2. Presence of competitive related industries

On competition, Porter, 2008

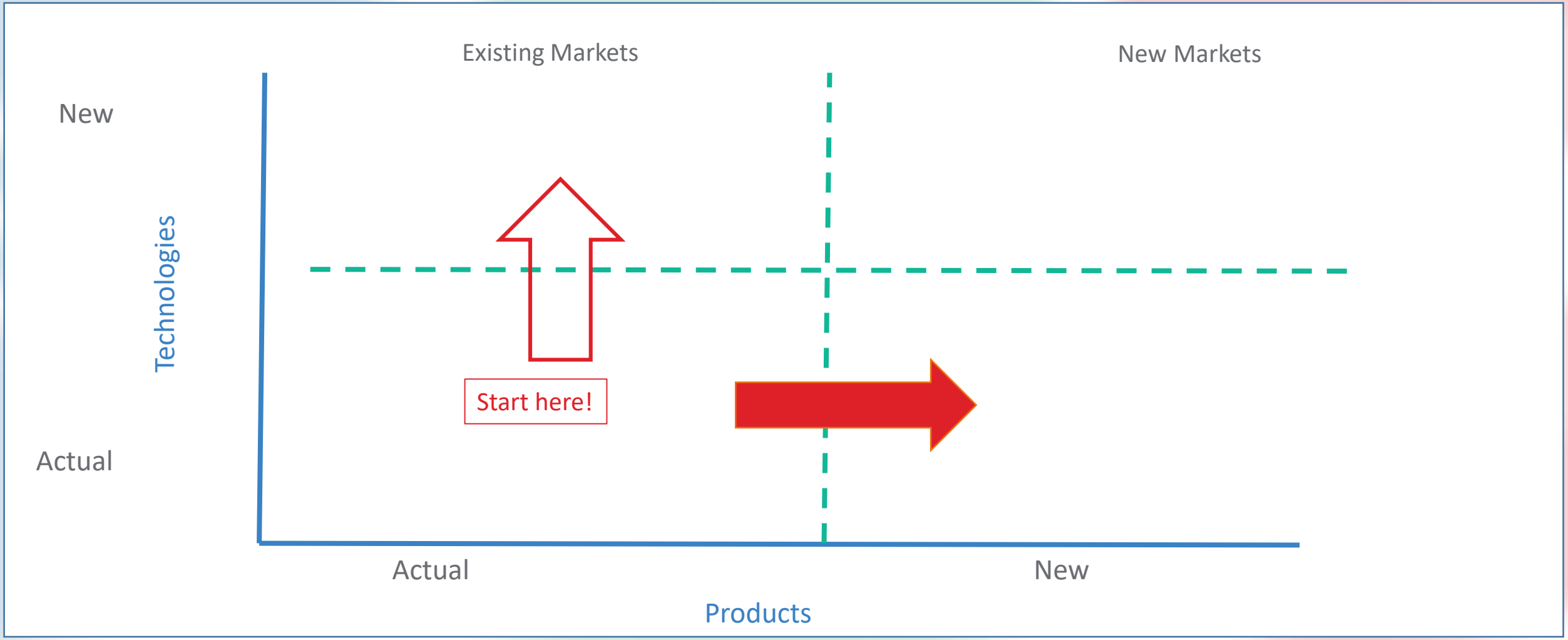
What is the product concept ?

STEP 1

Define product Concept

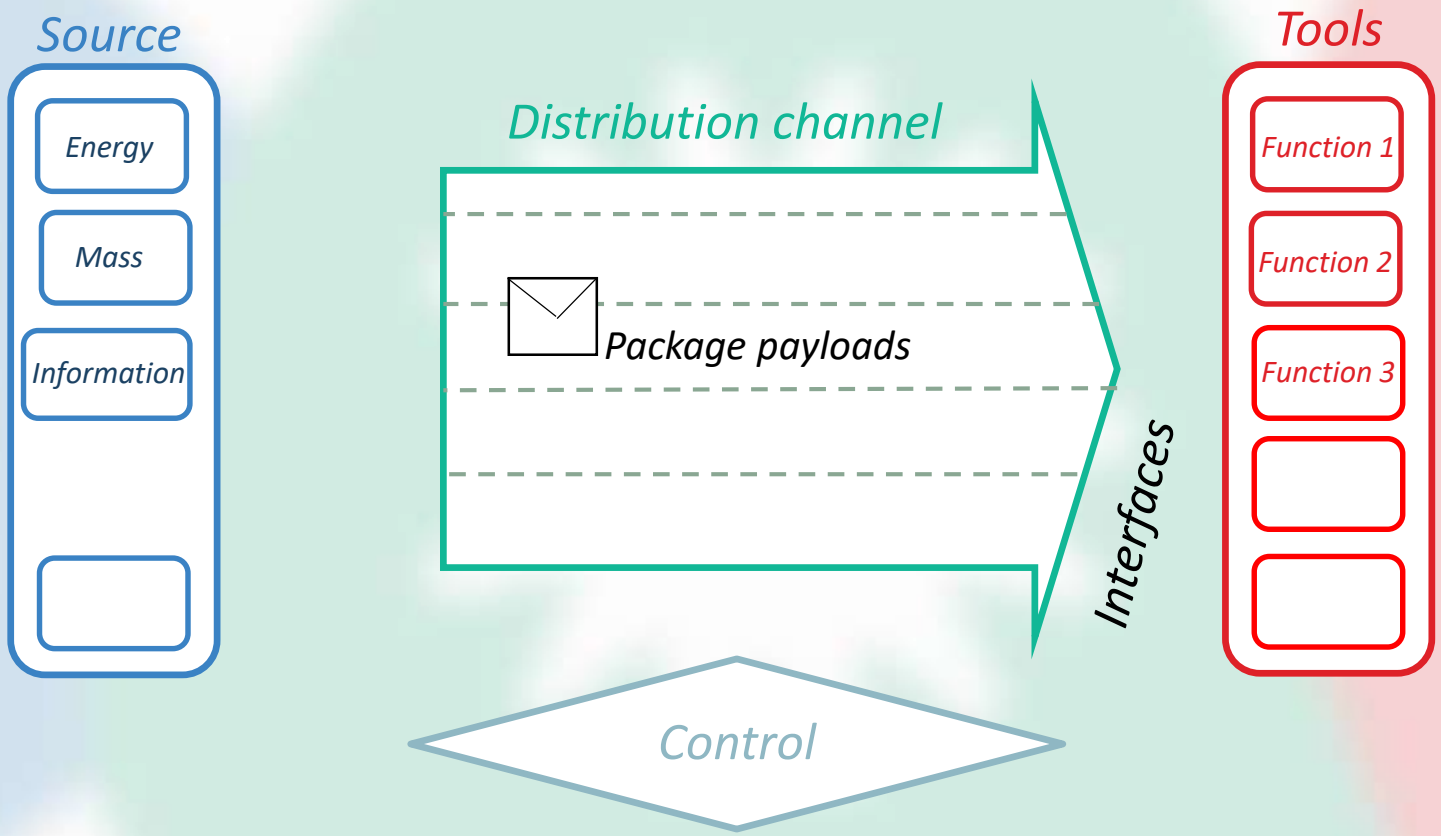


Where is the potential market ?



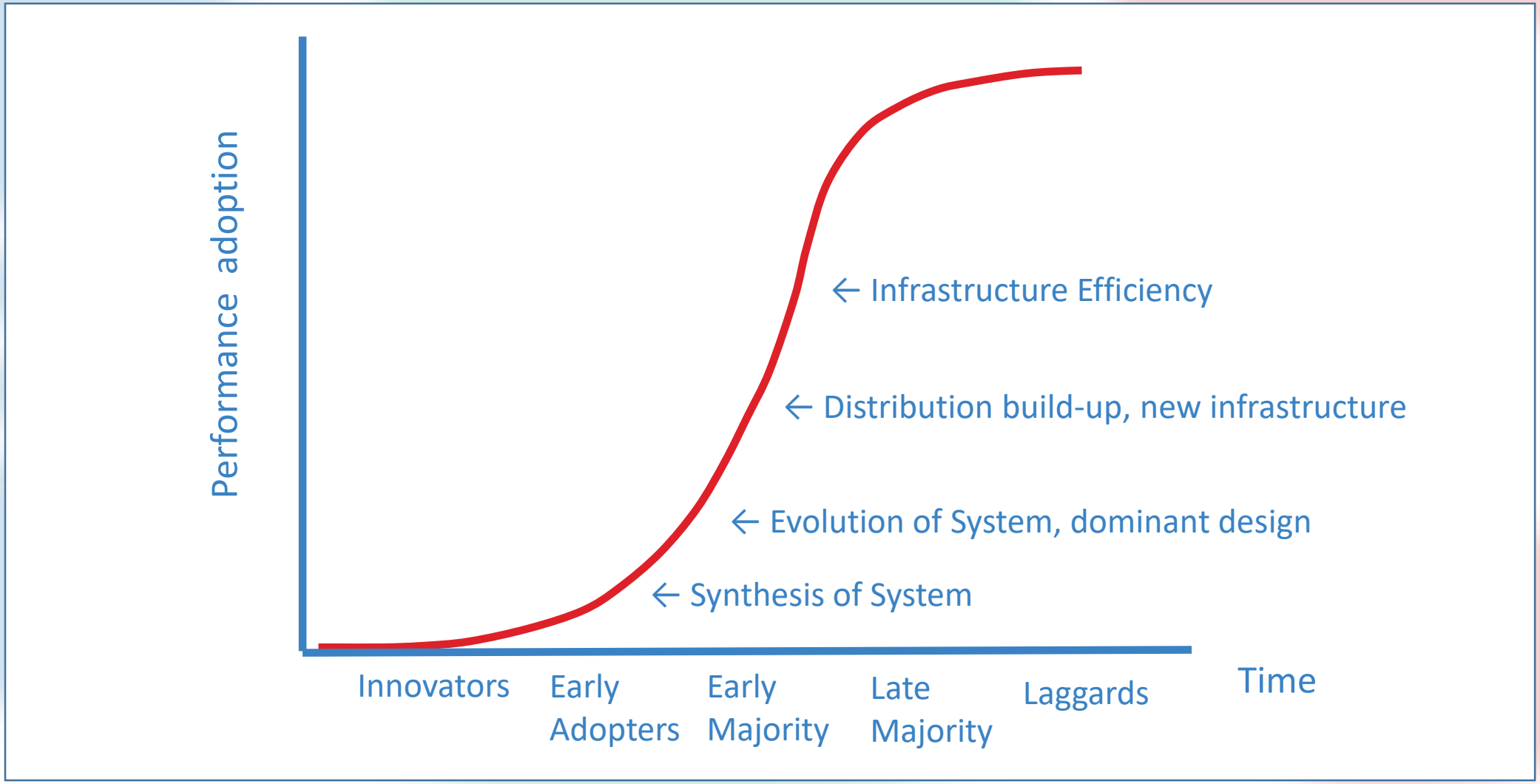
What is the System Model for the Product Concept ?

Explained in more detail later

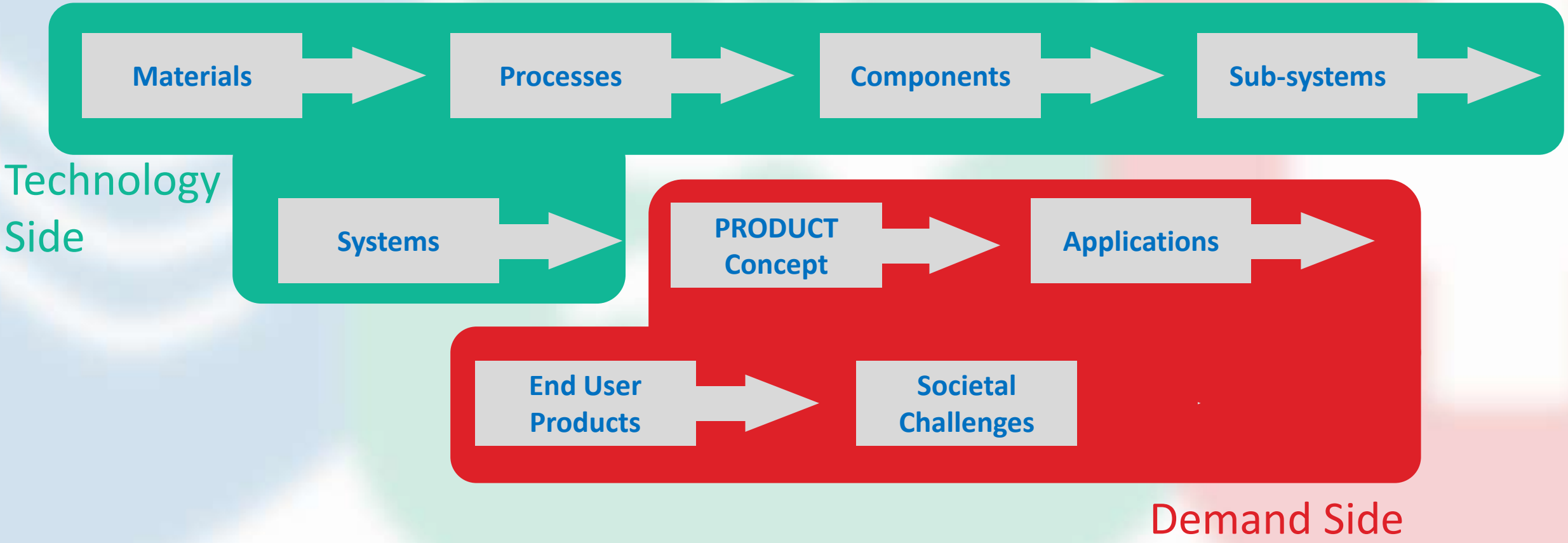


Scalable Innovation, Shteyn & Shtein, CRC Press

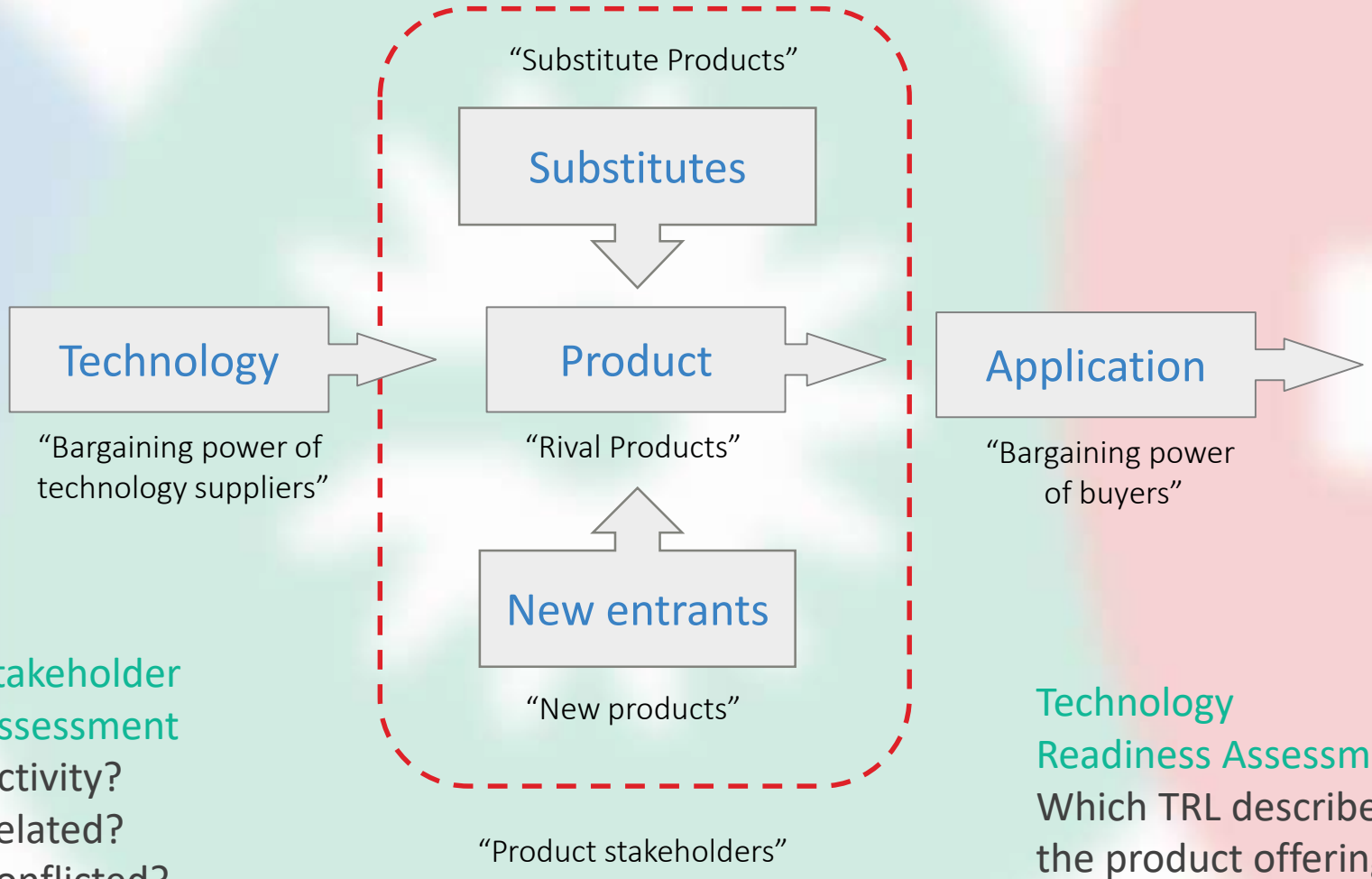
Progress on S-Curve linked to system model



Technical value chain for Product



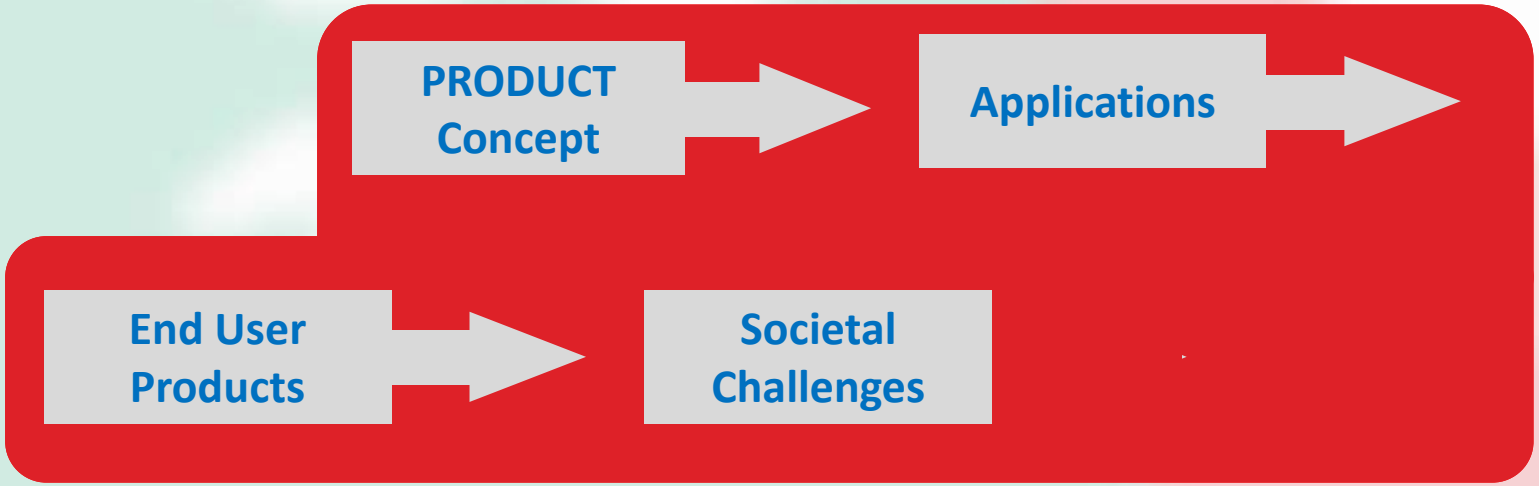
Competitiveness reflected in product's value chain



Stakeholder Assessment
Activity?
Related?
Conflicted?
Engageable ?

Technology Readiness Assessment
Which TRL describes the product offering and proposition of stakeholders ?

Technical Value Chain for a product

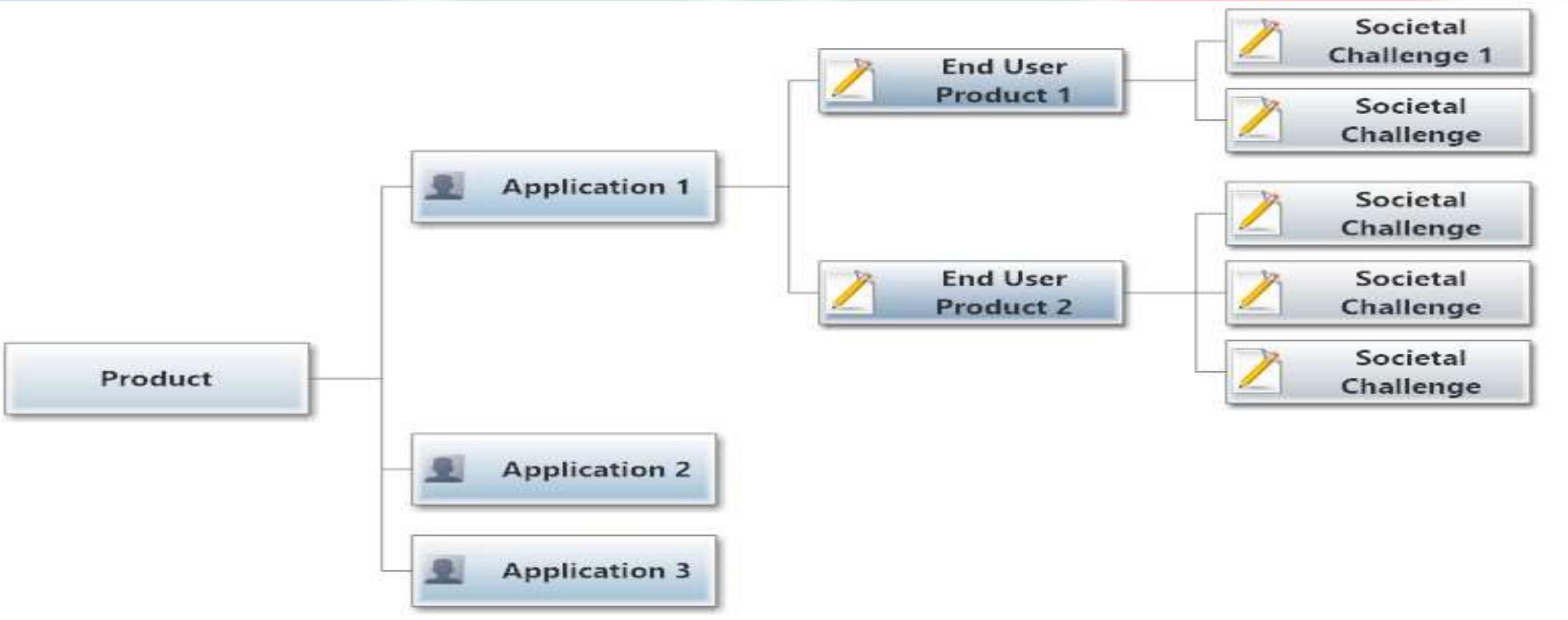


Demand Side is the Primary Focus

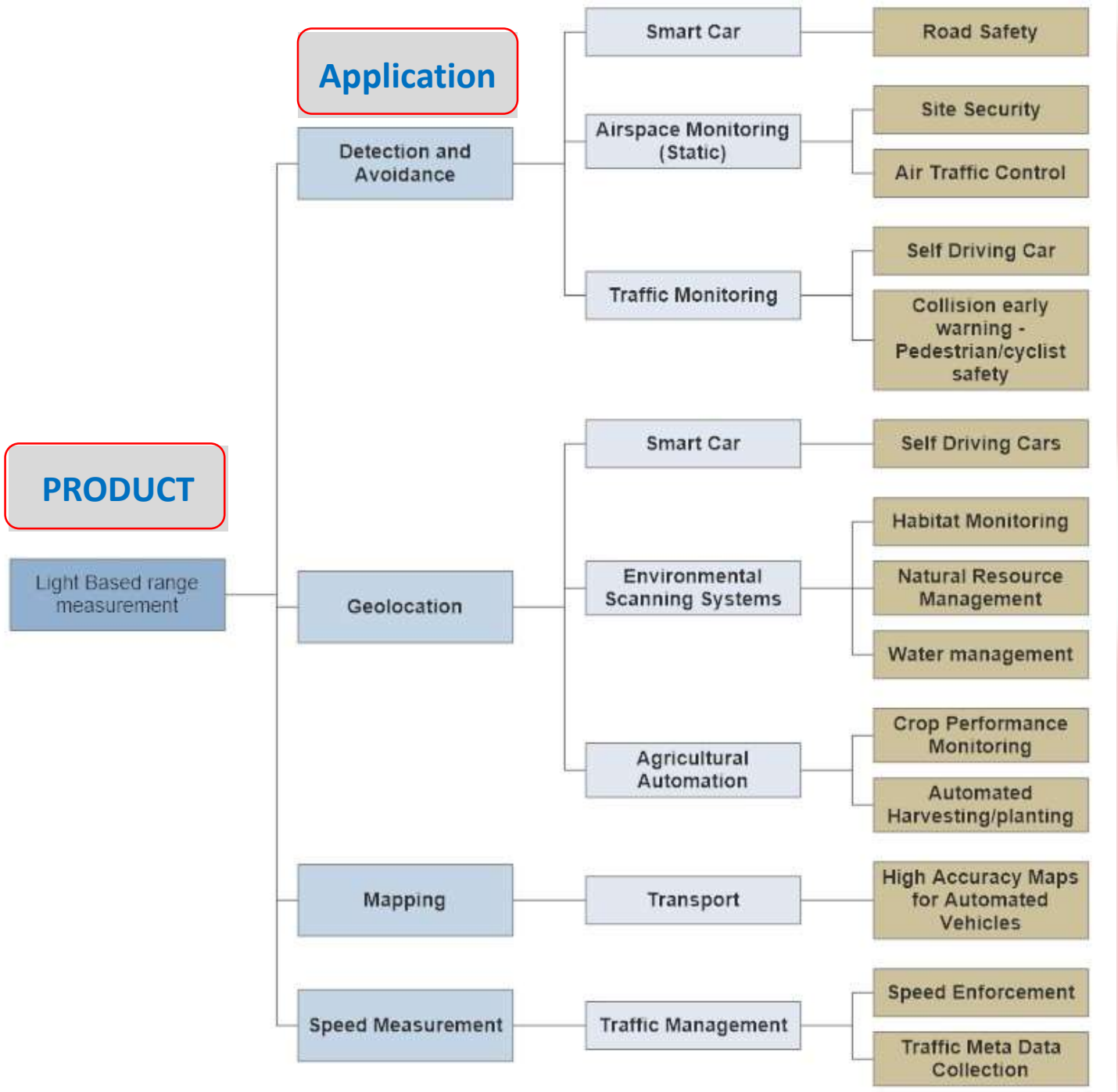
Part 2:
What is the application of the product ?

Identifying the stakeholders

Demand Tree for the Product



Example: Lidar



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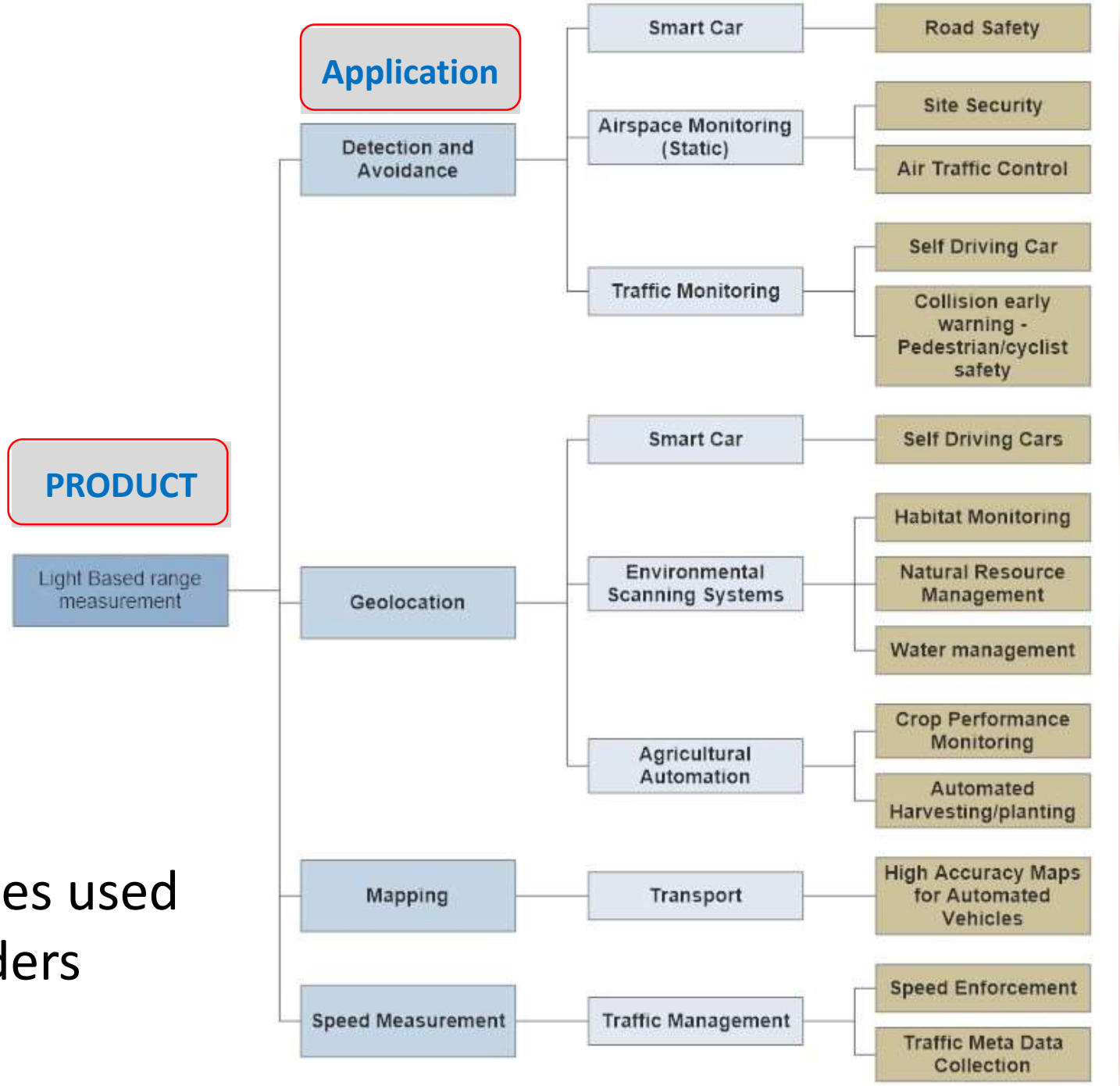
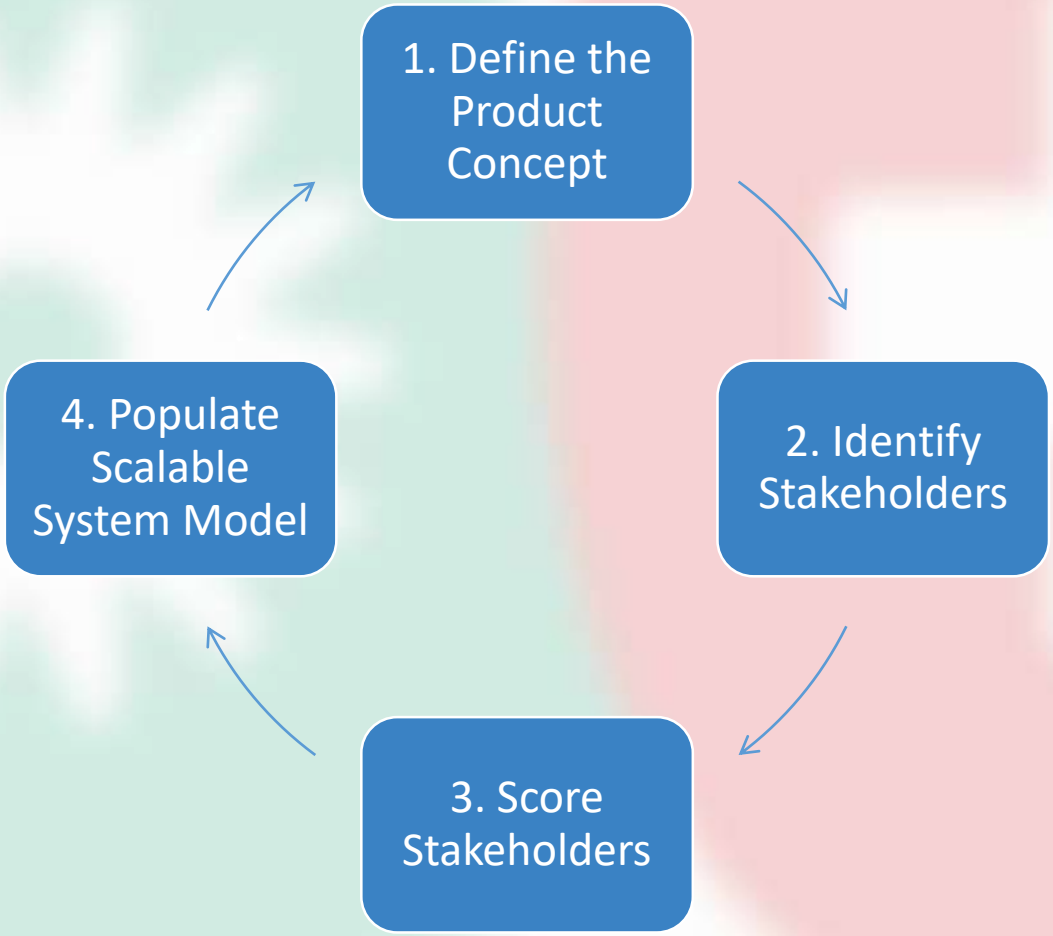


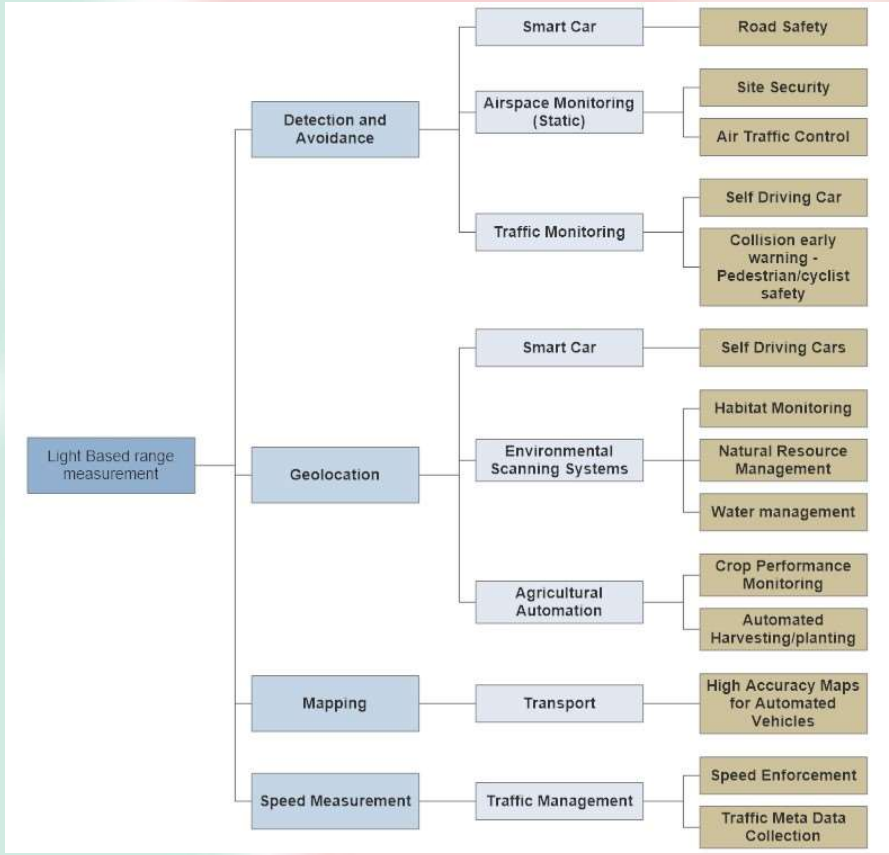
Entries become Keywords/Key Phrases used to identify Stakeholders

STEP 2
Identify Stakeholders



Mapping the Stakeholders

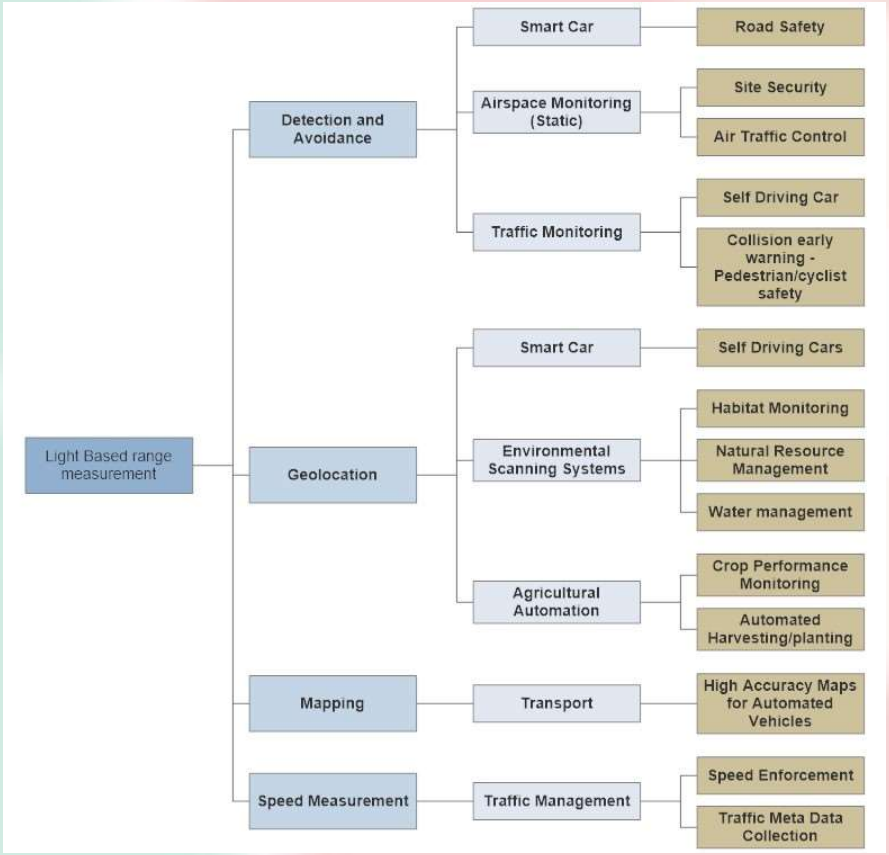
- Stakeholders are essential to realise the potential of the product in the market
- The technical value chain can help to map stakeholders in relation to the product



Identify the Stakeholders

- Who are the stakeholders?
  - Global – Preferred, but how to select ?
  - Regional – good but how to restrict ?
  - Local – most likely already known

- Target regional stakeholders in the desired sector/s



Regional & Sectoral Targeting using Industry Clusters

- Start with Clusters – Engagability, Relevance, Region Specific

  Cluster Observatory, European Secretariat for Cluster Analysis
- E.g. For Lidar: Automotive, Green Energy, Security, Marine …
  - Region =Europe – Concentrate on local companies
- Extract URL of cluster members - Use free online tools:
  - Note Parse – Extracts hyperlinks from Text
  - Link Grabber – Plugin Extracts links from webpages
  - Copy All URLs – Plugin Converts open Tabs to list of Hyperlinks
- Add other relevant databases of enterprise URLs

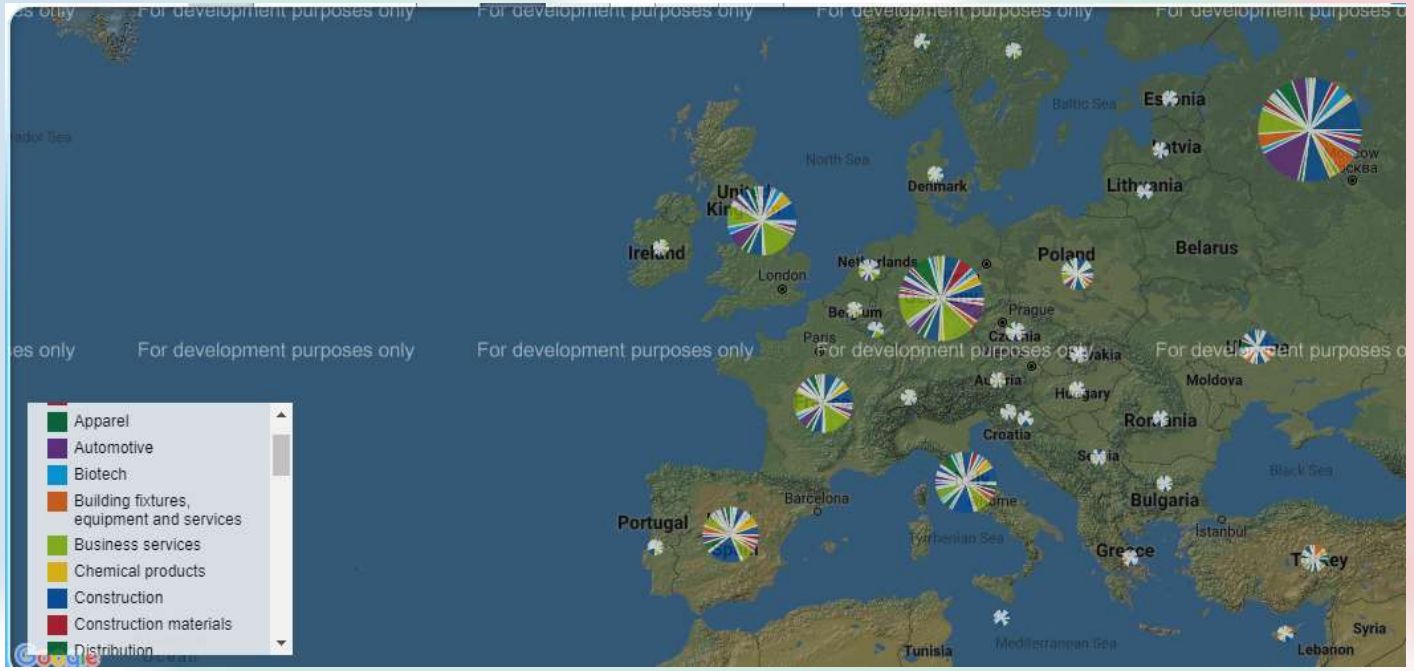
Regional & Sectoral Targeting: Industry Clusters

- European Secretariat for Cluster Analysis
  - 24 Gold level clusters in France

Name	Comparative portfolio	www	Label valid until
Aerospace Valley	Aviation and space	http://www.aerospace-valley.com/	2018/12/01
AGRI SUD-OUEST INNOVATION	Food industry	http://www.agrisudouest.com	2018/12/03
Alsace BioValley	Health and medical science	http://www.alsace-biovalley.com	2017/12/31
Axelera	New materials and chemistry	http://www.axelera.org	2019/06/04
Cap Digital	Creative industries	http://www.capdigital.com/	2019/07/15
CARA – European Cluster for Mobility Solutions	Transportation and mobility	https://cara.eu/	2019/02/25
Cluster Montagne	Sports, Leisure and Tourism	http://www.cluster-montagne.com	2019/01/31
HYDREOS	Energy and environment	https://www.hydreos.fr/	2020/10/29
ID4Car	Transportation and mobility	http://www.id4car.org	2021/07/30
LYONBIOPOLE	Health and medical science	http://www.lyonbiopole.com	2019/11/10
Minalogic	Micro, nano and optical technologies	http://www.minalogic.com/	2017/12/31
Pôle de compétitivité Optitec	Micro, nano and optical technologies	http://www.pole-optitec.com	2018/01/31
Pôle de compétitivité Plasturgie (PLASTIPOLIS)	New materials and chemistry	http://www.plastipolis.fr/	2018/06/17
Pôle EMC2	Production and engineering	http://www.pole-emc2.fr	2017/07/17
Pôle Fibres-Energivie	Construction	http://www.fibres-energivie.eu	2019/09/30
Pôle Mov'eo	Transportation and mobility	http://www.pole-moveo.org	2019/12/14
Pole SCS	ICT	http://www.pole-scs.org/	2018/05/21

Regional & Sectoral Targeting: Industry Clusters

- Cluster Observatory
  - 41 Sectors throughout Europe



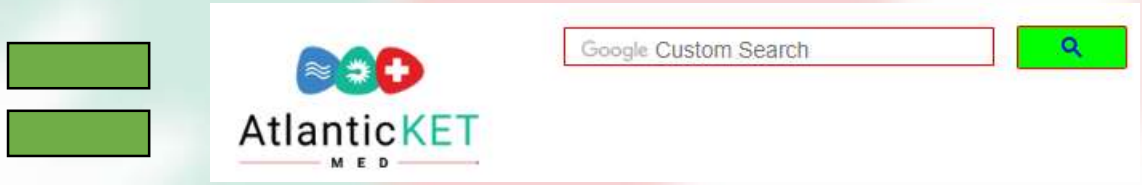
Regional & Sectoral Targeting: Custom Search Engines

- Software solutions: google, Yacy
  - Build a search engine that only looks at specific websites
  - Crawl the web and download & index the websites of the target companies
    - Current search engine has 1.7 Million documents indexed across ~10,000 websites

Regional & Sectoral Targeting: Custom Search Engines

1568	wiseed.com		www.wiseed.com
1569	withyou.fr		www.withyou.fr
1570	wittenstein-cyber-motor.de/		www.wittenstein-cyber-motor.de/
1571	wm-offshore.com/		www.wm-offshore.com/
1572	worldcastsystems.com		www.worldcastsystems.com
1573	wrfreiria.com		www.wrfreiria.com
1574	wso.dk/		www.wso.dk/
1575	wuerthindustri.dk/		www.wuerthindustri.dk/
1576	wuerth-industrie.com		www.wuerth-industrie.com
1577	wurth.fr		www.wurth.fr
1578	xamen.fr		www.xamen.fr
1579	yazaki-europe.com		www.yazaki-europe.com
1580	yggval.com		www.yggval.com
1581	zacco.com/		www.zacco.com/
1582	zeiss.de/		www.zeiss.de/
1583	zemenergy.com/		www.zemenergy.com/
1584	zenitel.com/contact/denmark		www.zenitel.com/contact/denmark
1585	ziehl-abegg.com/de/		www.ziehl-abegg.com/de/
1586	zindel.fr		www.zindel.fr
1587	zumtobelgroup.com/en/		www.zumtobelgroup.com/en/
1588	zupelux.dk/		www.zupelux.dk/
1589	zybersafe.com/		www.zybersafe.com/

Gold Clusters | Attendees | **Combined** | Pôle Véhicule du Futur | ceaga | electric mobility s-w | Gate 21 | GCENode | H



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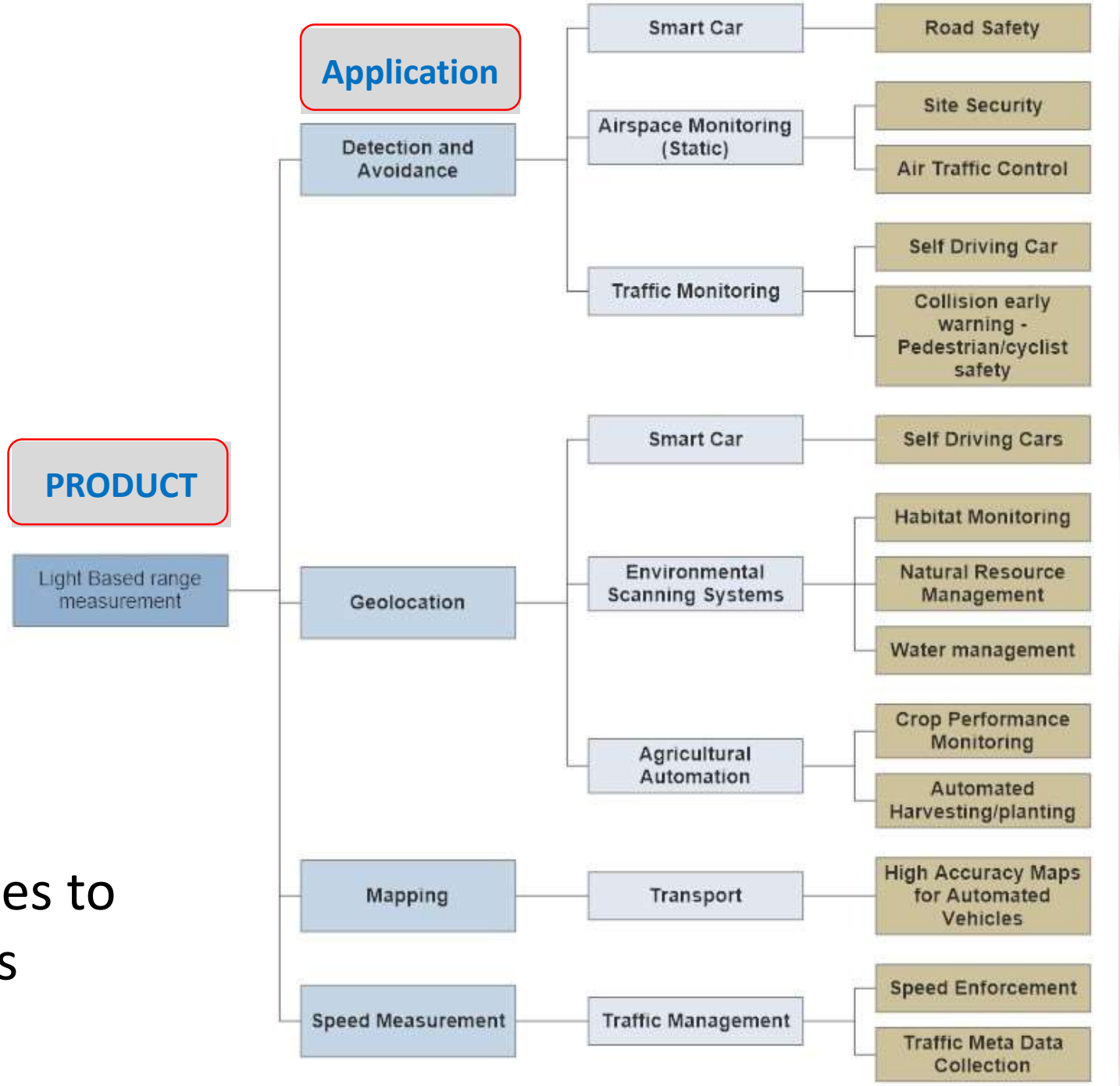
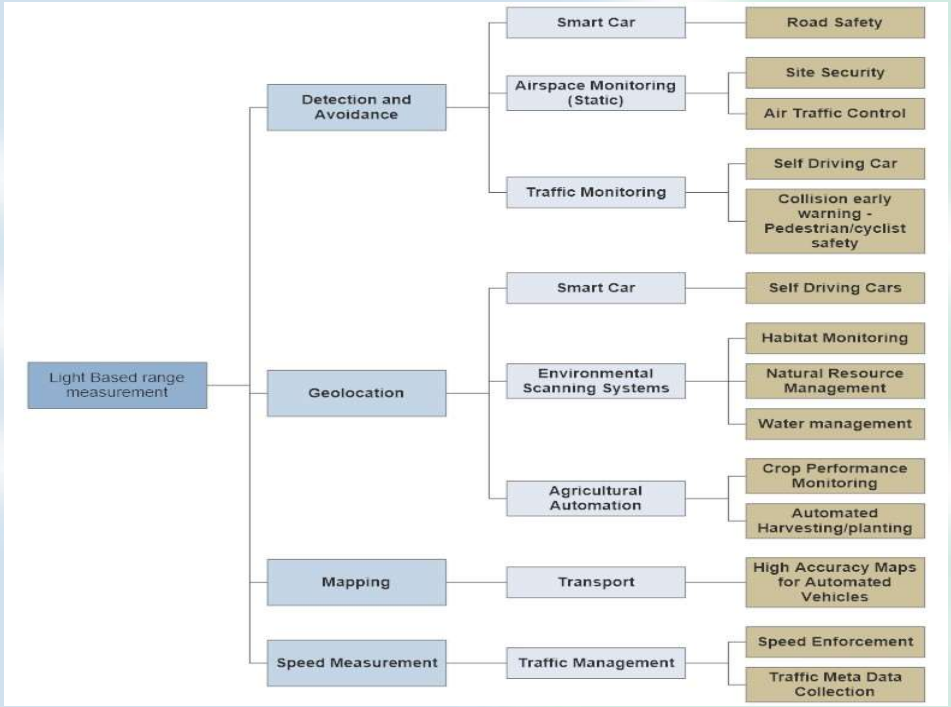
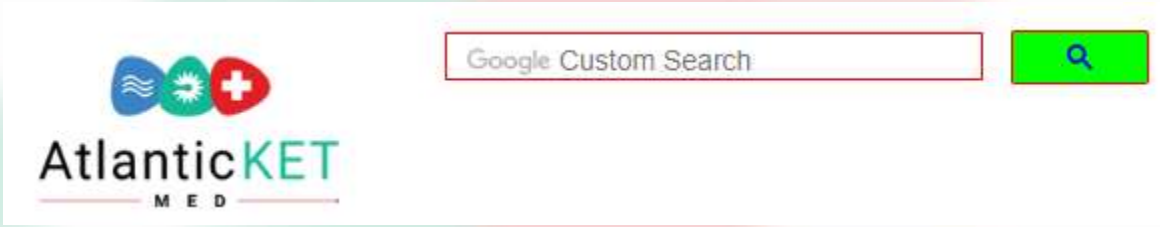


Entries become Keywords/Key Phrases to identify Stakeholders

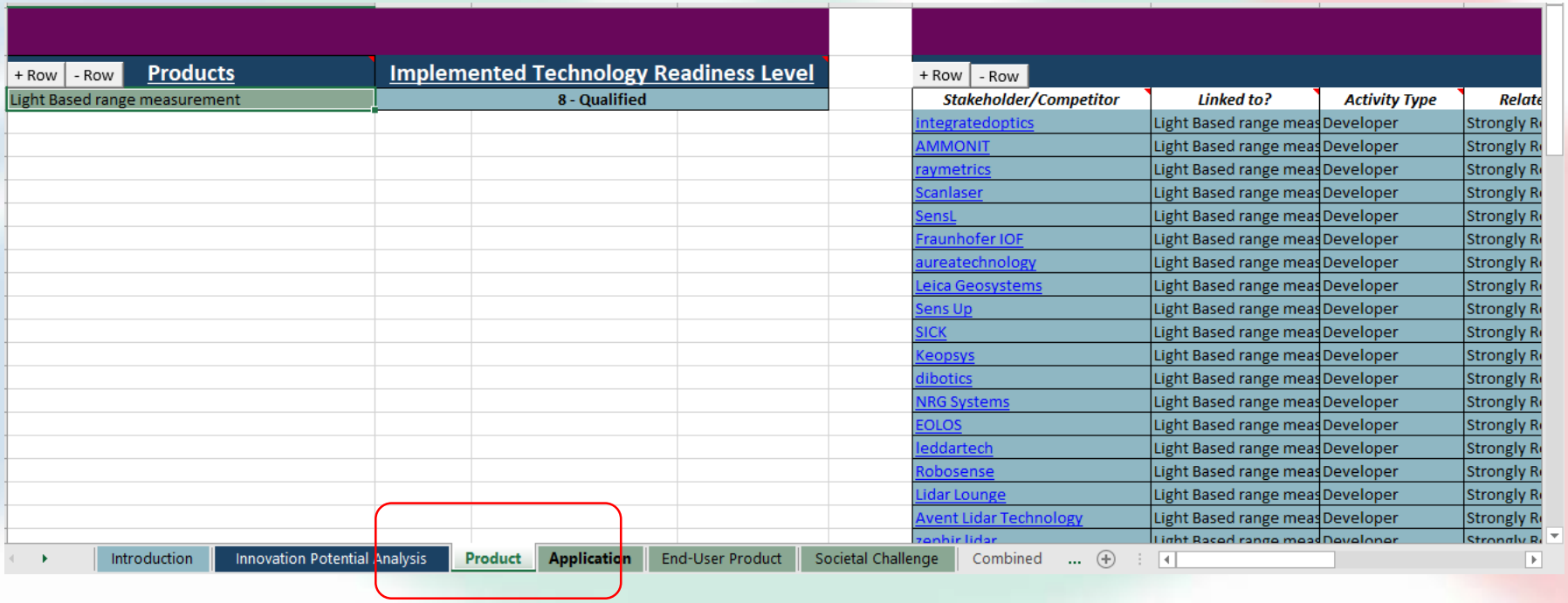
Identify the Stakeholders
Use value chain terms in the Custom Search Engine





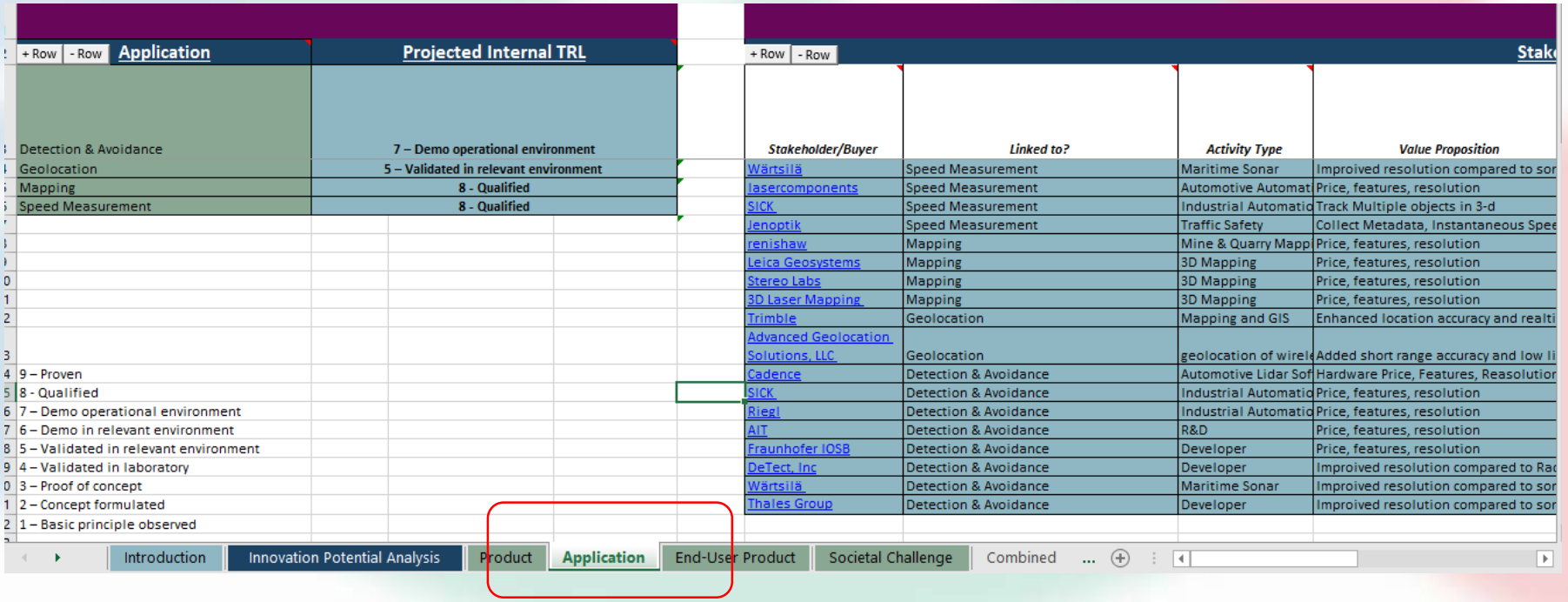
Managing the Stakeholders

- Spreadsheet tool to organise and score the stakeholders
  - Each level of the value chain has a page
  - Product:



Managing the stakeholders

- Spreadsheet tool to organise and score the stakeholders
  - Each level of the value chain has a page
  - Application:



+ Row	- Row	Application	Projected Internal TRL
		Detection & Avoidance	7 – Demo operational environment
		Geolocation	5 – Validated in relevant environment
		Mapping	8 - Qualified
		Speed Measurement	8 - Qualified

9 – Proven
8 - Qualified
7 – Demo operational environment
6 – Demo in relevant environment
5 – Validated in relevant environment
4 – Validated in laboratory
3 – Proof of concept
2 – Concept formulated
1 – Basic principle observed

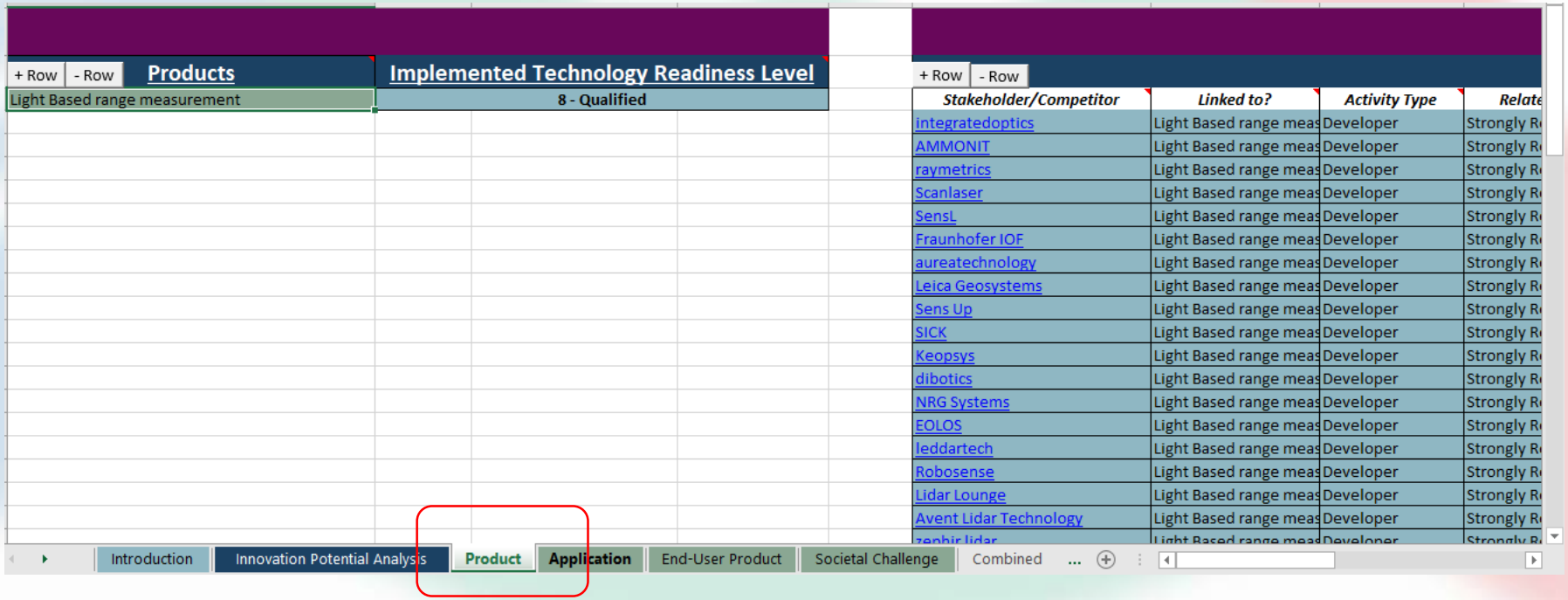
+ Row	- Row	Stak

Stakeholder/Buyer	*Linked to?*	*Activity Type*	*Value Proposition*
Wärtsilä	Speed Measurement	Maritime Sonar	Improved resolution compared to sor
lasercomponents	Speed Measurement	Automotive Automat	Price, features, resolution
SICK	Speed Measurement	Industrial Automatio	Track Multiple objects in 3-d
Jenoptik	Speed Measurement	Traffic Safety	Collect Metadata, Instantaneous Spee
renishaw	Mapping	Mine & Quarry Mapp	Price, features, resolution
Leica Geosystems	Mapping	3D Mapping	Price, features, resolution
Stereo Labs	Mapping	3D Mapping	Price, features, resolution
3D Laser Mapping	Mapping	3D Mapping	Price, features, resolution
Trimble	Geolocation	Mapping and GIS	Enhanced location accuracy and realti
Advanced Geolocation Solutions, LLC	Geolocation	geolocation of wirele	Added short range accuracy and low li
Cadence	Detection & Avoidance	Automotive Lidar Sof	Hardware Price, Features, Reasolutior
SICK	Detection & Avoidance	Industrial Automatio	Price, features, resolution
Riegl	Detection & Avoidance	Industrial Automatio	Price, features, resolution
AIT	Detection & Avoidance	R&D	Price, features, resolution
Fraunhofer IOSB	Detection & Avoidance	Developer	Price, features, resolution
DeTect, Inc	Detection & Avoidance	Developer	Improved resolution compared to Rac
Wärtsilä	Detection & Avoidance	Maritime Sonar	Improved resolution compared to sor
Thales Group	Detection & Avoidance	Developer	Improved resolution compared to sor

Introduction | Innovation Potential Analysis | Product | Application | End-User Product | Societal Challenge | Combined ...

Managing the stakeholders

- Start at the Product level
  - Identify potential stakeholders in the CSE who are direct competitors: Substitutes, rivals, etc.
  - Aids in understanding the market and positioning the value propositions



+ Row | - Row | Products | Implemented Technology Readiness Level

Products	Implemented Technology Readiness Level
Light Based range measurement	8 - Qualified

+ Row | - Row

Stakeholder/Competitor	Linked to?	Activity Type	Relate
integratedoptics	Light Based range meas	Developer	Strongly R
AMMONIT	Light Based range meas	Developer	Strongly R
raymetrics	Light Based range meas	Developer	Strongly R
Scanlaser	Light Based range meas	Developer	Strongly R
SensL	Light Based range meas	Developer	Strongly R
Fraunhofer IOF	Light Based range meas	Developer	Strongly R
aureatechnology	Light Based range meas	Developer	Strongly R
Leica Geosystems	Light Based range meas	Developer	Strongly R
Sens Up	Light Based range meas	Developer	Strongly R
SICK	Light Based range meas	Developer	Strongly R
Keopsys	Light Based range meas	Developer	Strongly R
dibotics	Light Based range meas	Developer	Strongly R
NRG Systems	Light Based range meas	Developer	Strongly R
EOLOS	Light Based range meas	Developer	Strongly R
leddartech	Light Based range meas	Developer	Strongly R
Robosense	Light Based range meas	Developer	Strongly R
Lidar Lounge	Light Based range meas	Developer	Strongly R
Avent Lidar Technology	Light Based range meas	Developer	Strongly R
zephir lidar	Light Based range meas	Developer	Strongly R

Introduction | Innovation Potential Analysis | Product | Application | End-User Product | Societal Challenge | Combined ...

Demand Side Value Proposition

Is the product concept relevant to the stakeholder?

Product Concept
e.g. Diagnostic device

Downstream Stakeholder
e.g. Doctor's Surgeries

What is the value to the doctor?
(in words)

The specific value proposition is core to stakeholder – stakeholder interactions and is easily generated for a relevant Stakeholder

If the Value Proposition is weak or difficult to define then they are not a Stakeholder.
Multiple points of Value are ok and should be captured in the Value Proposition.

Value Proposition

Capture in the spreadsheet tool

	A	B	C	D	E	F	G
1	*Stakeholder/Buyer*	*Linked to?*	*Activity Type*	*Value Proposition*	*System Model*	Overall Score	
90	lasercomponents	Speed Measurement	Automotive Automation	Price, features, resolution	Tool	7.66	
91	Jenoptik	Speed Measurement	Traffic Safety	Collect Metadata, Instantaneo	Tool	6.99	
92	Wärtsilä	Speed Measurement	Maritime Sonar	Improved resolution compar	Tool	6.88	
93	SICK	Speed Measurement	Industrial Automation	Track Multiple objects in 3-d	Tool	6.88	
94	Mikros	Traffic Management - Speed Measurement	Traffic Monitoring	Collect Metadata, Instantaneo	Tool	7.13	
95	Citilog	Traffic Management - Speed Measurement	Traffic Data Collection	Collect Metadata, Instantaneo	Tool	7.13	7.24
96	Jenoptix	Traffic Management - Speed Measurement	Traffic Safety Systems	Improved Accuracy and small	Tool	7.13	
97	Safran	Speed Enforcment - Traffic Management - Speed Measurement	Speed Enforcment	Price, features, resolution	Tool	7.41	
98	Fareco	Speed Enforcment - Traffic Management - Speed Measurement	Speed Enforcment	Price, features, resolution	Tool	7.41	
99	PTB	Speed Enforcment - Traffic Management - Speed Measurement	Traffic Safety	Price, features, resolution	Tool	7.41	
100	Morpho	Speed Enforcment - Traffic Management - Speed Measurement	Traffic Safety	Price, features, resolution	Tool	7.41	
101	Jenoptik	Speed Enforcment - Traffic Management - Speed Measurement	Traffic Safety	Price, features, resolution	Tool	7.41	
102							

The specific value proposition is core to stakeholder – stakeholder interactions and is easily generated for a relevant Stakeholder

If the Value Proposition to the doctor is weak or difficult to define then they are not a Stakeholder.

Multiple points of value should be captured in the Value Proposition.

Part 3: Scoring the Value Chain

The value proposition connects stakeholders

How do the different stakeholders add value to the product concept ?

Product Concept Stakeholder

Value to the Stakeholder?

We score the specific value proposition!

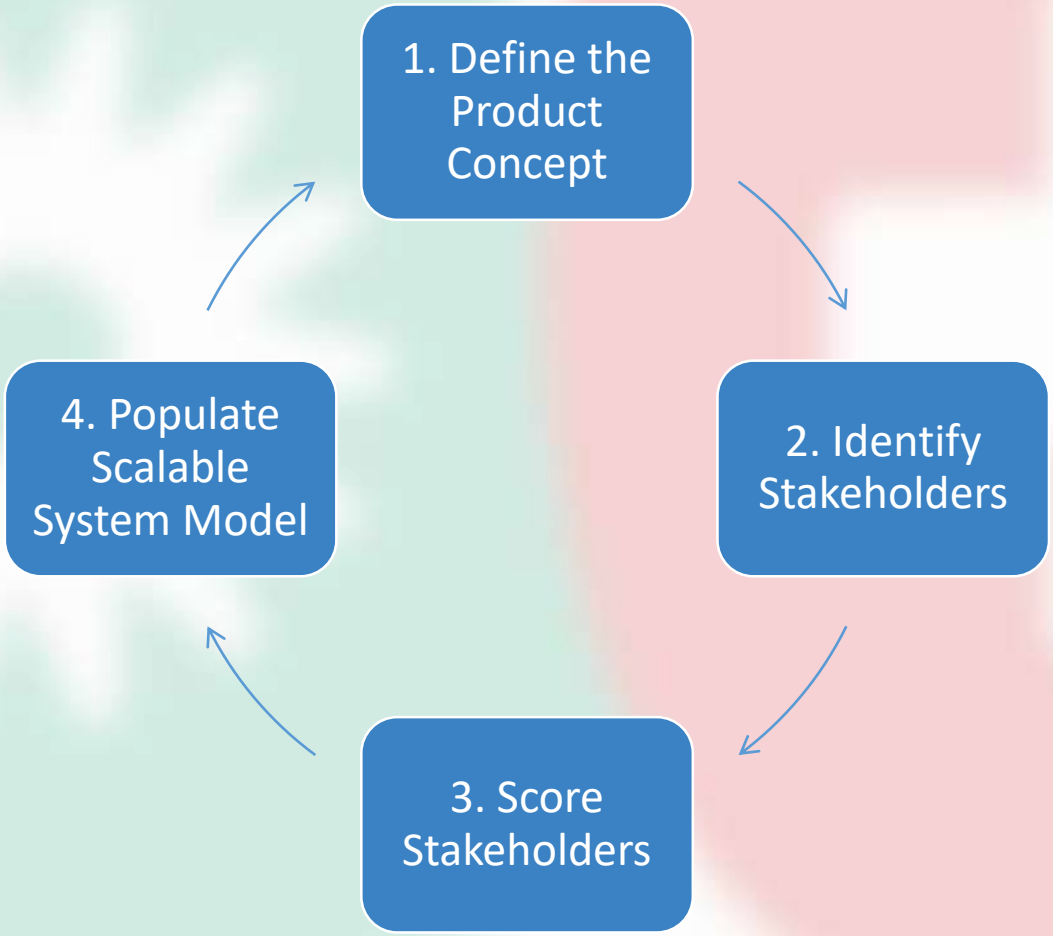
Technology side

Demand side

Value chain analysis

STEP 3

Scoring the value proposition that connects stakeholders



Scoring the stakeholders

- Stakeholder Basics:
  - Related Activity?
    - Is the stakeholder aligned with the enterprise ?
    - Will stakeholder growth and development help SME and vice versa?
  - Conflicted?
    - Involved with competition? Likely to usurp enterprise themselves?
  - Engageable?
    - Easy path to working relationship – Partner company, Cluster Member, or no connection
  - Working Relationship?
    - Existing connection are most easily leveraged

Assessing technology readiness of value proposition

TRL	Definition	Description	Yes /No
9 – Proven	Actual system operated over full range ?	System operated in final form, full range operation conditions ?	
8 - Qualified	Actual system completed & qualified through test & demonstration ?	Technology proven to work in its final form. End of true system development ?	
7 – Demo operational environment	Full-scale, prototype system in relevant environment ?	Actual prototype full scale system. Demonstrated in relevant environment ?	
6 – Demo in relevant environment	Pilot engineering scale system validated in relevant environment ?	Prototype beyond lab-scale, tested relevant environment, high demo readiness?	
5 – Validated in relevant environment	Laboratory scale system, concept validated in relevant environment ?	Technology components integrated in system that matches final application in almost all respects. High fidelity system, simulated environment?	
4 – Validated in laboratory	Component & or system validation in laboratory environment ?	Basic components integrated. Low fidelity system. Ad hoc testing on range of simulants?	
3 – Proof of concept	Analytical & experimental critical function – proof of concept?	Active research & development initiated?	
2 – Concept formulated	Technology level formulated?	Basic principles observed. Applications speculative. No proof analysis. Analytical ex ?	
1 – Basic principle observed	Basic principles observed & reported ?	Translation of scientific research to applied R&D. Study of technologies basic properties?	

- Score
  - Highly for high TRL on technology side
  - Highly for mid to high TRL on demand

Assessing the Innovation Potential -technology

- How much is the technology suddenly possible ?

- Score
  - 0, not suddenly possible
  - 1, recently possible
  - 2, just possible

Assessing the Innovation Potential -technology

- Does the enterprise have the resources to prototype and develop concept ?

- Score
  - 0, no
  - 1, some capacity
  - 2, Yes

Assessing the Innovation Potential -technology

- Does the stakeholder have sufficient expertise to exploit the Product?

- Score
  - 0, no
  - 1, Some expertise
  - 2, Yes

Assessing the Innovation Potential -technology

- Where is the technology on the S-Curve?

- Score
  - 0, at base or top
  - 1, midway
  - 2, above base

Assessing the Innovation Potential -Market

- Is the innovation desperately needed?

- Score
  - 0, not desperately needed
  - 1, somewhat desperately needed
  - 2, yes desperately

Assessing the Innovation Potential -Market

- How accessible is the market that exists for the proposed development ?

- Score
  - 0, not accessible
  - 1, somewhat accessible
  - 2, yes accessible

Assessing the Innovation Potential -Market

- How readily available are a creative crowd of first adopters?

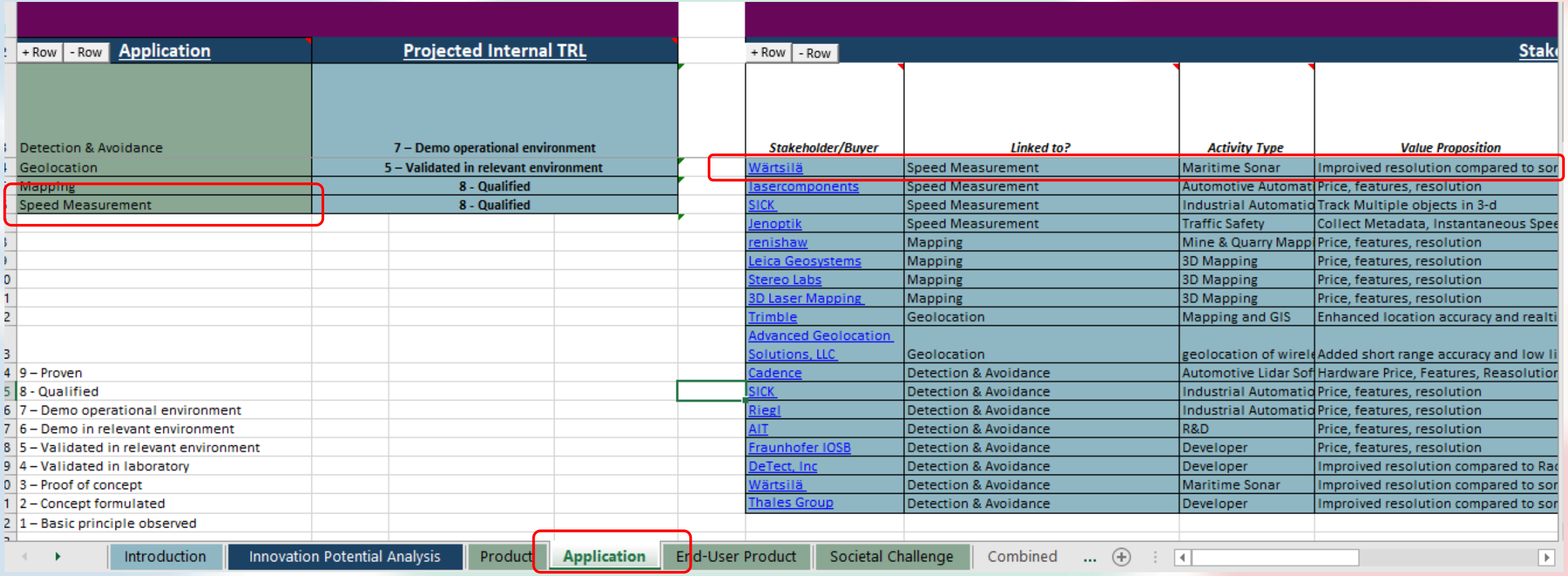
- Score
  - 0, not available
  - 1, somewhat available
  - 2, yes available

Assessing the Innovation Potential -Market

- How accessible are markets of a multitude?

- Score
  - 0, not accessible
  - 1, somewhat accessible
  - 2, yes accessible

Demonstration of Scoring



+ Row	- Row	Application	Projected Internal TRL
		Detection & Avoidance	7 – Demo operational environment
		Geolocation	5 – Validated in relevant environment
		Mapping	8 - Qualified
		Speed Measurement	8 - Qualified

9	9 – Proven
8	8 - Qualified
7	7 – Demo operational environment
6	6 – Demo in relevant environment
5	5 – Validated in relevant environment
4	4 – Validated in laboratory
3	3 – Proof of concept
2	2 – Concept formulated
1	1 – Basic principle observed

+ Row	- Row	Stakeholder/Buyer	Linked to?	Activity Type	Value Proposition
		Wärtsilä	Speed Measurement	Maritime Sonar	Improved resolution compared to sor
		lasercomponents	Speed Measurement	Automotive Automat	Price, features, resolution
		SICK	Speed Measurement	Industrial Automatic	Track Multiple objects in 3-d
		Jenoptik	Speed Measurement	Traffic Safety	Collect Metadata, Instantaneous Spee
		renishaw	Mapping	Mine & Quarry Mapp	Price, features, resolution
		Leica Geosystems	Mapping	3D Mapping	Price, features, resolution
		Stereo Labs	Mapping	3D Mapping	Price, features, resolution
		3D Laser Mapping	Mapping	3D Mapping	Price, features, resolution
		Trimble	Geolocation	Mapping and GIS	Enhanced location accuracy and realti
		Advanced Geolocation Solutions, LLC	Geolocation	geolocation of wirele	Added short range accuracy and low li
		Cadence	Detection & Avoidance	Automotive Lidar Sof	Hardware Price, Features, Reasolution
		SICK	Detection & Avoidance	Industrial Automatic	Price, features, resolution
		Riegl	Detection & Avoidance	Industrial Automatic	Price, features, resolution
		AIT	Detection & Avoidance	R&D	Price, features, resolution
		Fraunhofer IOSB	Detection & Avoidance	Developer	Price, features, resolution
		DeTect, Inc	Detection & Avoidance	Developer	Improved resolution compared to Rad
		Wärtsilä	Detection & Avoidance	Maritime Sonar	Improved resolution compared to sor
		Thales Group	Detection & Avoidance	Developer	Improved resolution compared to sor

Introduction | Innovation Potential Analysis | Product | Application | End-User Product | Societal Challenge | Combined ...

Demonstration of Scoring

+ Row - Row

Stakeholder Analysis

Stakeholder/Buyer	Linked to?	Activity Type	Value Proposition	System Model	Related Activity?	Conflicted?	Engagability Level	Working Relation
Wärtsilä	Speed Measurement	Maritime Sonar	Improved resolution compared to sonar	Tool	Strongly Related	Not Conflicted	Somewhat Engagable	Not Affiliated
lasercomponents	Speed Measurement	Automotive Automat	Price, features, resolution	Tool	Strongly Related	Somewhat Conflicted	Somewhat Engagable	Somewhat Affiliated
SICK	Speed Measurement	Industrial Automatio	Track Multiple objects in 3-d	Tool	Strongly Related	Somewhat Conflicted	Somewhat Engagable	Somewhat Affiliated
Jenoptik	Speed Measurement	Traffic Safety	Collect Metadata, Instantaneous Speed Me	Tool	Somewhat Related	Not Conflicted	Somewhat Engagable	Somewhat Affiliated
renishaw	Mapping	Mine & Quarry Mappi	Price, features, resolution	Tool	Strongly Related	Somewhat Conflicted	Somewhat Engagable	Somewhat Affiliated
Leica Geosystems	Mapping	3D Mapping	Price, features, resolution	Tool	Strongly Related	Somewhat Conflicted	Somewhat Engagable	Somewhat Affiliated
Stereo Labs	Mapping	3D Mapping	Price, features, resolution	Tool	Strongly Related	Somewhat Conflicted	Somewhat Engagable	Not Affiliated
3D Laser Mapping	Mapping	3D Mapping	Price, features, resolution	Tool	Strongly Related	Somewhat Conflicted	Somewhat Engagable	Not Affiliated
Trimble	Geolocation	Mapping and GIS	Enhanced location accuracy and realtime n	Tool	Somewhat Related	Somewhat Conflicted	Somewhat Engagable	Somewhat Affiliated
Advanced Geolocation Solutions, LLC	Geolocation	geolocation of wirele	Added short range accuracy and low light g	Tool	Somewhat Related	Somewhat Conflicted	Somewhat Engagable	Somewhat Affiliated
Cadence	Detection & Avoidance	Automotive Lidar Sof	Hardware Price, Features, Reasolution	Control, Packaged Pa	Somewhat Related	Somewhat Conflicted	Somewhat Engagable	Somewhat Affiliated
SICK	Detection & Avoidance	Industrial Automatio	Price, features, resolution	Tool	Somewhat Related	Somewhat Conflicted	Somewhat Engagable	Somewhat Affiliated
Riegl	Detection & Avoidance	Industrial Automatio	Price, features, resolution	Tool	Somewhat Related	Somewhat Conflicted	Somewhat Engagable	Somewhat Affiliated
AIT	Detection & Avoidance	R&D	Price, features, resolution	Tool	Strongly Related	Not Conflicted	Fully Engagable	Somewhat Affiliated
Fraunhofer IOSB	Detection & Avoidance	Developer	Price, features, resolution	Tool	Strongly Related	Somewhat Conflicted	Somewhat Engagable	Somewhat Affiliated
DeTect, Inc	Detection & Avoidance	Developer	Improved resolution compared to Radar	Tool	Strongly Related	Somewhat Conflicted	Somewhat Engagable	Somewhat Affiliated
Wärtsilä	Detection & Avoidance	Maritime Sonar	Improved resolution compared to sonar		Strongly Related	Somewhat Conflicted	Somewhat Engagable	Somewhat Affiliated
Thales Group	Detection & Avoidance	Developer	Improved resolution compared to sonar		Strongly Related	Somewhat Conflicted	Somewhat Engagable	Somewhat Affiliated

... | Innovation Potential Analysis | Product | Application | End-User Product | Societal Challenge | Combined | Averages

Demonstration of Scoring

+ Row - Row

Stakeholder Analysis

Stakeholder/Buyer	Linked to?	Activity Type	Value Proposition	System Model	Related Activity?	Conflicted?	Engagability Level	Working Relation
Wärtsilä	Speed Measurement	Maritime Sonar	Improved resolution compared to sonar	Tool	Strongly Related	Not Conflicted	Somewhat Engagable	Not Affiliated
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SICK	Speed Measurement	Industrial Automatio	Track Multiple objects in 3-d	Tool	Strongly Related	Somewhat Conflicted	Somewhat Engagable	Somewhat Affiliated
Jenoptik	Speed Measurement	Traffic Safety	Collect Metadata, Instantaneous Speed Me	Tool	Somewhat Related	Not Conflicted	Somewhat Engagable	Somewhat Affiliated
renishaw	Mapping	Mine & Quarry Mappi	Price, features, resolution	Tool	Strongly Related	Somewhat Conflicted	Somewhat Engagable	Somewhat Affiliated
Leica Geosystems	Mapping	3D Mapping	Price, features, resolution	Tool	Strongly Related	Somewhat Conflicted	Somewhat Engagable	Somewhat Affiliated
Stereo Labs	Mapping	3D Mapping	Price, features, resolution	Tool	Strongly Related	Somewhat Conflicted	Somewhat Engagable	Not Affiliated
3D Laser Mapping	Mapping	3D Mapping	Price, features, resolution	Tool	Strongly Related	Somewhat Conflicted	Somewhat Engagable	Not Affiliated
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Advanced Geolocation Solutions, LLC	Geolocation	geolocation of wirele	Added short range accuracy and low light g	Tool	Somewhat Related	Somewhat Conflicted	Somewhat Engagable	Somewhat Affiliated
Cadence	Detection & Avoidance	Automotive Lidar Sof	Hardware Price, Features, Reasolution	Control, Packaged Pa	Somewhat Related	Somewhat Conflicted	Somewhat Engagable	Somewhat Affiliated
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... | Innovation Potential Analysis | Product | Application | End-User Product | Societal Challenge | Combined | Averages

Demonstration of Scoring

Product/Service TRL	Stakehoder Score	How much is the technology suddenly possible ?	Does the company have the resources to prototype and develop?	Does the stakeholder have sufficient expertise to exploit the Product?	Where is the technology on the S-Curve?	Is the innovation desperately needed?	How accessible is the market that exists for the proposed development ?	How readily available are a creative crowd of first adopters?	How accessible are markets of a multitude?	Innovation Potential Score	Overall Score
5	6.75	1	2	2	1	1	2	2	1	6.75	6.88
7	6.75	1	2	2	2	1	2	2	2	7.88	7.66
5	6.75	1	2	2	1	1	2	2	1	6.75	6.88
6	6.75	1	2	2	1	0	2	2	1	6.19	6.99
7	6.75	1	2	2	2	1	2	2	1	7.31	7.52
7	6.75	1	2	2	2	1	2	2	1	7.31	7.52
7	6	1	2	2	2	1	2	2	1	7.31	7.33
7	6	1	2	2	2	1	2	2	1	7.31	7.33
5	6	2	2	2	1	1	2	2	0	6.75	5.69
5	6	2	2	2	1	1	2	2	0	6.75	5.69
7	6	1	2	2	2	1	1	1	2	6.75	6.94
7	6	1	2	2	2	1	2	1	1	6.75	6.94
7	6	1	2	2	2	1	2	1	1	6.75	6.94
6	8.25	1	2	2	2	1	2	2	1	7.31	7.39
7	6.75	1	2	2	2	1	1	2	1	6.75	7.13
7	6.75	1	2	2	2	1	1	2	1	6.75	7.13
7	6.75	1	2	2	2	1	1	2	1	6.75	7.13
7	6.75	1	2	2	2	1	1	2	1	6.75	7.13

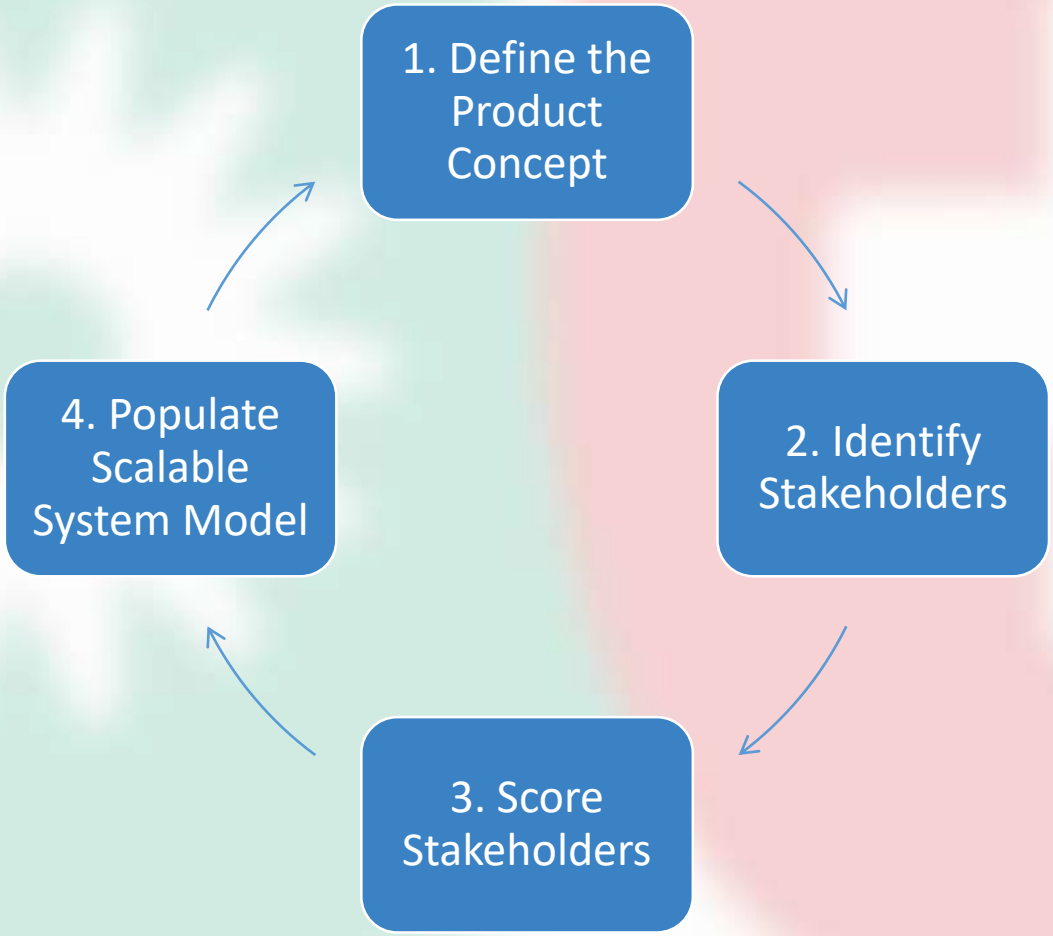
Impact of scoring

- Identifies most relevant stakeholders
- Identifies most important sectors for application

3	*Stakeholder/Buyer*	*Linked to?*	*Stakeholder Score*	Innovation Potential Score	Overall Score
4	Wärtsilä	Speed Measurement	6.75	6.75	6.88
5	lasercomponents	Speed Measurement	6.75	7.88	7.66
6	SICK	Speed Measurement	6.75	6.75	6.88
7	Jenoptik	Speed Measurement	6.75	6.19	6.99
8	renishaw	Mapping	6.75	7.31	7.52
9	Leica Geosystems	Mapping	6.75	7.31	7.52
10	Stereo Labs	Mapping	6	7.31	7.33
11	3D Laser Mapping	Mapping	6	7.31	7.33
12	Trimble	Geolocation	6	6.75	5.69
13	Advanced Geolocation Solutions, LLC	Geolocation	6	6.75	5.69
14	Cadence	Detection & Avoidance	6	6.75	6.94
15	SICK	Detection & Avoidance	6	6.75	6.94
16	Riegl	Detection & Avoidance	6	6.75	6.94
17	AIT	Detection & Avoidance	8.25	7.31	7.39
18	Fraunhofer IOSB	Detection & Avoidance	6.75	6.75	7.13
19	DeTect, Inc	Detection & Avoidance	6.75	6.75	7.13
20	Wärtsilä	Detection & Avoidance	6.75	6.75	7.13
21	Thales Group	Detection & Avoidance	6.75	6.75	7.13

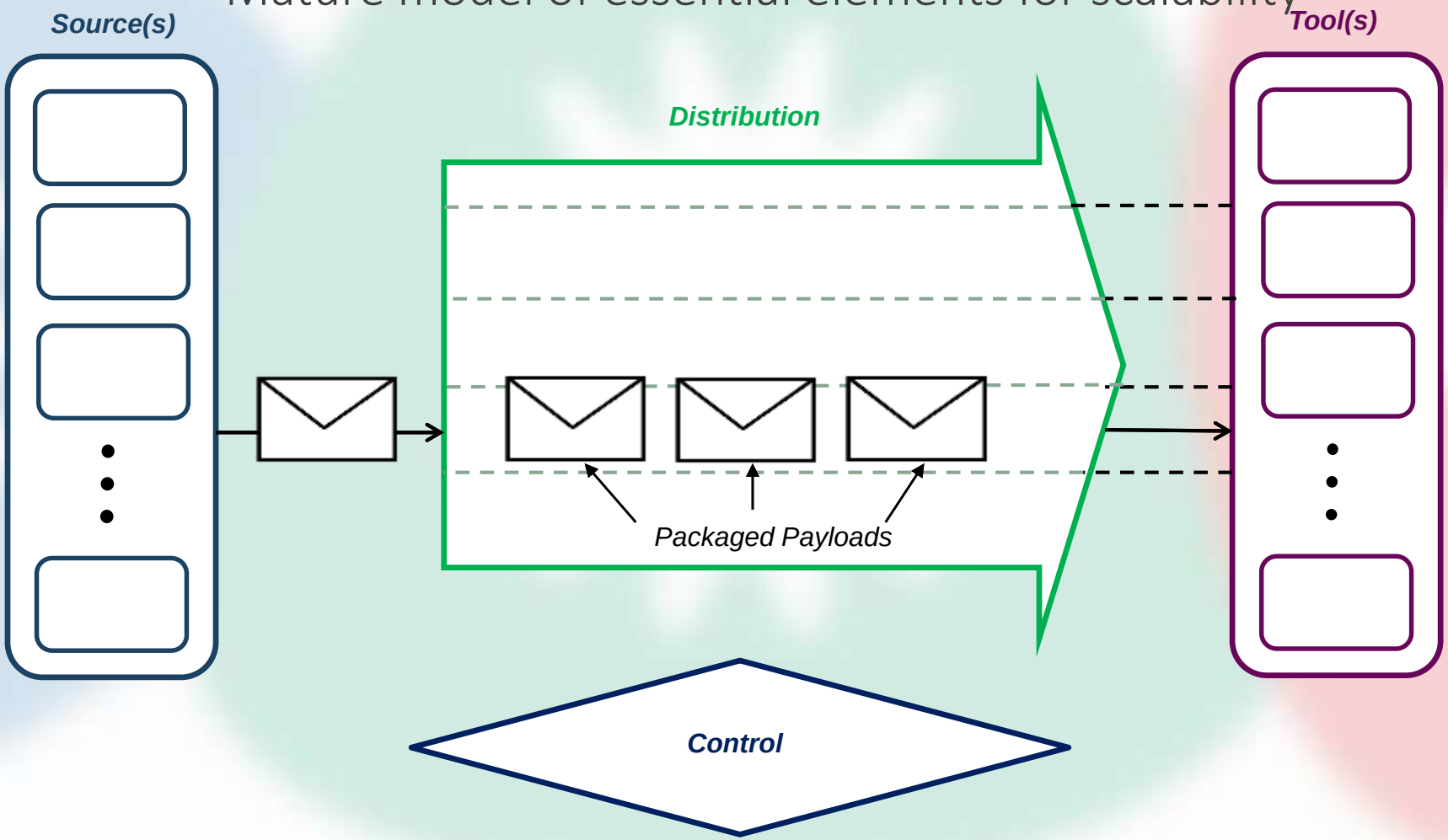
STEP 4

Consider the system model



Defining the Product: the System Model

Mature model of essential elements for scalability



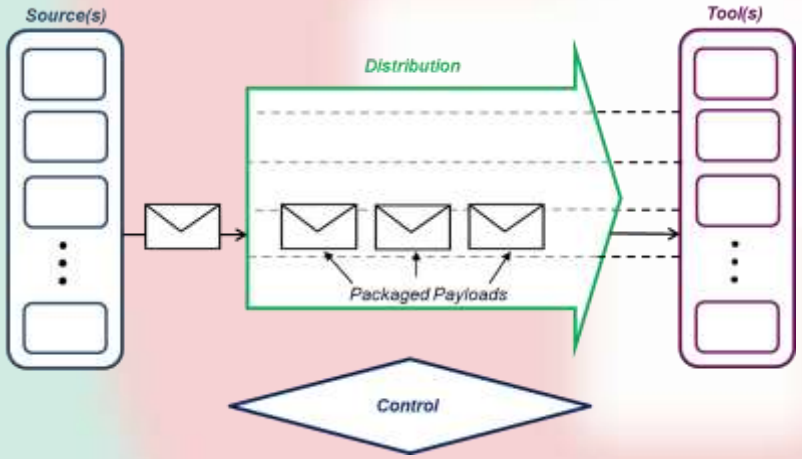
Reference

[1] Scalable Innovation, Shteyn & Shtein, CRC Press

The System Model

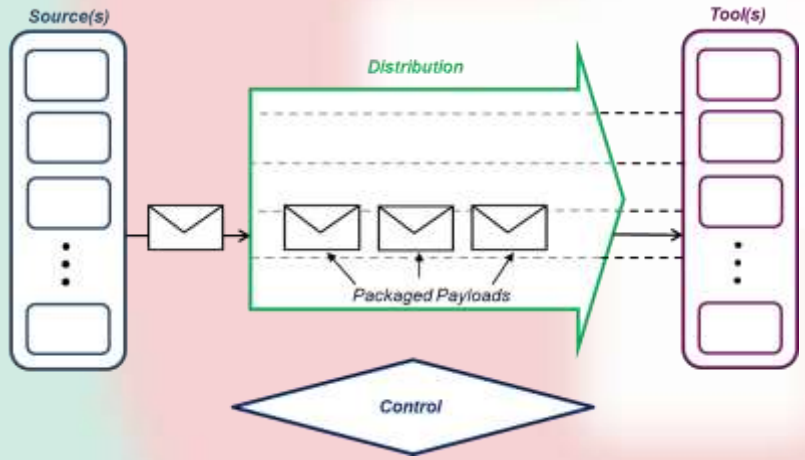
- **Market = Goods and Services Trade** = *Mass, Energy, Information* Exchange

- *Mass, Energy, Information* originates at '**Source**' (exchangeable format)
- *Mass, Energy, Information* used/transformed at '**Tool**' (useable format)
- *Mass, Energy, Information* travel (Space or Time) via '**Distribution**'
- *Mass, Energy, Information* formatted for use by Tool is '**Packaged Payload**'
- *Mass, Energy, Information* interactions ensured by '**Control**'

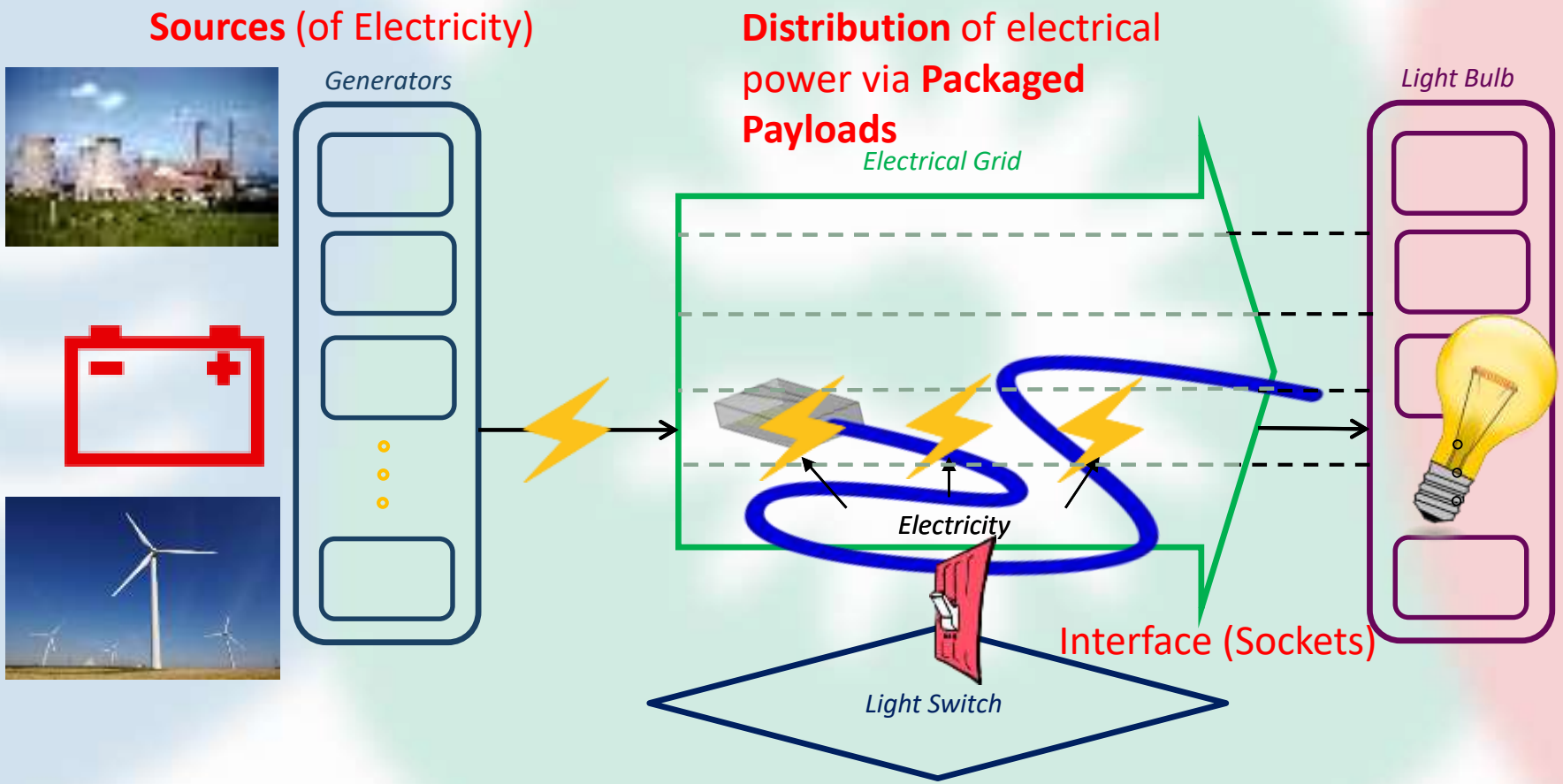


The System Model:

- '**Tool**' = Meaningful output of the System
- '**Source'** = Essential elements for the operation of the Product
- '**Distribution'** = Pathway between essential element and product
- '**Packaged Payload'** = Essential element in format that product can use,
- '**Control'** = Controls essential element and product interaction, defines user experience
- **'Interface'=** Points where mass, energy and information connect between the elements

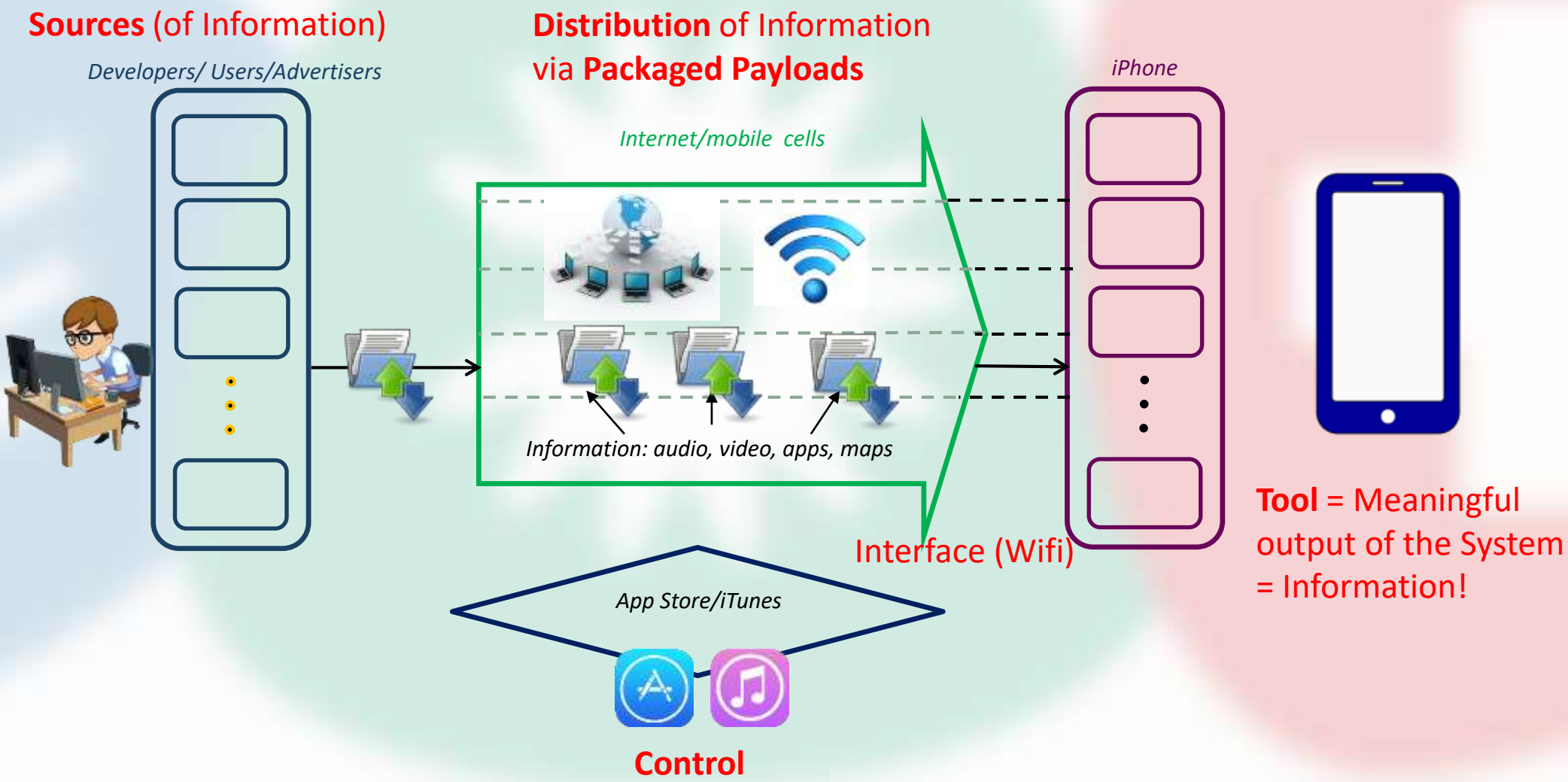


System Model: Example 1, Light Bulb

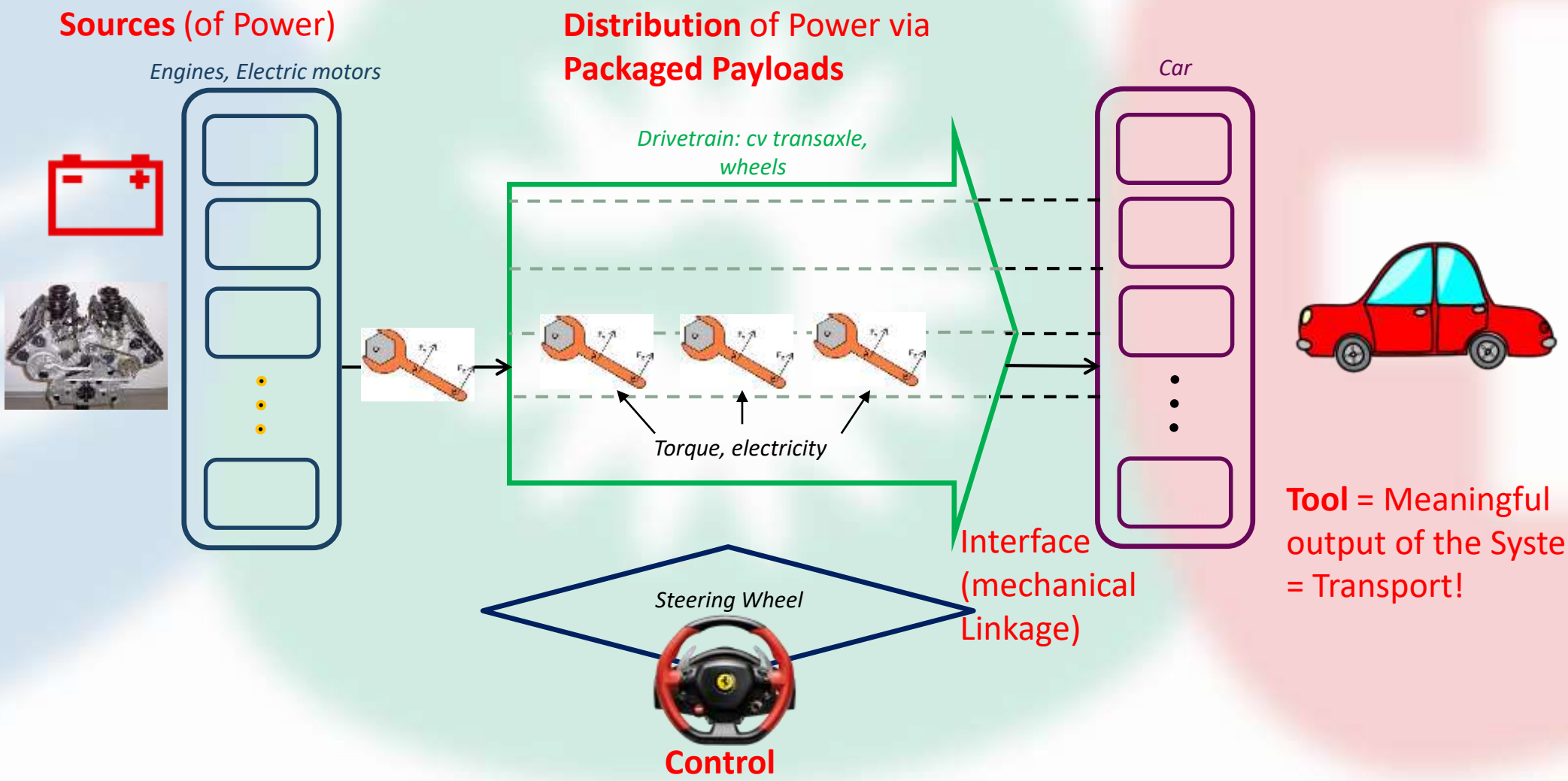


Tool = Meaningful output of the System = Light!

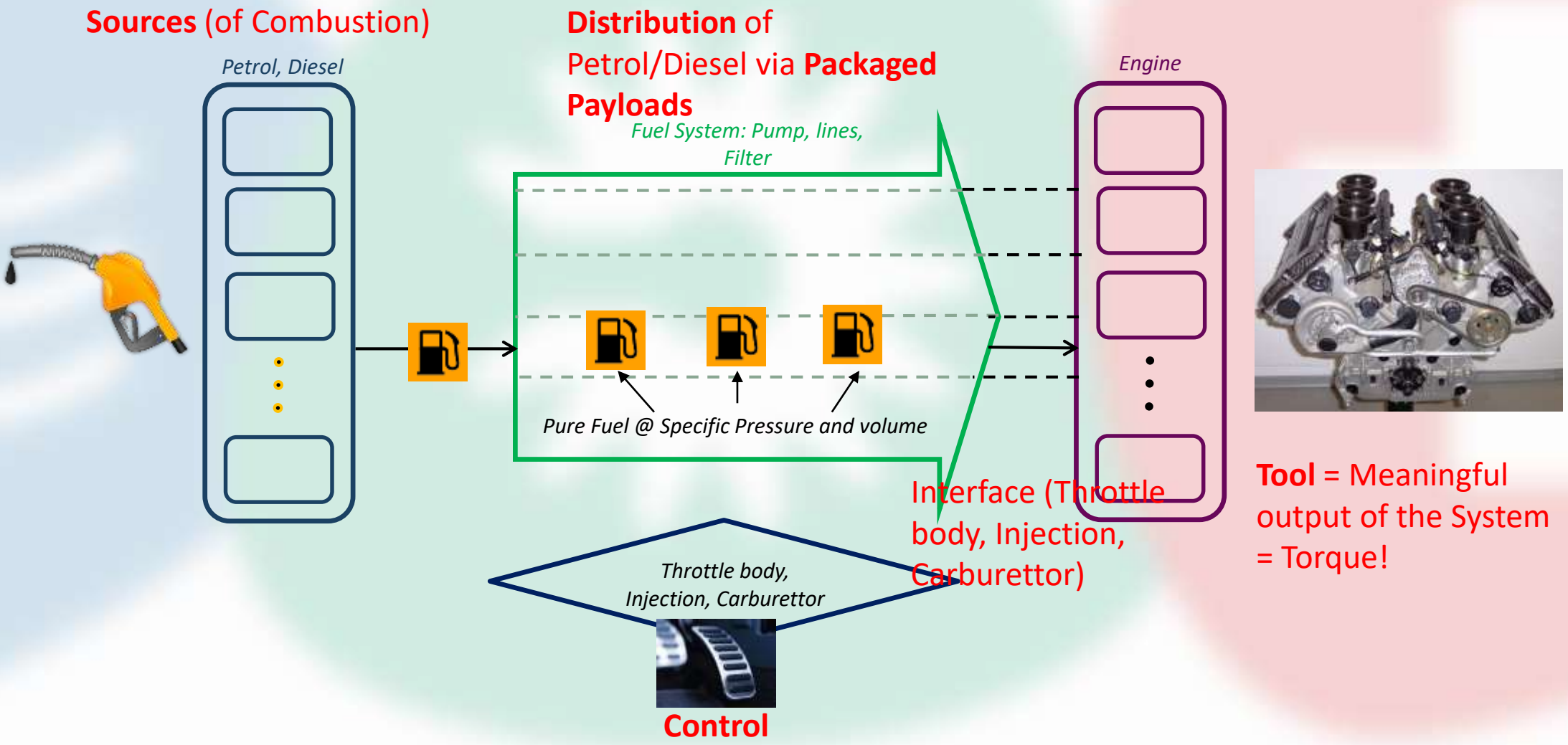
System Model: Example 2, iPhone



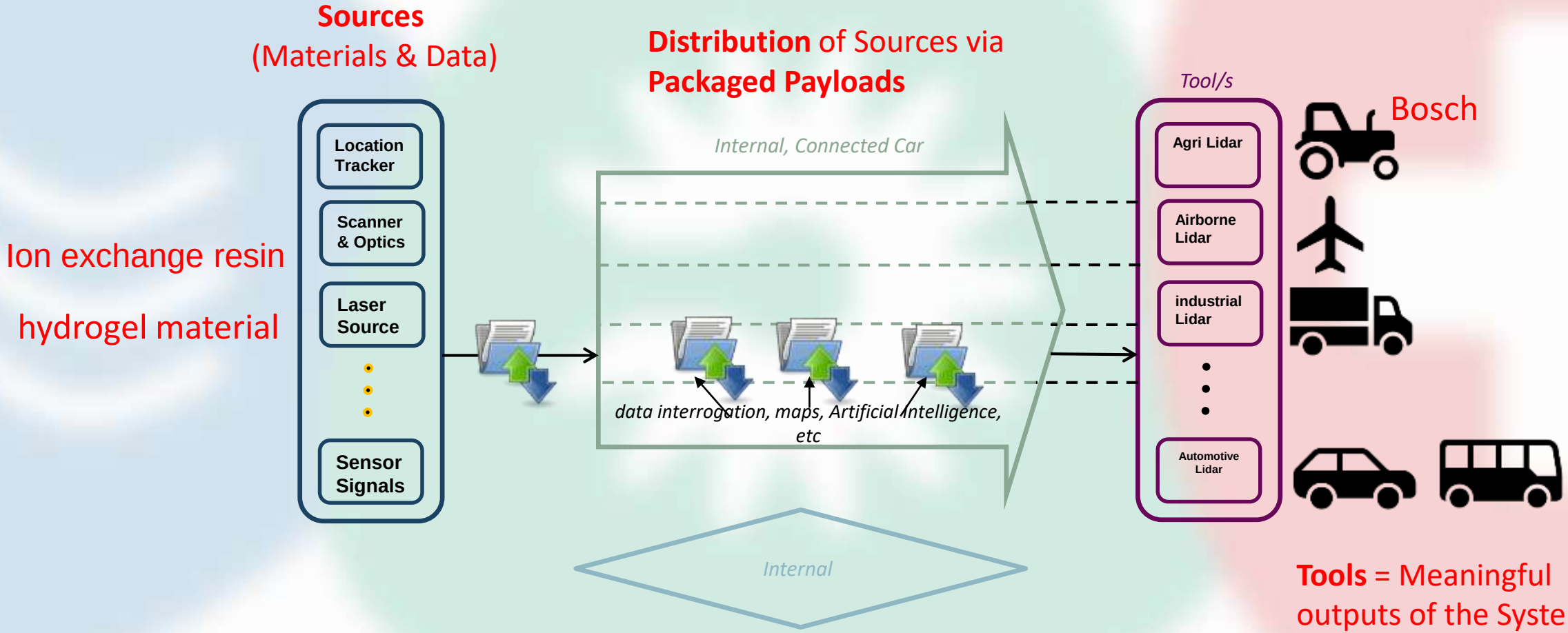
System Model: Example 3, Automobile



System Model: Example 4, Internal Combustion Engine (Systems are not independent)

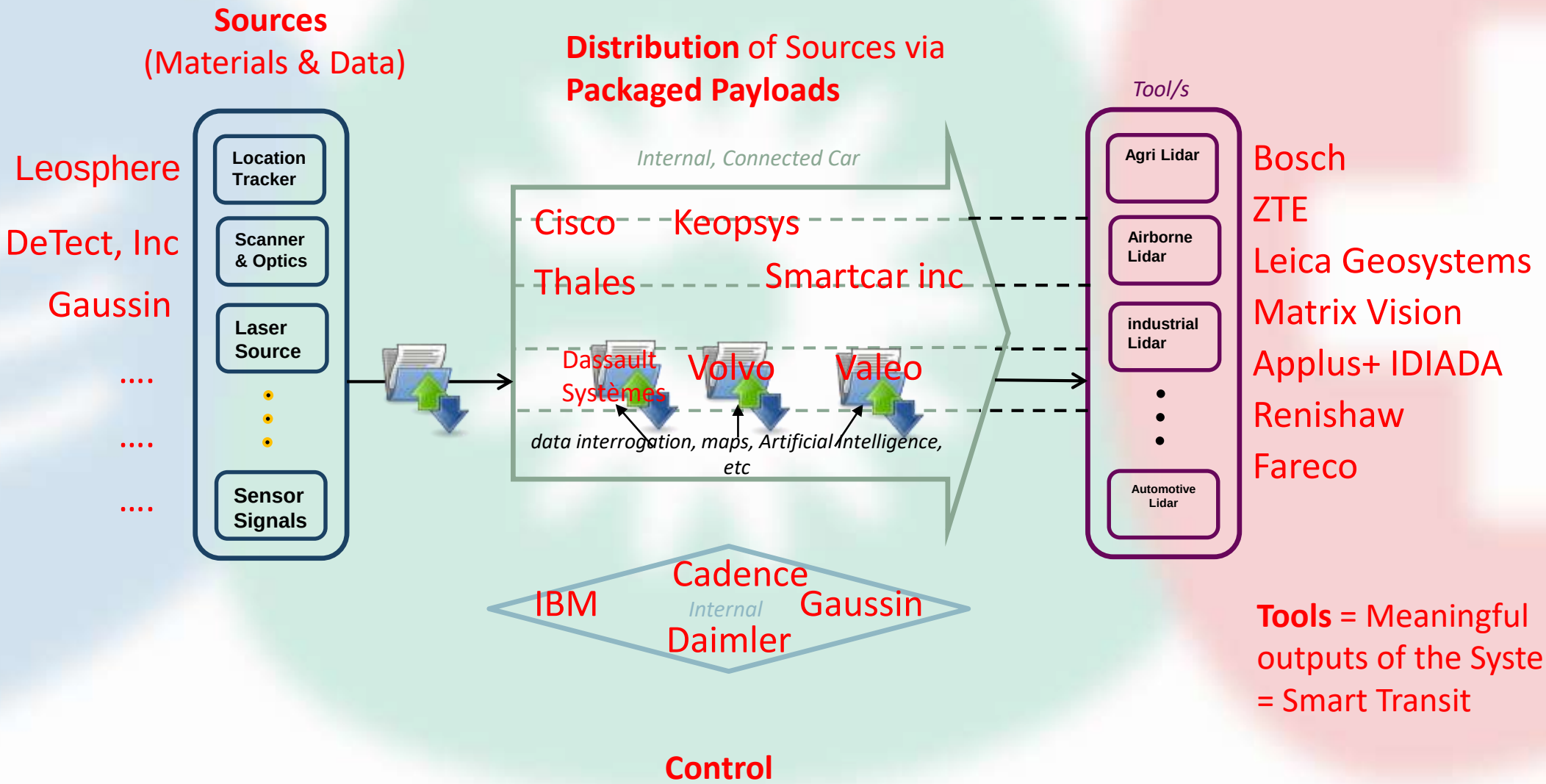


System Model: The Product Light Based range measurement (LIDAR)



Tools = Meaningful outputs of the System = Smart Transit

System Model: The Product Light Based range measurement (LIDAR)

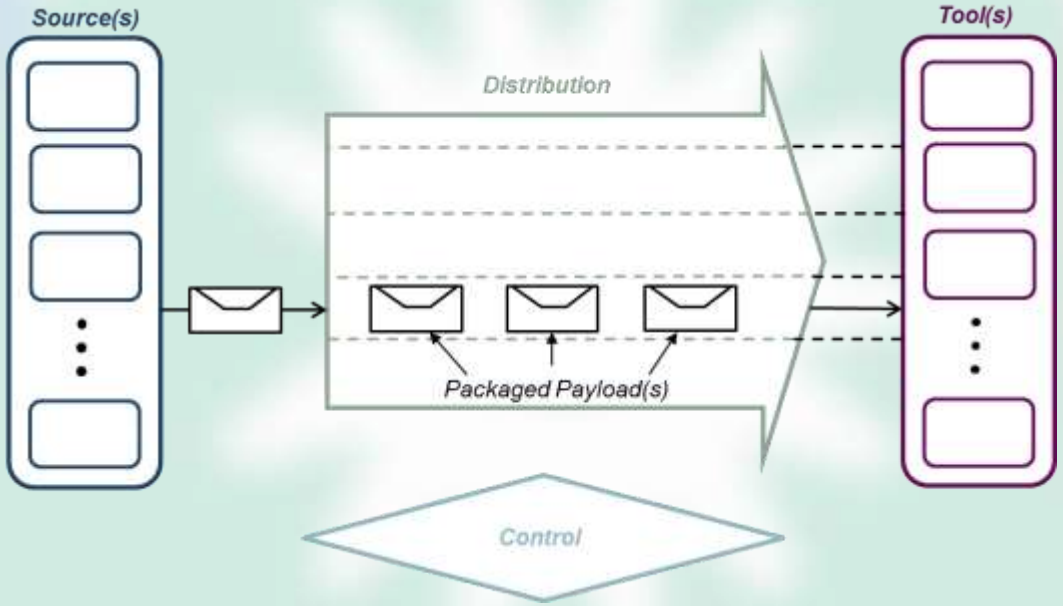


Tools = Meaningful outputs of the System = Smart Transit

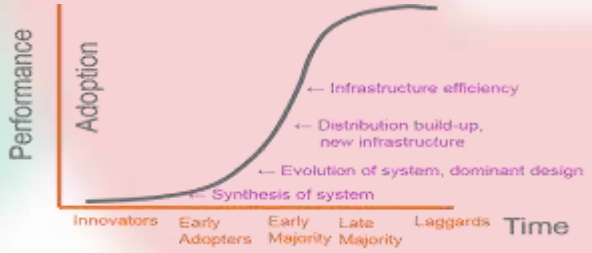
Place highly ranked Stakeholders into the System Model

Provide as many options as possible

Model of essential Elements for future scalability



Are there Gaps? How do we fill them?
Exercise is an effective form of debriefing and sets the SME up to exploit results



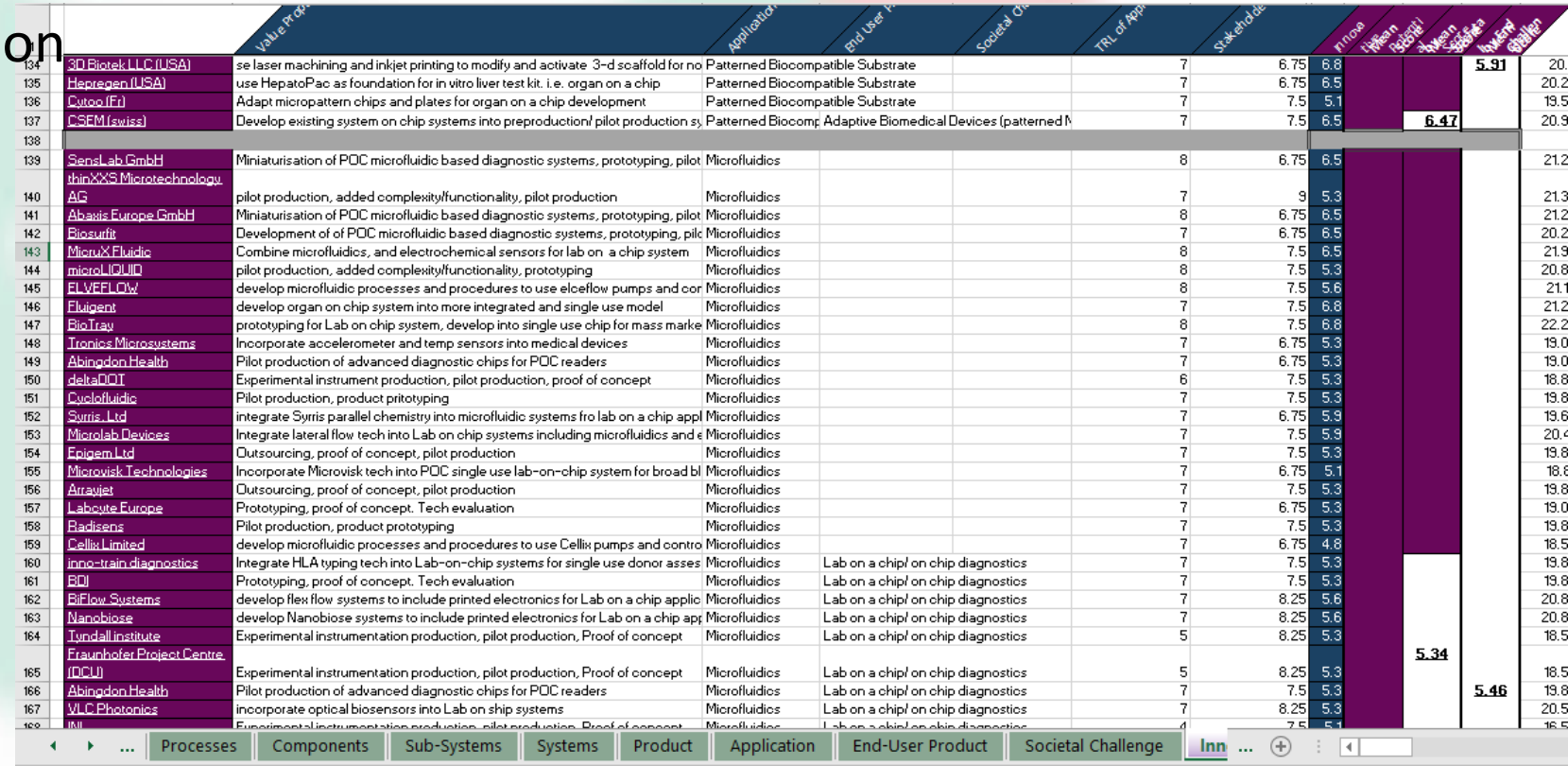
System Model enables S curve growth

Reference

[1] Scalable Innovation, Shteyn & Shtein, CRC Press

Results of Value Chain Analysis

- Comprehensive list of scored stakeholders
- Niche applications identified
- Prioritised application fields
- Concept for scalable innovation
- Revised product concept

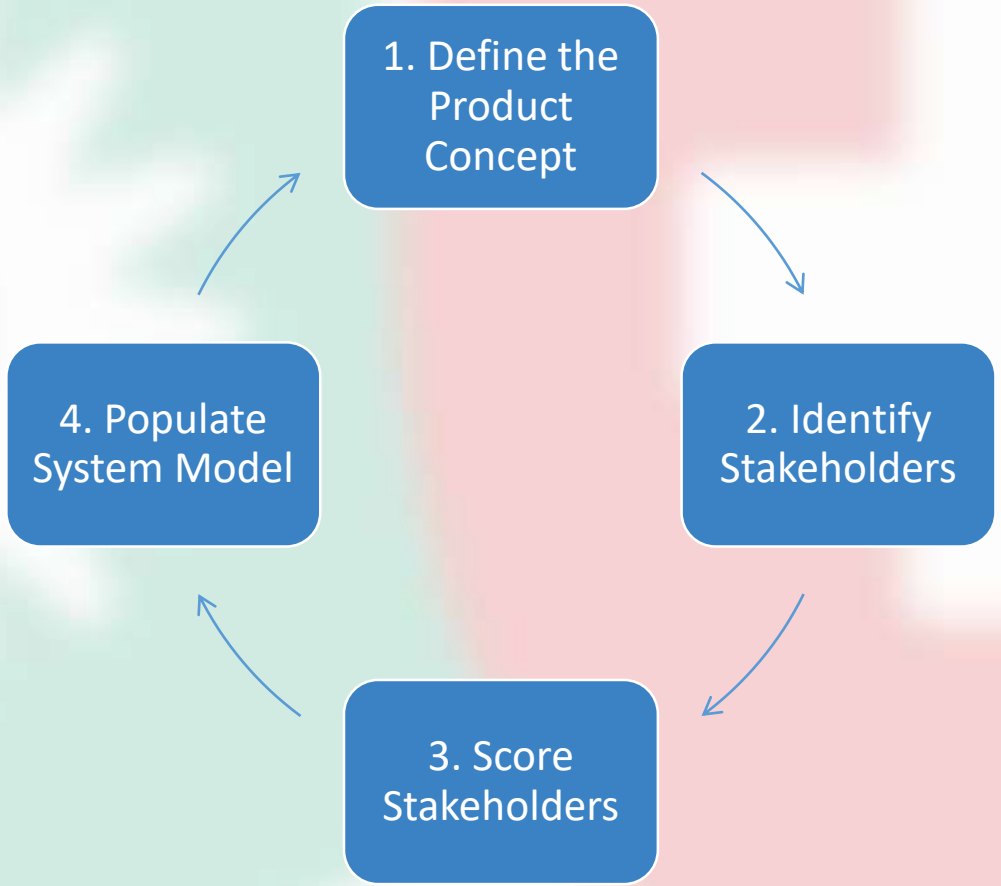


134	3D Biotek LLC (USA)	se laser machining and inkjet printing to modify and activate 3-d scaffold for no	Patterned Biocompatible Substrate			7	6.75	6.8				5.91	20.
135	Hepregen (USA)	use HepatoPac as foundation for in vitro liver test kit. i.e. organ on a chip	Patterned Biocompatible Substrate			7	6.75	6.5					20.2
136	Cytoo (Fr)	Adapt micropattern chips and plates for organ on a chip development	Patterned Biocompatible Substrate			7	7.5	5.1					19.5
137	CSEM (swiss)	Develop existing system on chip systems into preproduction/ pilot production sy	Patterned Biocomp	Adaptive Biomedical Devices (patterned M		7	7.5	6.5			6.47		20.9
138													
139	SensLab GmbH	Miniaturisation of POC microfluidic based diagnostic systems, prototyping, pilot	Microfluidics			8	6.75	6.5					21.2
140	thinXXS Microtechnology AG	pilot production, added complexity/functionality, pilot production	Microfluidics			7	9	5.3					21.3
141	Abaxis Europe GmbH	Miniaturisation of POC microfluidic based diagnostic systems, prototyping, pilot	Microfluidics			8	6.75	6.5					21.2
142	Biosurfit	Development of of POC microfluidic based diagnostic systems, prototyping, pilo	Microfluidics			7	6.75	6.5					20.2
143	MicruX Fluidic	Combine microfluidics, and electrochemical sensors for lab on a chip system	Microfluidics			8	7.5	6.5					21.9
144	microLIQUID	pilot production, added complexity/functionality, prototyping	Microfluidics			8	7.5	5.3					20.8
145	ELWEFLOW	develop microfluidic processes and procedures to use elceflow pumps and cor	Microfluidics			8	7.5	5.6					21.1
146	Fluigent	develop organ on chip system into more integrated and single use model	Microfluidics			7	7.5	6.8					21.2
147	BioTray	prototyping for Lab on chip system, develop into single use chip for mass marke	Microfluidics			8	7.5	6.8					22.2
148	Tronics Microsystems	Incorporate accelerometer and temp sensors into medical devices	Microfluidics			7	6.75	5.3					19.0
149	Abingdon Health	Pilot production of advanced diagnostic chips for POC readers	Microfluidics			7	6.75	5.3					19.0
150	deltaDOT	Experimental instrument production, pilot production, proof of concept	Microfluidics			6	7.5	5.3					18.8
151	Cyclofluidic	Pilot production, product pritotyping	Microfluidics			7	7.5	5.3					19.8
152	Syrris, Ltd	integrate Syrris parallel chemistry into microfluidic systems fro lab on a chip appl	Microfluidics			7	6.75	5.9					19.6
153	Microlab Devices	Integrate lateral flow tech into Lab on chip systems including microfluidics and e	Microfluidics			7	7.5	5.9					20.4
154	Epigem Ltd	Outsourcing, proof of concept, pilot production	Microfluidics			7	7.5	5.3					19.8
155	Microvisk Technologies	Incorporate Microvisk tech into POC single use lab-on-chip system for broad bl	Microfluidics			7	6.75	5.1					18.8
156	Arrayjet	Outsourcing, proof of concept, pilot production	Microfluidics			7	7.5	5.3					19.8
157	Labcute Europe	Prototyping, proof of concept. Tech evaluation	Microfluidics			7	6.75	5.3					19.0
158	Radisens	Pilot production, product prototyping	Microfluidics			7	7.5	5.3					19.8
159	Cellix Limited	develop microfluidic processes and procedures to use Cellix pumps and contro	Microfluidics			7	6.75	4.8					18.5
160	inno-train diagnostics	Integrate HLA typing tech into Lab-on-chip systems for single use donor asses	Microfluidics	Lab on a chip/ on chip diagnostics		7	7.5	5.3					19.8
161	BDI	Prototyping, proof of concept. Tech evaluation	Microfluidics	Lab on a chip/ on chip diagnostics		7	7.5	5.3					19.8
162	BiFlow Systems	develop flex flow systems to include printed electronics for Lab on a chip applic	Microfluidics	Lab on a chip/ on chip diagnostics		7	8.25	5.6					20.8
163	Nanobiose	develop Nanobiose systems to include printed electronics for Lab on a chip app	Microfluidics	Lab on a chip/ on chip diagnostics		7	8.25	5.6					20.8
164	Tyndall institute	Experimental instrumentation production, pilot production, Proof of concept	Microfluidics	Lab on a chip/ on chip diagnostics		5	8.25	5.3					18.5
165	Fraunhofer Project Centre (DCU)	Experimental instrumentation production, pilot production, Proof of concept	Microfluidics	Lab on a chip/ on chip diagnostics		5	8.25	5.3			5.34		18.5
166	Abingdon Health	Pilot production of advanced diagnostic chips for POC readers	Microfluidics	Lab on a chip/ on chip diagnostics		7	7.5	5.3				5.46	19.8
167	VLC Photonics	incorporate optical biosensors into Lab on ship systems	Microfluidics	Lab on a chip/ on chip diagnostics		7	8.25	5.3					20.5
168	INL	Experimental instrumentation production, pilot production, Proof of concept	Microfluidics	Lab on a chip/ on chip diagnostics		4	7.5	5.1					16.5

Processes | Components | Sub-Systems | Systems | Product | Application | End-User Product | Societal Challenge | Inn ...

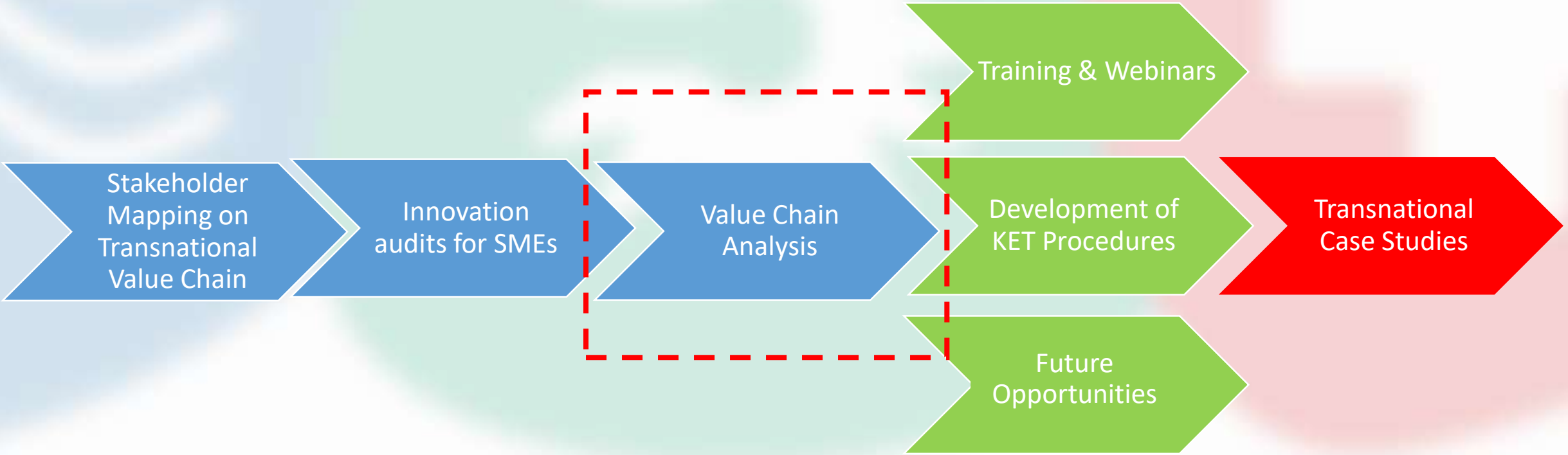
Impact value chain analysis

- Early Stage Assessment of new product concept
- High Tech enterprise gets to know the new field of application
- Determine the value of the product concept in the new field of application.
- Direction for future R&D activities by the enterprise
- Well developed System Model suited or Scalable Growth
- Populated pathway to Market



Wrap up: Context of AtlanticKETMed

- Establishing a Transnational Advanced Pilot Manufacturing Ecosystem for Future Biomedical Products
  - Exploiting the leveraging factor of Key Enabling Technologies (KETs)
  - New product concepts in medical technologies



Atlantic KET Med Deliverables

- Supporting Businesses using KETs in Med Tech:
  - 50 innovation audits
  - 25 company specific value chain analyses supporting new products
  - New training and expertise in KETs, Industrie4.0, and Scalable Innovation,
  - Hot Desks
  - Access procedures for 25 separate processes in the pilot ecosystem will be developed
  - 5 case studies to demonstrate opportunities for pilot manufacturing ecosystem – targeting a product to market by project end + 1yr

- Supporting Atlantic Area Regions for Pilot Manufacturing using KETs in Med Tech:
  - Education Policy
  - Improved Access to pilot infrastructure
  - Identification of missing/under-utilized technical resources
  - Improving competitiveness of companies in region
  - Build lasting cooperation between key players

Acknowledgement

- Atlantic KET Med Team
  - Register your interest on the website for more information at www.atlantic-ketmed.eu
  - Grant EAPA 384_2016

In summary

- Atlantic KET Med provides
  - Soft skill development for SMEs
    - Example given for value chain analysis
  - Technical development opportunities for SMEs
  - Commercial prototyping for SMEs

  - Register on the website for more information at www.atlantic-ketmed.eu

- Acknowledgement

Interreg Atlantic Area European Regional Development Fund EUROPEAN UNION