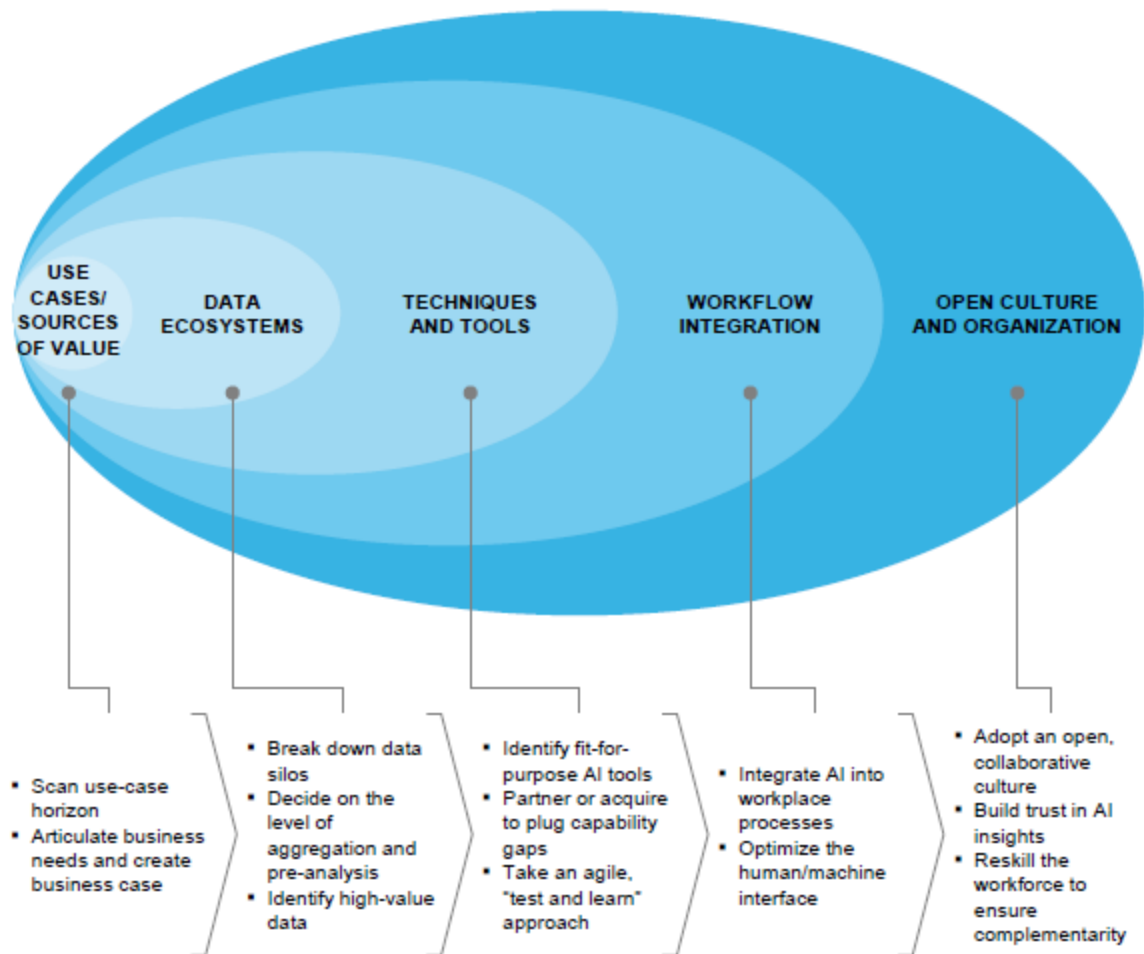


Sl.No	Requirement	Tasks To-Do
1	Identify / Design an ecosystem of tech areas of work, grouped by technology, our offerings, market segment, verticals, etc	For each service, product, or other offering, identify the tools, IDE, apps , libraries, OS, platforms as per best fit, log them in a matrix
2	Design landscape that shows our tools, products, that we use for various offerings	<p>Group the identified tools, apps as per best fit based on project needs, client needs, problem, ease of admin, less overheads and maintenance, mark these groups in the log matrix</p> <p>Design landscapes based on these and market segments, needs</p>
3	Capture these in an excel, later on make a graphical image one pager to fit as per the focus or theme	Based on the grouped tools, map these to the market segments, create images to show the fitment

Technology ecosystem template for Products, Services, Modernization, Research offerings, based on projects or consultation services



SOURCE: *The age of analytics: Competing in a data-driven world*, McKinsey Global Institute, December 2016; McKinsey Global Institute analysis

Tool No	Tool details	Usage / Use case
1	KNIME Analytics Platform	
2	R Studio /CRAN pkgs	
3	Library package- Pandas, Mahout, NumPy, Scikit-Learn, Spark MLLib, PyTorch, MXNet	
4	Cassandra 3.0/csqsh, cython with RedHat JDK	
5	Hadoop, HDFS	
6	Apache Phoenix for HBase interface	
7	Cloudera sandbox 5.8	
8	Eclipse Java edition	

9	Statistics using Excel	
10	Anaconda3, Orange, Spyder	
11	BigML	
12	Jupyter Notebook	
13	Apache CouchDB	
14	Node.js	
15	Kafka Connect	
16	Databricks	
17	Hive	
18	MySQL / MySQL WorkBench 8.0	
19	Perforce Hansoft	
20	JDK 1.8	
21	JetBrains IntelliJ IDEA	
22	MongoDB /pymongo	
23	Python 2.7 for MongoDB/ 3.7 for Anaconda and Jupyter Notebook	
24	XAMPP	
25	MS Office / 365	
26	MS Project	
27	MS HDInsight	
28	Datasets from Global Open Data, Scientific data, Open Science Data Cloud, Google Trends, Google Correlate, JSON Placeholder, Kaggle, Univ of Melbourne	
29	PM tools : Jira, AzureDevOps, VersionOne, Rally, <input type="checkbox"/> AgilityHealth	

Products landscape / ecosystem (as per MASTER PRODUCTS CATALOGUE - V1.2)

Domain	Our Product	Our Products landscape / ecosystem/ value adds
AGRI PRODUCTS	<ol style="list-style-type: none"> 1. Farmer's climate aid 2. Precision agriculture/satellite farming aids 3. Agricultural tube farming aids 4. Smart Agriculture farm safety 5. Smart Agriculture crop safety 6. Smart Agriculture processing 7. Smart Agriculture storage 	<p>Weather forecast – Spark, Hive, climate, rainfall, snowfall , GIS datasets, Jupyter notebook, Google maps, historical time series forecasting algorithms using ML, Docker, and Kubernetes.</p> <p>Precision agriculture (PA), satellite farming or site specific crop management (SSCM), decision support system, on observing, measuring and responding to inter and intra-field variability in crops – GIS, spatial datasets, LEO satellite data feeds, Drone data feeds, images, and image classifications algorithms based on texture, mapping to issues, normality, dryness, wet, under-water, contamination levels etc. Co-relate similar, seasonal, historical data using CRAN statistical packages using R. Spark, HBase, Jupyter notebooks, Python, Linux, Neural NW based decision support system, batch –processing using data pipelines, nano, bio-sensors for various levels of monitoring, reporting and roll-up status , Analyzing satellite feeds to detect early warnings for pests, bugs, swarms approaching crops, snow, hails, temperature variations that enable farmers responses. Rodent and flies management by way of switching on sensors, buzzers to chase away using mini robots, rule based and fuzzy logic systems, LAMP , MEAN stack based portals hosted on Azure or AWS platforms</p> <p>Use of computer vision based robotic arms, conveyor belts , image sensors, real time classification of varieties of grains, at various configurable setting based on ISO, standards, sorting of wide range of raw crop deliverables and using farmer-friendly GUI settings to sort and auto value the market value. These all use various datasets, cost metrics, market value, expert systems inputs, that enable better return to farmer</p> <p>Stock Inventory management software along with real time analysis and degradation analysis, lab reports that enable better supply chain stock movements using MS Project, AI based Scheduling software using Python, R, robot-arms and integrated vision cameras</p> <p>Grain Storage system bio-sensors, nano-sensors collect various ecological , environment, ambient that enable better visibility and alerting farmers to sprinkle required remedy, all run in real time and batch- modes driven by centralized community servers/ cloud that offer value to supply chain</p> <p>Expert robot systems that will support basic farming tasks like tilling, sowing, harvesting, sorting fertilizer spraying, fruit picking all make better productivity and</p>

		allow farmers to do more of planning and profit making sales activities
AI PRODUCTS	<p>8. <u>AI based Multi-agent system package</u></p> <p>9. <u>Concordance software for text discovery and analysis</u></p>	<p>MAS systems using Java, Prolog/ Synergy, under Linux help realization, O-MaSE, JADE and autonomous intelligent agents to design agent societies that use genetic algorithms to better the agent society. This has lots of uses like in Digital Twin for new product design, Simulation of war like situations and games that help in better reinforced learning and adoption of virtual roles/ avatars that can help real world entities and humans.</p> <p>Realization of Use cases like Natural disaster management for proactive evacuation using mobile apps, automated mobile instructions (ambient and local aware services) using Android, iOS and other popular OS. Use of Autonomous Learning Agents for Decentralized Data and Information Network(ALADDIN), Industrial Sensors, Decision support systems using graphics.</p> <p>For Telecom 5G, private spectrums, AM/FM and other usable bands, using AI / ML algorithms and real time analysis, we offer load balancining, security features to prevent intrusion of live programs and a sense of comfort that operations will resume even with a disruption, to achieve 99.9% uptime. Smart grid functions, with edge computing, field based analysis and reporting and lot more that integrates electrical, electronics and software interfaces using NIST, ISO, and IEEE standards</p> <p>Text analysis packages using R based CRAN, NLP packages, Open NLP, and Natural Language Toolkit (NLTK) for unstructured big data analysis, mining and use of HBase, Hive for large volume storage in TB, enables better insights of the text semantics, meta-data and sentiments</p>
AUTOMOBILE PRODUCTS	<p>10. <u>Manufacturing Robotic process automation system</u></p> <p>11. <u>Electric car using a solid state hybrid battery</u></p>	<p>Kofax, AutomationAnywhere, HelpSystems, RAGE, IBM PowerAI</p> <p>Robotic systems from FANUC, KUKA, ABB , GE</p> <p>Overlay virtual systems , ROS, Motherboards, Raspberry pie boards, explainable AI tools for inference engine based decision system/ controller</p> <p>Photovoltaic cells, supercapacitors, nano-wired battery kits with micro batteries for nanosystems/ embedded systems, and battery for health-gadgets / long running remote systems</p>
AVIATION PRODUCTS	<p>12. <u>Aircraft delay analysis using big data with R</u></p> <p>13. <u>Engineering Test rig</u></p> <p>14. <u>Avionics units software test modules</u></p>	<p>R packages for delay analysis, multi facet charts, MIL STD 1553B, ADC, sensors, LRU unit processing, testing and performance w.r.t. delays in flights, SoC FPGA , wired \ wireless protocols, Boards from DDC, Apollo, 4GL libraries, 2d/3d graphics libraries, static / dynamic time spectrum analyzers, relays, safety trip</p>

	15. Smart flight safety 16. Smart passenger travel 17. Smart fleet maintenance 18. Smart digital twins 19. Smart ticketing, cargo tracking, delivery	<p>switches, mobile app, POST, Cloud, edge computing, avionic parameters analysis using big data, spark, ML libraries, reporting and analysis using Tableau, MIS reports , virtual reality, simulations/ trainings based on proper / improper use, misuse, abuse of controls, safe flying training test environments using mixed, hybrid reality and automated corrections plan based on a pilots digital twin that captures the personality, traits and human preferences. Simulated space travel, using historical data about the facts of the universe, risks and how they can be removed for an actual flight that travel to far off planets</p> <p>In-flight experience for passenger who plan to tour the flight exterior , flying area using location aware, context aware apps, screens, virtual guides. Using big-data, satellite datasets, local view of the travel point is generated for virtual experience, for connecting flights, cabs, hotels, and transit information offered in mobile with no internet</p>
DATA CENTER-COMPUTING PRODUCTS	20. Smart Nano computing system 21. Smart Quantum Cryptography 22. Wireless Nanosensor Networks (WNSN) 23. Edge, fog computing	<p>DNA bio-material, nanotubes, gate circuits, computing platform using bio-sensor interfaces, energy efficient computing. Health science, genome packages , R and Python packages for analysis and quality testing</p> <p>Azure Edge, AWS lambda, Azure IoT using 5G Quantum kits using IBM, Google and AWS</p>
DEFENSE PRODUCTS	24. Intelligent Army suite system 25. Force fields systems 26. Stealth technology kit	<p>Nano-technology, Intelligent fabric, Integrated virtual views, 3d view using mixed reality, various guides/cues for helmets, watch, inbuilt health monitor, gadgets, body temperature / movement generation of power (emergency), bio-sensors for poisonous gas detection, in body computing , location tracker, safe homing guidance even when suite is removed, auto locator alerts to base stations, GPS, GIS, satellite datasets, Spark, HBase, real time and batch processing, intelligence data decryption, in body memory erasure tools with biometric approvals</p> <p>Stealth technology carbon nano-tubes, nano-computing, user programmable interference amount generation for deflection, software, hardware interfaces</p>
EDUCATION PRODUCTS	27. Predicting Grant Applications using Spark's machine learning 28. RPN Calculator (using C) 29. Simple Math Calculator (using Java and JavaScript) 30. Hangman game (using Java) 31. Graph nodes reachability analysis software (using DFS, BFS) 32. Dynamic Tree node management (<p>Simple educational aids that help students get the real inside working of tools like calculators that show them how the equations / theorems are translated to solve real world problems. Pieces of code, equations and results, along with errors are shown using interactive apps, software written by us. We use variety of languages, visualization and graphics (2d/3d) that help students learn easily and do interns happily. We use C, C++, Java, Python, 4G libraries, R, virtual reality, mixed reality and make PC based learning fun that enables better memorization, quicker learning. Our syllabus is based on popular adaptive learning techniques unique for each learner.</p>

	<u>using BST and node traversals)</u> 33. <u>Adaptive learning kit</u> 34. <u>Emerging business learning systems</u>	We also blend the learning with business, engineering and medical syllabus that enables students can start practicing after they graduate with good hands-on. We use mixed reality, NLP techniques to help learn better
ENERGY PRODUCTS	35. <u>Smart metering system</u> 36. <u>Digital Energy meter</u> 37. <u>Smart grid system</u> 38. <u>Nano-wired battery</u> 39. Hybrid energy system interfaces and massive storage systems 40. Micro-batteries charged by everything from buildings to our bodies	<p>Smart grid software using Azure IoT, AWS, Cisco NW, edge services backed by Low power protocols, ZigBee, Grid sensors, energy converters using digital techniques, DSP, filters to suppress surges, accidental trips etc</p> <p>Inbuilt power failure analysis, prediction using big data, Azure HDInsights, integration of operational planes, IoT planes data planes and management planes using dual redundant failover clusters using Dockers and Kubernetes</p> <p>Neural NW based Inference engines that enable better edge based IoT devices monitoring and feedback control mechanism</p> <p>Failover Backup grid to support main grid failure with interconnects that switch over in seconds and based on OLA, Suitable data center type availability of 99% is possible using our unique architecture, big data analysis and smart control</p> <p>Suitable standards from NIST, Smart grid alliance, Green standards all make our products industrial grade</p>
ENGINEERING PRODUCTS	41. <u>Digital TV</u>	We have base design for digital TV using comb filter, DSP processing using fourier transforms. We plan to add more features that enable use of latest technologies like virtual reality, NLP based interactivity, android TV, intelligent DTH, world channels integration, introducing online learning from home for all courses and research work wherever possible. Use of satellite based phone services, FM radio and many more spectrum use using 5G, WiFi. We plan to offer TV in various form factors that meet needs of individual like on a mobile app for various age groups, professions and genders. Integrated with radio, Internet, IoT, Virtual Office , the way TV is used will change as many convergence and similar use to a laptop will ensure TV will live long
DRESS PRODUCTS	42. <u>Intelligent dress material</u>	This project leverages on exoskeleton as base wear along with cloth/ fabric that acts as a base for all types of gadgets. We customize the base gadgets and tailor them to match unique needs of individuals based on various factors. We have 10 models that will be mapped to requirements that enable better working condition, ambient and threat aversion including nearby abnormal human behaviors. We use IoT, AI/ML algorithms, NLP, sentiment analysis, adaptive learning and nano, bio-sensors to make the material suitable for industrial, commercial and home use

GAMING & ENTERTAINMENT PRODUCTS	43. <u>Shape generator for Games using Computer Graphics</u>	Using Computer Graphics, we plan to use 3D, 4D, images, sounds and newer modes of gaming experience using SnapDragon, Intel Graphics accelerators, GPU, and an adaptive learning virtual assistant that reads your moves and offers recommended moves
GOVERNMENT PRODUCTS	44. <u>Multi agent system for natural disaster management</u> 45. <u>Smart City cyber physical systems</u>	<p>MAS systems using Java, Prolog/ Synergy, under Linux help realization, O-MaSE, JADE and autonomous intelligent agents to design agent societies that use genetic algorithms to better the agent society. This has lots of uses like in Digital Twin for new product design, Simulation of war like situations and games that help in better reinforced learning and adoption of virtual roles/ avatars that can help real world entities and humans.</p> <p>Realization of Use cases like Natural disaster management for proactive evacuation using mobile apps, automated mobile instructions (ambient and local aware services) using Android, iOS and other popular OS. Use of Autonomous Learning Agents for Decentralized Data and Information Network(ALADDIN), Industrial Sensors, Decision support systems using graphics. We adopt this to Govt frameworks, datasets, metrology labs, National agencies and generate advance reports using Tableau, Power BI, MIS charts and control room design</p> <p>Based on European Research Cluster standards and frameworks, we plan to develop cyber-physical systems that span across all major offering by city council. We offer flexible, unique solutions for each city while retaining the base model and offering localized solutions using IoT, Edge, Cloud, home gadgets, mobiles, laptops and interfaces to public services</p>
GREEN ENVIRONMENT PRODUCTS	46. <u>Clean Tech systems</u>	<p>Using Remap, IRENA global energy modeling framework, we plan to integrate conventional energies with newer energies using software, hardware, battery storage, smart grid, hybrid energy sources, nuclear, hydro energy, energy banks, that enable sustainable growth for at least one decade</p> <p>We plan to modernize existing power plant that will enable lesser pollution and better RoI, using better energy source overlays or new designs for the plants. We plan to even modernize the conventional energy systems that will use lesser power and can easily sustain for a week instead of a daily charge</p>
HEALTHCARE / LIFESCIENCE PRODUCTS	47. <u>Intelligent Health monitoring systems</u> 48. <u>Smart Drug delivery</u> 49. <u>Smart nano coatings</u> 50. <u>Smart anti-microbial technologies</u>	Wireless Body Area network (WBAN), Intelligent fabrics, Bluetooth, 6LoWPAN, personal operating systems with less footprint like in android, iOS, AWS Cloud, Inference engine for sensor based edge intelligence decision making, lambda functions, bio-sensors, oxy meters, pulse meters, mini-cardiac gadgets, mini-ecg, IOT systems

	51. Smart medical batteries 52. Intelligent EHR services 53. Intelligent Doctor, physician services 54. Intelligent solutions for dental services 55. Intelligent paramedic services 56. Smart Diagnosis systems	<p>Deep Learning based body scan, extraction of features, diagnosis of abnormality using CNN, slices, 2d, 3d reports for easier surgery.</p> <p>Nano scale drug delivery patch/ cloth, nano sensor for delivery metrics, part targeted delivery system using 2d/3d measures to pinpoint the cancer and deliver right amount instead of brute force delivery, use of AI/ML to segment and pinpoint the abnormal area</p> <p>Nano-devices planted in intelligent fabric allows in better diagnosis within few hours without humans using AI/ expert system and ready to use normal charts/ graphs.</p> <p>Nano, bio-sensors that work on the signatures of the molecules, pollutants, viruses and bacteria, will enable better analysis using AI/ML with an inference engine to assist pathologists to diagnose precisely</p> <p>Low power micro batteries with nano-coating that help 99% efficiency in transfer of electrons and rechargeable using inside-body temperatures and other natural elements</p> <p>Patient health records processing management and long term storage using big-data, NoSQL document databases like CouchDB</p>
HI TECH PRODUCTS	57. Voice driven AI technology system 58. Intelligent Digital twin system	<p>AWS AI, Lambda, Translate, Kinesis, Comprehend, API gateway all driven in AWS / Java Runtime engine enables the app to be embedded or used in a standalone mode</p> <p>Oracle IoT Digital Twin is being leveraged to build big-data systems along with Spark, Hive and NoSQL concepts. Hadoop/YARN used to wherever possible</p>
HOSPITALITY PRODUCTS	59. Intelligent Hotel reservation management system 60. MAS based TAGA trading agent system 61. Intelligent food quality testing system 62. Intelligent Traveler's bots	<p>Hotel and Hospitality system will be driven by hybrid cloud platform with near real time processing using Hadoop based transaction/ non-transactional events with guaranteed delivery using SMS, app alerts, push notifications. AI/ML used to recommend suitable offers, discounts and early bird / holiday plans to premium clients. Data sets from tourism, hotels, national offices and related agencies are used to feed continuously. GUI to be JavaScript, Node.js., React, MEAN stack with cloud based security and scalability</p> <p>FIPS based multi-agent system for online trading and deals management using Agent society based human behavior simulation and inference to design various options for deals using Java, Python, Kafka, Akka, Eclipse, MongoDB, CouchDB and lambda functions to trigger events and offline processing</p>

		<p>Food quality testing for viruses, Covid, poison, lead, heavy metals, silica based on software signature mapping and classification based on various user selected features, Nano and bio-sensors used with nano-measurements being scaled for physical real size using AI algorithms</p> <p>Travel virtual guide using location, context aware apps integrated with tour data, history and real data to offer a great user experience even without no internet with offline ready to use data, use of GIS, satellite, local data sets, lambda, bot framework</p>
HR PRODUCTS	63. <u>Resume shortlister AI agent system</u>	Use of Text mining algorithms, NLP libraries for unstructured data, Spark, EMR, ranking and priority algorithms, improved ATS pipeline with various user friendly filters that allow narrowing from a large pool of open resume to a limited setoff 100 for personal review. Use of recommendation for top fitting resources with unique skills
IT-BT PRODUCTS	64. <u>Intelligent routing & resolution system for a Call Center</u>	NLP based algorithms for real time analysis and routing using Spark, Kafka streams that offer transactional guarantee
LAW PRODUCTS	65. <u>Intelligent Lawyer system</u>	An adaptable Neural network with feeds from expert systems that allows rule based and fuzzy based decision to be possible for best judgment. Aprior algorithm based knowledge offers better results. May be Markov chains will help
MANUFACTURING PRODUCTS	66. <u>Intelligent Industry 4.0 robotic system</u> 67. <u>Collaborative Robot Cell safety system</u> 68. <u>Smart manufacturing robots</u> 69. <u>Smart manufacturing virtual assistant</u> 70. <u>Smart manufacturing inventory intelligence</u> 71. <u>Smart manufacturing plant automation</u> 72. <u>Smart manufacturing scheduling</u> 73. <u>Smart manufacturing process automation</u> 74. <u>Smart manufacturing quality intelligence</u>	

	75. <u>Smart manufacturing product ideas</u> 76. <u>Smart manufacturing niche industry solutions</u>	
RESEARCH PRODUCTS	77. Experimental claytronics 78. Molecular electronics digital technology 79. Programmable matter 80. Using The Internet For Hardware Downloads — Not Just Software 81. Nanobots brain plug-ins for the cloud 82. Gene therapy for deafness 83. <u>Next Tech or NT aids, integration and systems</u> 84. Early Clustered Regularly Interspaced Short Palindromic Repeats (CRISPR) gene editing technology	
RETAIL PRODUCTS	85. <u>Smart retail SCM</u> 86. <u>Smart retail inventory and anti-theft system</u> 87. <u>Smart retail shopping recommender</u> 88. <u>Smart retail warranty</u> 89. <u>Smart retail safety</u> 90. <u>Smart retail logistics</u> 91. <u>Smart FMCG</u> 92. <u>Smart retail innovations</u>	
SECURITY PRODUCTS	93. Anti-theft detectors for business online details safe 94. Personal security kit for personal-family safety and safety of assets 95. Personal defender kit for early warning and self defense 96. Nanotech sensors for preventing individual and group terrorism	
TELECOM PRODUCTS	97. <u>Intelligent Telecom resource management system</u> 98. <u>Mobile Ambient intelligent system</u> 99. <u>5G planning, migration services</u>	

	100. <u>Network planning</u> 101. <u>Network infrastructure implementation</u> 102. <u>Telco software design</u> 103. <u>Cloud integration services</u> 104. <u>Smart Telco NW</u> 105. <u>Smart Telco virtual assistants</u> 106. <u>Smart Telco Inventory</u> 107. <u>Smart Telco predictive maintenance</u> 108. <u>Smart Telco process automation</u> 109. <u>Smart Telco industrial solutions</u>	
Transport products	110. <u>Intelligent Telemetry system for multi-modal vehicles</u> 111. <u>Intelligent Transport and logistics tracking</u> 112. <u>Cognitive Travel system</u> 113. <u>Cognitive Driver's aid</u> 114. <u>Intelligent traffic Management system</u> 115. <u>Intelligent Drones' Order dispatch system</u>	
BANKING PRODUCTS	116. <u>Bit coin and crypto currencies</u> 117. <u>Anti-quantum hackers aids</u>	
CO-WORKING PRODUCTS	118. <u>Solution Café - personalized co-working space</u>	