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Solving Digital Business Challenges

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Solving Digital Business Challenges

Takeaways from WOIC 2017 practitioner sessions

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Acknowledge of the important contributions of Chiara E. DE MARCO, Martha GEIGER, Laura KREILING, Pradip SWARNAKAR, Liang MEI

Research presented in this report is based on:

1. Problem Submission: Firms submitted corporate challenges relating to digital business models across several industries. Problems were screened and selected.
2. Problem Framing: Professor Darwin conducted individual sessions with individual firms to solicit input from both open innovation researchers and practitioners.
3. Problem Solving: Input, feedback, and recommendations provided by a community of academic experts and open innovation practitioners across industries who worked deliberated in groups of eight during a one-hour session per challenge.

“For success you need to be connected to external knowledge. Researchers are an overlooked resource who are willing to help”

Professor Solomon Darwin

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Executive Summary

Digitalization is one of the multiple drivers of change. Digitalization changes the status quo of multiple industries by creating a nonstop volatile, uncertain, complex and ambiguous environment. Firms want to understand digitalization, which is considered, at the same time, as an opportunity to be caught and as a threat or source of discomfort.

Each of the company selected at WOIC 2018 struggled with digitalization. They used the practitioners' session of WOIC 2018 to get external thought about how to shift these struggles or discomforts into opportunities. More globally, the common question that overlooks all these companies is **how to successfully surf the wave of a more and more digitalized world?** To respond to this question, WOIC 2018 academics and professional experts had a double mission.

First, the experts had to identify the value creation opportunities behind the digitalization struggle of each firm. It mainly consisted of thinking about:

- What market segment could be reached through digitalization? Can digitalization reinforce the link between the company and current/new customers?
- How can digitalization increase the value proposed to the customers? How can digitalization become a "pain reliever" and not just be considered as "vitamin"?
- How can digitalization change or improve the value chain to deliver firms' offerings?

Second, the experts had to think about the business model behind this value creation based on digitalization. Indeed, to create value through digitalization is not enough; firms have to think about how to capture a portion of the value created. It mainly consisted of thinking about:

- What could be the firm's strategy based on the digitalized technology (incorporate technology in current business, licensing the technology to other firms, launching new ventures that exploit the technology in new business areas etc.)?
- Which are additional ways to add further streams of revenue through digitalization?
- What could be the value network needed to sustain the value proposed through digitalization? What are complementary assets that could add value to the firm's offering?

By simultaneously thinking of value creation and value proposition, the experts offered insights into **how digitalization can leverage the firm's current business model or rethink a totally new business model.**

Keep in mind:

1. *Digitalization is NOT a slow-moving factor.* Some industries think that digitalization is a slow-moving factor and that they have a lot of time to think about how the company can adapt to the digital world. This is not the case and the changes will happen before companies realize it.
2. *You are NOT alone in facing the issue of digitalization.* All the practitioners' across firms and industries have the same issue (i.e. all of them face the same threat – and opportunity - of digitalization)
3. *Do NOT look only at your challenge.* Each challenge can be a source of inspiration to reframe your thinking. Each of them can help identify opportunities to leverage or totally rethink company's business model through digitalization.
4. *Rethink the dominant business model with digitalization opportunities.* The main risk is to decide not to experiment with alternative business models. Focusing on the dominant business model results in too many good ideas unused, or the pursuit of only incremental innovation.
5. *Create or strengthen your processes for experimenting with alternative business models.* **Thanks to Lean Startup, there are now robust examples for experimenting with new business models in many industries.**

Challenge #1: Avery Dennison



Challenge



“In an industry that is moving towards the digital world, how can Avery Dennison, as a materials company and producer of master rolls of laminated label media stay competitive and adapt to the changes in the industry? What could be their strategy if labels disappears? How can Avery disrupt itself?”

MAX WINOGRAD, Director Open Innovation & Venture Investments, Avery Dennison

Avery's Background

Avery Dennison produces master rolls of laminated label media, i.e. labels and films for large-scale labels. Avery adopts a business-to-business (*B2B*) approach. It produces and distributes labels to converters (printers) and integrators (brand owners), then turns the product into labels for end-user products, e.g. Heineken beer bottles¹. Via labels, Avery gives character to the products sold by Avery's customers. Avery's competitive position in the label industry relies on:

- Customer experience (the sales of Avery's customers can be improved using innovative and thoughtful labels),
- Scale effect (Avery provides high performance products at lower costs by efficiently producing high quantities of labels),
- Cost effect (Avery reduces the customer's operational costs of the label),
- Continuous improvement of technology

Recommendations from the practitioner session

The community of experts and academics offered six takeaways on how Avery could use digitalization to create and capture value:

1. Use digital labels to create value for end-user of its customer's products

Avery could rethink value creation. Avery, even as a *B2B* company, should not only focus on its direct clients but on the end-users. Becoming useful for the end-users will sustain the use of labels and thus clients interest in labels. Concretely, Avery could become: (a) *a major actor in end-user expectation concerning block-chain*: End-users do not always trust the supply-chain for products like food. If the end-user can access digitalized supply chain data through Avery's label they will trust the supply-chain and thus buy more products. Avery should think about becoming a major actor in the blockchain trend (cf. Forbes 2017 article “the Blockchain of Food”²); (b) *a major actor in end-user expectation concerning personalization of object through unique label*: digitalization allows brand owner to access lots of data about their customers. Avery could develop luxury labels, which are personalized for some specific end-customers. For example, for a big event like WOIC, the event organizers could look for Heineken labels with “WOIC” written on it.

¹ Avery's products also include films used in cars and reflective road signs covering, and in the healthcare industry (products that stick to skin).

² <https://www.forbes.com/sites/themixingbowl/2017/10/23/the-blockchain-of-food/#47714540775f>

2. Offer free labels and sell data analysis by putting sensors on labels

Avery’s business model can shift from selling labels to data collection and data analysis of the end-user’s product consumption. This shift would rely on putting sensors on the products through which Avery could collect, analyze and sell data on the end-user consumption. The table below shows a list of potentially interesting data and analysis that Avery could sell.

The data collected with sensors on labels	Analysis of the data collected
<ul style="list-style-type: none"> - Localization: the journey of the product after the end-user bought it - Consumption data: when and where - End of the product: where does it end 	<ul style="list-style-type: none"> - Can the journey following end-user purchase be reduced? - Where is the product located now? How much product remains to the buyer? - Where does it end? Can it be recollected to promote environment sustainability?

3. Innovate the channel of distribution: offer virtual labels in virtual reality experience

Avery could extend its sales of the physical label by selling virtual labels. Virtual reality and augmented reality are new horizons to enhance a company brand. By having an efficient virtual label, Avery could strengthen customers’ product sales. Looking for synergetic effects between virtual and physical labels could also give Avery a competitive advantage. Indeed, virtual labels are the next generation of labels. These virtual labels could leverage Avery’s current scale effect (the cost of duplicating a virtual label is really low) and cost effect (the cost of creating a virtual label will decrease with time and experience).

4. Licensing-in the technology needed or fund the technology development (e.g. sensors)

To grab these opportunities, Avery needs sensor technology. To create labels with sensors, Avery should identify existing sensors and if they can quickly reuse them in its business model. If the sensors already exist, Avery should license-in the technology; acquire the start-up or hire experts of the domain. If it does not exist, Avery should influence the ecosystem to allow these sensors to be developed (e.g. fund university projects or start-ups to develop the missing technologies)³.

5. Licensing-out its label expertise to sensor companies

Avery might not be the most relevant company to collect and analyze the data that the label-sensor collected. Instead of selling its label with proprietary sensors, Avery could collaborate with lots of sensor companies and create a library of sensors for the label. Thus, Avery would sell the label with sensor options. If Avery customer chooses a sensor, Avery pays royalties to the company that developed and produced the sensor. *Remark: it could do the same for the virtual reality or any complementary asset, which is outside its current scope*

6. Collaborate with competitors

Avery is not the only company threaten by the disappearing of the label. Avery could collaborate with other leaders of the label industry to leverage the value creation to end-user and make label mandatory for brand owners. For instance, competitors could collaborate to increase their bargaining power to access the supply chain data or share the cost of developing label as a tool for accessing blockchain information. Competitors can collaborate to maintain or even increase the role expected from the label. By collaborating, Avery and its competitors share the cost, and they increase the likelihood of shaping the ecosystem in which they operate.

³ To benefit from these technology developments, the firm needs to not just fund technology development projects, but also be involved in the board and interact regularly with the persons involved in the project.

Challenge #2: Enel Challenge



Challenge



“If ‘data is the new oil’, there is a potential ‘digital door’ that any company can enter. Data is a driver of growth and evolution. Entering this digital door might be mandatory to survive. But the reality is more complex, having data is not enough. The data needs to be extracted, refined, valued, bought and sold in different ways. Enel have huge quantity of data, but they do not know what to do with it yet.”
ERNESTO CIORRA, Chief Innovability Officer, Enel

Enel’s Background

Enel is a multinational energy company and one of the world’s leader among integrated operators. It works in more than 30 countries across 5 continents and is committed to leading the “energy transition”, based on renewables and grid digitization. Technologically, the company is already investing heavily in solar PV, hydro, geothermal, and other renewable sources, as well as digitizing the grid.

Enel launched a new global corporate identity on January 26th, 2016 and simultaneously unveiled the new logos for Enel Green Power and Endesa. The new brand strategy is the incarnation of the “Open Power” approach, with “openness” as the keystone of the group’s strategic and operational approach. “Open Power” means: opening energy access to more people; opening the world of energy to new technologies; opening energy management to people; opening energy to new uses; and opening to more partnerships” Enel aims to be a modern, open, flexible and responsive utility company, ready to lead the energy transition.

Currently, the energy and gas context is disrupted by the possibility of producing energy at home. Facing this trend, Enel needs to reinvent its business model and the use of data could be one sustainable solution.

Recommendations from the practitioner session

1. Use the data collected to shift from energy-seller model to energy-service model

Enel collects a huge amount of data. Via these data, Enel can become an energy-service company (and not be only an energy-selling company). Being an energy-service company can take different forms:

- *Sell benchmarking consulting services:* Enel can give client advice on the cost of energy and develop consumption management. By using artificial intelligence and the data it collects, Enel could: personalize the advice to continuously improve efficient consumption; identify defecting product reporting consumption higher than usual and identifying the causes; and identify technological improvement highlighting energy-saving using new toasters). *Remark: the end user can also be a city. Enel could compare the energy consumption efficiency of different buildings over time, geographical area, building materials etc.*
- *Sell consulting services to the new-entrants (homemade energy produced by private user):* develop consulting expertise in the analysis of the homemade energy consumption and production, or in the development and management of an efficient grid.
- *Sell consulting services in safety and security:* Through sensors on data consumption, Enel can sell an alert system to end-user and even cities. Enel might be able to predict leaks or potential fires before any visible sign.

- Offer predefined bill based on a fixed amount of money and not watt consumption: Enel's expertise and data analysis enable Enel to predict its client energy needs and translate them in a fixed amount of money. The client will have no more surprise on the monthly bills.

Remark: it opens a new market for Enel because this predefined bill makes the end-user free from the need of having a bank account to access energy. The client can pay in cash at the beginning of the month.

2. Develop Mobile app to 'smart home and smart energy'

The main difficulty in the energy sector is to store the energy and deal with the peak hours (time slots in which the consumption is very high). Through the smartphone app consumer could actually make more transparent and informed decisions. The consumer is likely to monitor the daily use of energy if it involves dynamic pricing at different points of the day. The consumers can understand the consequences of their choices in economic terms and not merely kilowatts per hour of energy consumption. This will increase transparency, which is a noble way to create value from the data. This is a unique idea of cognitive intervention. The utility companies think in terms of kilowatt-hours, while consumers think in terms of money. So, if the company wants to create value, then it can speak the language of the consumer rather than its industry language.

3. Become a third-party enabler of peer-to-peer homemade energy exchange

Enel could develop a blockchain to promote peer-to-peer homemade energy exchange. Whether it is generation phase, distribution phase, or sales phase, blockchain is a robust technology to do the peer-to-peer transactions at multiple levels of the value chain, for industrial and commercial users.

Becoming an enabler of homemade energy could shift Enel's fear of "homemade energy produced by private user" into an opportunity to build a new stream of business. The core condition is that Enel uses its internal capabilities (e.g. maintaining a sustainable grid, collecting and analyzing data on the energy consumption and production) to capture value from these new projects.

4. Profiting from energy consumption platform

Enel can create a platform in which anyone can upload energy consumption and, in return, receive a free consumption analysis/benchmarking (the platform needs to be free because customers contribute their data).

The business model of this platform could rely on:

- Making the company pay to be on the platform. If the company's product has better consumption characteristics, Enel can offer it as a concrete solution in optimizing the end-user energy consumption.
- License out the data to a company like Amazon.fr, which could use the data to target clients or add some additional benchmarking characteristics to its products.
- Having the end-user consumption of energy and the details on the end-user products, Enel can license out to manufacturing company the data of the consumption of energy of the competitors' product. Moreover, it could not only license the raw data but also the analyzed data (e.g. trend etc.)

5. Profiting from a neighborhood consumption map

Enel could develop a city consumption platform. Enel could map the geographical distribution of energy consumption and make the resulting data available to businesses or consumers. Concretely, Enel can imitate Google map. Developing this map could allow:

- Companies to propose targeted solutions meeting energy-savings needs of potential customers.
- Cities to promote environmental sustainability and educate the society. Cities could create incentives to behave better by showing that their direct neighbors do better (have a more judicious and sustainable consumption) or that

the direct neighbor saves money from judicious consumption.

Remark: Past research (in behavioral economics) supports the experiment related to consumer attitude and behavioral changes with respect to its neighbors' behavior (see Levitan, 2014, Frederiks et. al., 2015, Kowalska-Pyzalska, 2017). Related to consumers' changing behavior of energy consumption, it has been observed that neighbors' behavior is actually a more powerful motivating response because we are not only economic creatures but also social creatures.

Moreover, this idea of *Energy Consumption Map* can be developed in multiple ways. For example, Enel could do this visual inspection of the energy consumption for buildings and then sell or license a world-wide benchmarking.

Remark: each data collected and not reused has a potential external partner interested in using it. Enel can ask royalties in the use of the data.

Recommended references

Levitan, D., 2014. How data and social pressure can reduce home energy use. *Yale Environment*, 360.

https://e360.yale.edu/features/how_data_and_social_pressure_can_reduce_home_energy_use

Frederiks, E.R., Stenner, K. and Hobman, E.V., 2015. Household energy use: Applying behavioural economics to understand consumer decision-making and behaviour. *Renewable and Sustainable Energy Reviews*, 41, pp.1385-1394.

Kowalska-Pyzalska, A., 2017. What makes consumers adopt to innovative energy services in the energy market? A review of incentives and barriers. *Renewable and Sustainable Energy Reviews*.

Challenge #3: Tech Mahindra



Challenge



“We have a promising open source platform which leverages AI. But we do not know yet how to capture value from an open source platform. Moreover, the success of our open-source platform relies on the number of people joining us. Thus, we need to find out what business model could enhance the incentive to join us and how to value capture from this.”

JAGDISH MITRA Chief Strategy Officer, Tech Mahindra

Tech Mahindra’s Background

Tech Mahindra and ATT, in collaboration with Linux foundation, have recently launched the AI platform Acumos. The aim is to promote an open and connected AI platform that will connect all the existing AI algorithms. This platform promotes collaboration between developers and enterprises and leverages the future of AI (e.g. Tech Mahindra want to nurture an active, large ecosystem to sustain Acumos for the longer term).

Recommendations from the practitioner session

1. Not look at end-user as customers but look at the current platform as customers

Tech Mahindra could be bigger than an additional platform. Its goal could be becoming a ‘platform of platforms’, which (1) connects existing AI platforms and (2) matches complementary datasets and algorithms. In that case, it could sell its developers’ expertise to speed up the research to interconnect the companies’ platform to other platforms’ products.

2. Gamification of the contribution on the platform

One way to create an incentive in the participation of the open source community can be to use “gamification”. Games can boost the outside-in processes of AI algorithms. Two alternatives ways are possible:

- Create a game with a prize at the end. Well-designed prizes can stimulate the participation of current developers to engage in the community and attract new one.
- Pick a fight with a big player of the industry. Challenging a star in the industry makes for good press releases and puts the name of Tech Mahindra out there. It is a win even if they lose the battle because the press release will be good. The challenge could even strengthen the open community spirit, particularly if Tech Mahindra can appear to be “more open” than the star being challenged.

The gamification can also be an opportunity to identify needs. For that, Tech Mahindra needs to open the subject of the game to the platform community. It can shape the development of the platform based on real needs, which creates a virtuous circle. As it responds to real needs, more developers use it.

The gamification can be on the algorithms but also on the data (to foster data sharing). Huge amount of data is a condition for AI algorithm to work. Thus, the platform could boost algorithm development if they give access to interesting data.

3. Differentiate the access to the platform based on data access

The relevance of AI algorithms is based on data collected. Without data or with biased data, AI does not work well. Thus, one of the main challenges of Tech Mahindra is how to collect data. Tech Mahindra could develop a two-sided offer in which the participants, which give access to their own data, do not pay, while the ones who refuse to give access need to pay.

4. Rethink who is willing to pay

Tech Mahindra could add a business layer on top of the open and free platform to make money:

- Personalize AI algorithm. The open platform gives for free the generic templates, but offers a consulting service to personalize them. Tech Mahindra should target companies, which are not in the tech industry and which could be interested to develop AI services. Tech Mahindra could take example on IBM business model shifting software industry (cf. Chesbrough, 2003⁴).
- Teach the basic use and implantation of the generic algorithm. There are many organizations, which do not know how to use generic algorithm. For instance, the academics and university would like to use these generic templates but do not have the required knowledge to do it.
- Sell human resource data. They could be able to identify the most efficient developer capable of improving or creating the algorithm. They could help them find external good developers with the specific AI expertise that the company needs.

Remark: Tech Mahindra needs to generate data on the name and address of the best developers on specific subject. Even if they are not interested in exploring this business model, they could license out these data to human resources consulting companies.

⁴ Chesbrough (2003), "Open Innovation: The New Imperative for Creating and Profiting From Technology » Harvard Business School Press

Challenge #4: Hygge Energy



Challenge



“We want to be the Uber of the electricity platform. Our goal is to enable the sharing of energy. HYGGE Energy goal is to change how energy is sourced and to disrupt the business model of the big players (like Enel). How could digitalization help?”

PRATEEK SAXENA CEO, Hygge Energy

Hygge Energy Background

The current centralized model of the existing grid faces significant issues surrounding security, the mass outage caused by natural disasters, overloaded grids from increased demand, and accessibility to remote locations and aging infrastructures. Furthermore, in a global economy, developing countries need reliable access to energy to reduce poverty, improve health, increase productivity, enhance competitiveness and promote economic growth.

Hygge Energy is a spin-out of TechMahindra which is creating a solution that can provide power to remote areas and smaller communities while being tied to the main grid and accessible for drawing in the event of increased demand or emergency. The introduction of Nested Microgrids, integrated with the software platform of Microgrid as a Service into the main utility grid will help to alleviate the current issues of security, mass outage from natural disasters, overloading from increased demand and accessibility to remote locations.

Hygge Energy’s business model relies on enabling energy sharing: the company does not own or produce the energy, but it manages energy flows. Its vision is to enable users to give electricity to the grid when they don’t need it.

Recommendations from the practitioner session

1. Use digitalization to not only offer mere energy but secure and private energy

An underexplored customer group is the very wealthy people who want a secure and private energy provider in combination with privacy guarantees on their consumption and usage. The idea is to develop a “luxury offer” to this customer group.

2. Use digitalization to shift from energy provider to service provider

Combine the access to energy with additional advices:

- Hygge Energy can sell a pre-paid amount of energy for consumption (thus the customers do not need a bank account to access energy, which can be a real barrier for developing country)
- Benchmark the consumption of energy between similar cities in India or between private homes

Remark: this can be part of the “luxury offer” developed above

3. Reinforce the value of exponential technology

The energy will take different forms (e.g. coming from salt water) and with a different path to market (e.g. global grid or local and individual grid). Hygge Energy could think about the interconnection between these different energy forms and path to market. In this battle, the “security” of the energy exchange will have a key role. New technology like blockchain

could be an interesting mean to explore. Similarly, Hygge Energy needs to think about the connection of its technology to the smart home (e.g. explore the internet of things).

4. Inside-out the technology to a competitor in developed market (a solution to face the incumbent barriers)

HYGGE Energy might not be the best company to drive its technology into developing markets. The current existing firms might be a more efficient path. Current existing firms already have the knowledge of market and the network to efficiently commercialize a disruptive innovation in their industry. Moreover, by not collaborating with current existing firms, HYGGE Energy takes the risk that existing firms are going to hinder Hygge Energy's development (like the taxi drivers hampered the development of Uber in France or Italy).

Hygge Energy could be inspired by the story of TiVo television which disrupt the television industry and managed to get the support of the current existing firms (cf. Ansari et al. 2016 article).

Thus, Hygge Energy addresses firstly those who currently do not have access to energy (e.g. India, the isolated geographical areas in a developed country (e.g. remote areas located in the mountain or on islands in France or Italy, which have a very bad internet connection).

5. Rethink who would be interested to pay for Hygge Energy technology: not always the end-user

Hygge energy could think a step ahead: not about the raw data but about the analysis the company would be able to conduct on these data. Thus, what type of data analysis vendor could Hygge Energy be? Based on this information, it could even develop a business model where the technology is free for the users, while the one paying for it are the buyers of the data.

Recommended reference

Ansari, S. S., Garud, R., & Kumaraswamy, A. (2016). The disruptor's dilemma: TiVo and the U.S. television ecosystem. *Strategic Management Journal*, 37(9), 1829–1853

Challenge #5: BBVA

BBVA

Challenge



“The conventional banking business models are no longer enough to meet customer needs. Digitalization is one solution to offer a compelling customer experience to those whom currently are unsatisfied with banking and financial services. The question is what could be the digitalization opportunities that BBVA does not see? What could be the business model to attract customers that are not with BBVA yet?”

MARISOL MENENDEZ ALVAREZ, Head of Open Innovation, BBVA

BBVA Background

Banco Bilbao Vizcaya Argentaria (BBVA), S.A. is a multinational Spanish banking group. BBVA is the second largest bank in Spain. BBVA offers different financial services and products through multiple business models worldwide. Their services and products aim to help customers in making the better financial decision, positively impacting people’s lives and companies’ activities. BBVA’s purpose will inspire internal and external stakeholders to pursue the company vision.

BBVA is aware that conventional banking business models are no longer enough to meet customer needs (e.g. the profound regulatory changes, world economy towards emerging markets, and changes in society, lifestyles and buying habits). BBVA has been able to anticipate and evolve, offering to its customers new and simpler solutions that they can access how, where and whenever they want. All this has been possible thanks to the use of technology as a strategic element to differentiate BBVA from its competitors. The goal of the company is to continue on this path by leveraging the use of digitalization and consider the development of an open-innovation platform.

Recommendations from the practitioner session

1. Create a network platform to identify potential partners

The core competitive advantage of BBVA is its capacity to identify new partners. BBVA can sell this service of connecting people/companies and create a platform based on its database. In this race of connecting people, BBVA has the competitive advantage of being a bank and accessing for years strategic financial information about its partners.

Thus, BBVA could use its status of a banking company to create “trust” among the partners selected by the platform. Indeed, BBVA could add a metric or a guarantee on the financial strength of the companies that no other platform would have.

Remark: in this business model, BBVA needs to pay attention to the quality of start-ups with which to connect. The quality will directly affect the firms trust.

2. Capitalize on its internal resource: create an incentive for employees

One issue of implementing of Open Innovation is to consider it as separate silo. All employees should be aware and concerned about OI. Thus, BBVA needs to track the internal awareness of OI and, to do so, it can create an incentive like a financial incentive for the employee that identify and attract new companies, and are able to connect with other companies in BBVA OI ecosystem. This strategy would rely on one of the best marketing channels: the “spread by word of mouth”.

3. Be a BBVA customer or pay to be connected to the open innovation platform

The open innovation platform should openly share the ideas/technologies/partners under the condition that the company can demonstrate a high level of trust. The value capture would rely on keeping the name of the companies involved secret and the delivery of “trustiness” certificates to the company they are connecting too.

Instead of making everyone paying for being connected, BBVA could attract new customers by offering this service for free to its own customers and charging the non-customers.

Moreover, in the long term, BBVA could have data on how companies connect to each other (e.g. what types of firms?), and thus, anticipate the unexplored needs of similar firms. To achieve similar possibilities, BBVA needs to invest in artificial intelligence.

Remark: The customers would pay not only for the connection but the high trust in the solvability and seriousness of the companies on the platform.

4. Inside-out the technology for the platform

BBVA is a digital company that happens to deliver financial services and wants to move towards becoming a **technology company**. The question is whether BBVA has the best knowledge to become a technology company or it should collaborate with a technological company (e.g. inside-out practices)

One of the key resources of BBVA is its status, which is associated to principles of integrity, prudence and transparency. It is this status that can attract technological company to partner with BBVA. Thus, BBVA might be interested in focusing on the selection of potential partners and the creation of “trust”, but not on the technology.

Additional challenge : How to measure of OI Success?

In this quest to disrupt its Business Model, BBVA developed an Open Innovation strategy. BBVA created an OI Hub in which it built a community of OI practice for training and tools to be delivered to OI practitioners. But, BBVA wonders how could it measure the success of OI? Currently, BBVA uses as a KPI to measure the success of OI strategy the number of projects generated through openness, a number of pilot projects and proof of concepts conducted, along with the number of ‘collisions’ (‘connections’) created. But this KPI does not consider the improvement of business along different dimensions as the Ecosystems (worldwide), learning and time.

The experts’ response :

The measurement of OI success should happen on single projects/programs to measure the expansion of business that did not exist before the development of OI activities. BBVA should discover and highlight the activities that are developed ‘on top’ of what the company was already doing before OI. For that, BBVA should focus on the relative metric, rather than absolute ones (i.e. adopt a dynamic view instead of a static one).

BBVA could measure different aspects of open innovation by using the ‘sensing, seizing and transforming’ factors of the dynamic capabilities framework, developed by David Teece. Within each aspect, different KPIs should be used, both quantitative and qualitative. Note that quantitative measures are only useful if they are checked and benchmarked by qualitative reviews. For example, measuring the number of collaboration partnerships found is only useful if their quantity is not preferred over their quality.

- Sensing: This is all about finding a partner to collaborate with, so quantitative measures on how many project partners were found would be useful. It is possible to use a table, with rows corresponding to different types of open innovation partners (start-ups, universities, corporations, VCs) etc., and columns corresponding to different stages of the innovation funnel (ideation, development, commercialization, scaling). Thus, the number of each type of a partner can be tracked throughout the innovation process, to keep track of how many projects are started, and how many of those projects are followed through until scaling.

	Ideation	Development	Commercialization	Scaling	...
Start-ups	# = ?	# = ?	# = ?	# = ?	
Universities	# = ?	# = ?	# = ?	# = ?	
Corporations	# = ?	# = ?	# = ?	# = ?	
VCs	# = ?	# = ?	# = ?	# = ?	
...					

Again, use qualitative discussions to check for quality of partnerships, not just quantity. Additionally, at the *sensing* stage, experts thought about different time horizons of projects. On Horizon 1 (H1) there are projects that support the current business; on Horizon 2 (H2), there are projects that will be relevant to current business units only in the future; and on Horizon 3 (H3), there are the far-out projects, which are likely not related to any current business units. Specific KPIs should be developed concerning the number of projects that should be started per each category of time horizon. Often, companies follow a 70/20/10 approach for H1/H2/H3, but this varies depending on company’s needs. This will ensure that exploration and exploitation are both taken care of in the open innovation activities.

- Seizing: Seizing opportunities is about how many of the projects with potential open innovation partners that were scouted are then adopted by the company. However, seizing is more about qualitative measures of success than quantitative. At this stage, an in-depth view of the projects that made it through the innovation funnel so far must be taken. Some open innovation offices in large corporations have KPIs on how many open innovation projects must be killed, to check whether the team is taking enough risks and following projects with less certainty but huge potential impact. Again, checking mechanisms must be put in place to make sure that this particular KPI does not trigger bad behavior (i.e. that projects are started just for the sake of shutting them down and reaching this non-adoption KPI).
- Transforming: This stage focuses on the actual output of the project. It is about how well the projects are integrated into business units and commercialized. Eventually, the revenue will come into play, i.e. a KPI about how much revenue a project brings or how much costs it saves etc.

Remark 1: To measure the success of Open Innovation, BBVA needs to find metrics to evaluate the use of external ideas (outside-in process), as well as the use of external path for ideas (inside-out process).

Remark 2: Use open innovation in the process of measuring Open Innovation success. Ensure internal transparency on OI initiatives, explain to others what you are doing and allow critical questions.

Remark 3: The 2x2 matrix that Marisol presented reminded the technology intelligence matrix developed by Kerr, Mortara, and Phaal in their 2006 paper

Kerr, C. I. V., Letizia Mortara, R. Phaal, and D. R. Probert. 2006. "A Conceptual Model for Technology Intelligence." International Journal of Technology Intelligence and Planning 2(1):73.

In addition, Loh and Mortara (2017) discuss "How to Measure Technology Intelligence"

Loh, Ying Wan and Letizia Mortara. 2017. "How to Measure Technology Intelligence?" International Journal of Intelligence and Planning 11(3):187–211.



Challenge #6: Johnson Controls

Challenge



“Johnson Controls needs to change its way of doing business due to the proliferation of technology in the life of the general population. Indeed, the technology empowers the general population, which is able to influence decision-making processes, ultimately changing decisions taken upstream in the value chain. Thus, even if Johnson Controls is a B2B business, paradoxically it needs to connect to the users of its products, which are not its direct clients. The question is ‘how?’ Moreover, the proliferation of technology increases expectation of more and more simple and integrated solution, and Johnson Controls sees start-ups taking over space. Thus, how should it react?”

LENNY JOSEPH Global Vice President, Johnson Controls

Background

Johnson Controls (JC) is a leader in building technology products and goes to market through multiple channels. Johnson Controls provides products and services for the building and automotive sector. More precisely, on the building side, JC operates on residential and complex buildings (vs the ‘simple offices or home residence buildings’), such as the data centers and airports. The building side was the focus of the industry challenge at WOIC 2017.

The direct value that Johnson Controls creates comes from the installation of small controlling devices within buildings, and from software that can collect data. Electrical and mechanical contractors buy the devices that JC builds, to integrate them into their buildings. Johnson Controls has currently more than 4 million “users” worldwide considering that its devices and software are installed in buildings, cars, etc. Its customers are building owners, and the building occupants are its users. Based on this value creation, Johnson Controls captures value in three phases:

- 1- Product sales, the planning phase
- 2- Consulting sales, building phase
- 3- Maintenance costs, offering sales

Remark: Johnson Controls tried to create a new market place 5 years ago and it failed in this attempt. Company people stated that the reason for failure could have been that they were not ready to make it and that now the timing might be mature.

Recommendations

1. Via digitalization, integrate the building occupants in JC decision

Even if the building occupants have no role in the decision-making processes, their opinions and needs are more and more considered in the building design and construction phase. Thus, it is strategic for JC to strengthen its direct relationship with them. To do so, JC can:

- **Crowdsource the building occupant needs:** Use the community to ask for help – ask the customers directly what they want. This approach would simultaneously improve both B2B (by creating a platform for open innovation partners in the space) and B2C (by offering services directly to the customer and asking them for their needs).

- Attract more **high-end customers** and **social influencers** for marketing and reputational purposes. By building a strong relationship with **high-end customers** and **social influencers**, **JC could be emotionally linked to luxury**, high-tech and smart buildings. This digital link will increase the expectations of building owners and occupants on JC products in the luxury building process.

2. Via digitalization, rethink the building and organization structure



To adapt to the changes, Johnson Controls needs to rethink its view of the building :

- each building can become individual and unique (like smartphone, each smartphone is individual and unique because of the app downloaded and how these apps are orchestrated)
- each building can be involved in an ecosystem rather than thinking of silos, buildings could become inter-connected and place to exchange data.

However, Johnson Controls needs to gain agility to be able to face shifts in the perception of the building. To reach this goal, JC could create a spin-off structure:

Johnson Controls is currently an invisible brand because consumers do not want to be consciously aware of the facilities in their home or in the building they occupy. The facilities just need to work and make the occupant comfortable, so the consumer is not aware of Johnson Control as a brand. Creating a spin-off company could be a solution. The spin-off would be separated from the bureaucratic processes and business unit silos of Johnson Controls. This separation could give the new entity its own visible DNA, rules and agility.

Remark : it could be a separate brand to Johnson Controls, but keeping this company under the wing of Johnson Controls, and maybe even conceiving the spin-off's name as followed by something like "powered by Johnson Controls", to make Johnson more visible and to ensure that it becomes known that this new brand is backed up by the muscle and resources of a large company like Johnson Controls.

3. Create value using virtual reality

Johnson Controls might add value offering a virtual setup of the buildings. The virtual reality simulations of the services/products supplied would provide a competitive advantage to the Building owner, who could use it to increase sales and differentiate from the competition. JC would win because, in the virtual setup, there would be its own products, which building occupant will expect afterward.

Furthermore, separating the classification of the buildings following local government regulations (in the US) is a longer-term strategy that would allow Johnson Controls to offer different categories of complex buildings: from the basics to the most accessorized and luxury ones.

4. A new business model relying on offering platforms for sharing economy or startups

With a new spin-off, JC can invent its ways of profiting from its capabilities. For instance, the new entity could create an Airbnb-model type for the sharing economy around energy surpluses. Homeowners that have green houses and have surplus energy can sell their surplus energy to the neighbors, especially if they are away for periods of time (Prateek Saxena from Hygge Energy was speaking about a similar business model, so maybe a connection between Johnson Controls and Hygge Energy could be mutually fruitful for the companies).

5. Shift from selling to customized and renting contracts

Johnson Controls could design options for different user experience/usage: bronze/silver/gold. The idea is to fit apartments with different standards and make users pay for which standard they want (e.g. if the fridge should talk to the fire alarm system). The customization could also be based on the generation of the technologies (gold has the latest

and best one, silver has the second best, and bronze: has the third generation). So, as soon as a new technology arises, the gold standard users benefit from the new technologies, the silver users receive the second-hand ones, previously used by the gold standard, and pass their technologies to the bronze users.

This system supposes a change in the business model and, paradoxically, the value of the product increases. It is the same with Tesla, when you buy a Tesla you benefit from all the technological improvement even 5 years after buying it (so the Tesla is worth more 5 years after it is bought because of all the software advancement).

This shift in thinking calls for a shift in the payment methods. Instead of having a buyer-seller relationship, it could be a rental contract. More precisely, rental contracts throughout the building lifecycle, lasting approximately 25 years.

6. Capitalized the learning on a past failure and retry

Going back to the market place idea that Johnson Controls tried and failed at few years ago, because the market wasn't ready yet. Re-launching this idea under a different brand will reduce resistance to re-trying something that already failed within the company. More concretely, the goal could be a disintegrated model concerning the channels to market. In a medium-term strategy (5-10 years), Johnson Controls should define a possible market place bringing together: i) contractors and people/structures engaged on different degrees of knowledge transfer process; ii) businesses; iii) constructors; iv) post-contractors. This would be a B2B strategy to build a market place and not a platform. Many actors are included to gain mutual benefits and satisfy their needs and interests. It is the B2B2B2B-etc. strategy, aiming at making the single B2B relationships strong, to then shift to a B2C business model.



Challenge #7: Siemens Challenge



Challenge



“For big energy companies like Siemens, challenges as well as opportunities are associated with how quickly the company could embed itself in the changing ecosystems and feel the temperature changes, and then react quickly to ride the tide. Siemens feels the need to consider new elements like scaled up renewables, storage, e-mobility as well as peer to peer trading etc. These elements are leveraged by the digitalization. The question is what are the potential future opportunities offered by digitalization?”

DR. ZUOZHI ZHAO. CTO. Siemens Power & Gas

Background

Siemens Power is one of the most promising businesses of Siemens. The goal is to master the challenges of changing energy systems by offering cutting-edge products and services covering the entire energy value chain. This energy value chain is rapidly changing because of the growing importance of individual energy sources and options for power generation. The latter is becoming more and more decentralized, making grid management increasingly complex. Electrical consumption continues to steadily rise all over the world.

Currently, Siemens’ portfolio ranges from state-of-the-art compressors, turbines and generators to virtual power plants, intelligent grid management and innovative storage solutions. All of them aims at meeting customers’ needs, combining physical and digital technologies.

Recommendation

1. Digitalization allows Siemens to be a major actor in consulting activities for circular economy and Internet of Things

Siemens Power can have a competitive advantage by **giving advice and operational solutions to the Circular economy**. A circular economy is an alternative to a traditional linear economy (make, use, dispose of) in which resources are kept in use for as long as possible, the maximum value is extracted from them whilst in use and, at the end of each service life⁵, products and materials are then recovered and regenerated.

Moreover, Siemens can **become a consulting company for the Internet of Things (IoT)**. The IoT is “*the connection – via the internet – of objects from the physical world that are equipped with sensors, actuators and communication technology*”. Currently, this technology is looked at by a large variety of domains, such as manufacturing, healthcare and energy, to facilitate the development of new applications and the improvement of existing applications. New types of business models must be developed to enable the commercial exploitation of these applications. Siemens could take inspiration from existing frameworks to facilitate the development of these business models.

2. Rethink Siemens key activities to create value with digitalization:

Digitalization creates multiple needs to achieve a balanced grid allowing individual and decentralized energy production, storage, distribution and use. Siemens has alternative possibilities to develop complementary assets that the actors of the decentralized grid could need by:

⁵ <http://www.wrap.org.uk/about-us/about/wrap-and-circular-economy>

- Becoming transparent about energy sources. This might not be suitable for emerging markets, but for those where energy is already an established commodity. Indeed the “transparency” and “ethics” are two factors which are more and more valuable in the established market. For instance, the partnership on artificial intelligence puts ethics and transparency as keystone in their models.
- Designing of ‘solar barrels’ that allow the storage, transport and trade of energy.
- Developing the activities of Electron transport & dissemination.
- Working on the development of an ‘energy cloud’ to break down company silos.
- Developing grid-hubs with “movable solutions”. Siemens could bring energy to users in remote areas. Siemens could take inspiration in ‘milk man’ or ‘air drop energy’.

3. Rethink Siemens’ key resource with digitalization: other sources of energy or consulting activities

Siemens main resources in the energy system might not be current and known energy. Siemens needs to explore a new source of energy (e.g. energy produced by salt water) or even explore the new type of resources offered to clients (e.g. not the energy itself but the consulting activities in energy).

For instance, in the consulting activities, Siemens could use the data collected to :

- Monitor usage to predict demand,
- Understand user needs & involve users to co-create solutions they desire (build long-term customer relationships),
- Connect with Google deep mind to generate intelligence from energy usage.

Remark: be aware that Siemens does not only have valuable data but also a very valuable capability for analyzing the data. Siemens can generate revenues from the data but also its data analysis.

4. Rethink the channel to access customers: capture value by eliminating utility companies

Siemens could maintain the traditional model of selling power to utility companies, who then sell to consumers. Or, Siemens could adopt a more disruptive option selling independently of the grid, i.e. eliminating utility companies. With this option, Siemens can then sell to two types of customers: households or industrial customers. With industrial customers, there are multiple opportunities for providing individualized services along with the product, thereby differentiating Siemens from the competition.

5. Rethink the way the customers pay: advertisement, resale of data and/or customize service

Siemens could rethink the business model by **receiving payment through advertisement or resale of data**. Siemens could combine the opportunities offered by mobile phone and its analytical capabilities in energy consumption to develop an app ranking, or creating a kind of ‘Yelp’ for building occupants or mind sphere for multi buildings. In these business model, the end-user will not pay, Siemens would profit from the data collected and resold, or on the advertisement.

Additionally, Siemens could differentiate itself from competitors by offering customized options at different prices. The customization can depend on: 1) the energy source (e.g. from a circular economy or not); 2) the payment (outcome-based model founded on payment per kWh, lease out or rental); 3) the different options of going to market (e.g. offer different types of power from different sources of power); and 4) the content of service (e.g. offer various applications and analytics around power generation).

6. Capture value by partnering

Siemens Power and Gas can have different partnership models

- Look for telecommunication companies to rethink the power generation. More precisely, Siemens could use a co-competition strategy in which multiple competitor's co-own assets. It has been successfully implemented by some companies and could work in this industry also.
- Look for a public-private-partnership model which involves the assets owned by state-owned enterprises, as is currently happening in Canada.

Remark: the key is to find partners with complementary assets to the ones internally owned.



Challenge #8: Goodyear



Challenge



“Digital communication technologies could respond to need of preventive use of tires: no more flat tires! But there seems to be a multiple service opportunities based on digital communication. What could they be?”

SURENDRA CHAWLA, Senior Director, Goodyear

Background

Goodyear is one of the world’s leading company developing, manufacturing, marketing, and distributing tires for most applications and it manufactures and markets rubber-related chemicals for various other applications. From the beginning, Goodyear aimed to manage services and not be only a “tire sellers”. Indeed, Goodyear started with the consumers’ problem of maintaining the tire pressure. According to Goodyear’s observation, 66% of the tires are underinflated, which ends up as a significant economic loss of the customers. Through service innovation, Goodyear expects to engage the customer for best practices with economic incentives and relies on competing on high-value segments of the market on B2B or B2C.

One of its key services is based on “Air maintenance with preinstalled pump”: In this process, Goodyear uses a preinstalled regulator and pump. The regulator monitors the tire pressure, and the pump automatically maintains the tire pressure of the commercial truck. Through this process, Goodyear wants to create value for the customers because most of the trucking companies don’t want to deal with tires. So, Goodyear developed a unique service out of the ‘leap’ segment. In this process, Goodyear manages and owns the entire services related to tires. It install tires and is involved in roadside maintenance and replacement. From a value capture perspective, Goodyear engaged in hundred percent service involving 2,300 dealers in North America.

Through the introduction of digitization in the market (particularly the use of IoT), Goodyear perceives a new market which involves innovation and digital communication technologies. Digital communication technologies could respond to need of preventive capabilities: for instance, with the application of sensors in the tire, information related to tire temperature and pressure can be broadcasted to the consumer in real time. Using a hefty analytics engine, the system can predict inflation trends in the commercial trucks. Thus, a truck running in Nevada can give signals that it is going to run another 600 miles and the driver needs to replace or repair it before that. Goodyear believes that value capture could be a monthly fee and the APIs for service and product analytics.

In the future, Goodyear wants to develop more these innovative business models for the service sector of the tire and intends to integrate the product quality improvement with services.

Recommendations

1. Rethink the value proposed with digitalization to their current customers.
(e.g. the “green people” or offer a second life to the old generation of sensor-tire)

In addition to offer “safeness”, Goodyear can offer “sustainability”. Since the management of the end of tires’ life cycle is extremely difficult and not sustainable because the profits related to tires’ recycling are extremely low, this segment of the product life-cycle is not well managed. Goodyear could work on innovating the recycling process of its tires and, in

general, the end of their life, offering this additional service with its products, which would especially attract the “**green people**” or offer a **second life to the old generation of sensor-tires**. For instance, the sensor used to offer safeness could also localize the tires that can be recycled in a second market. Indeed, the customers in the high-value segments would always be interested in the tires with the newest sensors. Goodyear can create with digitalization a shorter life product of high quality tires.

Remark: the recycling could also be more profitable because they could reuse the sensors.

Moreover, Goodyear can create additional value with **customized** tires. Each customer would have a unique type of tire designed and built according to individual tastes and preferences, meeting specific and personal needs (the digitalization could help identify the customer tastes and create a library to guarantee the exclusivity of the personalized tires).

Remark: different degrees of customization can be a way to capture value.

2. Rethink the value proposed with digitalization by regionalizing the services

As a multinational company Goodyear must deal with many consumers from around the world with various cultural backgrounds. If Goodyear wants to explore the service sector, then it should design region specific tailor-made service suitable to that culture. For example, it has been observed that consumers do not want to pay extra for the better product and services related to tire. However, in North America, some consumer is ready to pay extra for safety and security. The digitalization could help explore this kind of region-specific consumer behavior.

3. Rethink the value proposed with digitalization to new customers (sale data or become asset complementary to electric vehicles)

Goodyear should identify the data collected and think about a business model to directly or indirectly generate revenues from them, directly by creating the data platform and service related to it; indirectly by giving the data and collect royalties of the revenue generated by these data. With sensors on the tires, Goodyear could collect real-time information on the end-user use of the car (distance, frequency, speeds etc.). These data could interest lots of companies:

- Google to increase the accuracy of the “Google Maps app” (e.g. data of a slowdown in traffic)
- Insurance companies (e.g. to offer a customized offer based on the use of a car)
- Automobile industry (e.g. to know better the client depending on the type of car bought)
- Governments (e.g. on the quality of roads or air)

Additionally, the number of electronic vehicles (EVs) is going to increase in the near future and if Goodyear is interested in capturing the market they should involve into the services of EV. It is an excellent opportunity to open EV charging stations in selected locations. If Goodyear can move into this area, then there is an opportunity to engage the customer in service solutions. However, it is not clear how the charging station will help to monitor the tire lifecycle and how Goodyear is going to get the competitive advantage over other companies who are already in the charging station business.

4. Emotional digital bridge'

On the safeness side, the ‘emotional digital bridge’ would be addressed: targeting the customers most interested in having a constant support and service from the company. Moreover, by ensuring an assistance and monitoring tires conditions, the company would address the pain of having unsecurity by proactively assist instead of waiting for the flat ties to happen.

5. Rethink who is interested in car safety and thus who is paying

Paradoxically, the customers who might be the most interested in the car user safety might not be the car user but insurance companies (i.e., reduce the cost due to customer using the insurance), government (i.e., reduce the car incidents on the highways) or even employers of car users (i.e. offer it as a benefit to be sure that the employee will not arrive late to meetings because of flat tires). Thus, the value capture for safeness can be paid by high-end consumer segments, but also by any actors that value the safety of the driver. This way of thinking opens the potential customers of Goodyear services.

It is also possible to invent a combined offer in which Goodyear, the insurance company and the car user wins. The use of Goodyear services reduces the car user insurance and the insurance receive royalties on all the customers attracted thanks to the insurance.

6. Give for free the sensors to car users and sell data

Goodyear needs to reach a high level of data collected to become an attractive partner for data. To reach this level, Goodyear could give for free the sensors to car end-user but also to competitors. They could access for free Goodyear's preventive capabilities. By doing so, its sensors would become a standard against which no one can compete (because they are free). And with the data collected, Goodyear would have a valuable data monopoly that it could adapt and sell to external actors (e.g. Google for car circulation, automobile companies for use of the car, etc.).

7. Be an actor in a new way of paying for the car: a "subscription car model".

The company could work with automobile companies and offer together with a **"subscription car model"**. The goal is to go beyond their "tier Subscription" model idea and offer the entire (all parts) vehicle subscription. Or Goodyear could also work with car rental company to increase the quality of the vehicles they rent (with a guarantee that the tiers will not be damaged during the rent).

Recommended references

One article highlights Goodyear innovations strategy:

Smith, W. K., & Tushman, M. L. (2005). Managing strategic contradictions: A top management model for managing innovation streams. *Organization Science*, 16(5), 522-536.

Conclusion and cross-cases takeaways

We asked the academic and professional experts to be futurists and offer open-thoughts about how the digitalization can change company business models and/or the perception of their struggle due to digitalization as profitable opportunities.

The experts found multiple ways to use digitalization to create value for all the company even if they belong to very different industries. Most of the value creation opportunities rely on providing additional layers of business to their current business model by collecting a new type of data and using these data to shift from product sellers to service providers.

The experts also realized that the main struggle is that most of the value creation offered to the companies do not end up fitting with the firms' current businesses. In response, the firm needs either to do internal investment, or licensing-in the missing capabilities or license-out the data for letting someone else go to market with them.

The main takeaway is that even if some value creation does not fit their business model, it does not mean that the company should not use it or put it "on a shelf". It appears that other companies can be interested to license in the data collected by the company.

Thus, each of the company needs to engage in a reflection on what types of data can be collected in addition to company's current activities and which data could interest other actors. Identifying these interested actors can create a strong business model. It reinforces the firm's position based on its current customers and can even attract new ones because the partners will offer complementary activities, and at the same times the company receives royalties on it.

For example, Tech Mahindra licensing out the information on the best developers on specific areas to human resources companies (it will attract more developers because of this additional service and tech Mahindra will receive royalties on it).

Thus, the firms must think about what are the business model behind the use of digitalization and data collection. The use of the same digitalized technology to collect data can yield to different values in two different Business Models:

"An inferior digitalized technology with a better business model can yield more value than a better digitalized technology with an inferior business model" (alternative quote to Chesbrough, 2003, 2006)

Company	Value creation opportunities thank digitalization	Value captured from these opportunities
Avery	<p>Become useful for the end-customers sustain a B2B business model</p> <p>Use virtual reality is an innovative channel of distribution</p> <p><i>Remark: value comes from the analysis of the data collected and not only form the data collected</i></p>	<p>License-in the technology needed (e.g. sensors)</p> <p>License-out the expertise to sensors companies</p> <p>Collaborate with competitors to create a favorable environment which is leader in new trends as blockchain</p>
Enel	<p>Collect data allow to add profiting service layers on the current business model</p>	<p>Create free platforms relies on founding other actors ready to pay for the data collected or the use of the platform (advertisement)</p>

	<p>Use mobile apps as a channel to connect directly to end consumers and collect data</p> <p>Look for enabler position. Be a connector</p>	<p>There are good ideas inside the company</p>
Tech Mahindra	<p>Become meta-organization. There is a business model of connecting existing platforms which are not compatible (become a 'platform for platforms')</p> <p>Implement gamification of the contribution. It will create an incentive for the participation</p>	<p>Digitalization offers the possibility to add a business layer on top of the open and free platform to make money: consulting activity through personalized offers, teaching activity, selling of human resource data</p> <p>Capture value is possible by differentiating the access to the platform</p>
Hygge Energy	<p>Use digitalization to increase the expectation for security and privacy, thus the firm can evolve from product offers to security and privacy services in this domain</p> <p>Use digitalization to offer a new business model to solve unmet expectation (e.g. access to energy for people who do not have a bank account; or benchmarking)</p> <p>Use exponential technology (e.g. blockchains and IoT)</p>	<p>Inside-out the technology to a competitor in the developed market (a solution to face the incumbent barriers)</p> <p>Inside-out: Rethink who would be interested to pay for Hygge Energy technology (not always the end-user)</p>
BBVA	<p>Sell digital connection (the competitive advantage relies on the quality and trust the actors can have in these connections)</p> <p>Use the internal resources to attract new client for open innovation project (with digitalization is possible to track the internal awareness of OI across the company)</p>	<p>A new type of coupled inside-out and outside-in: Open the use of the platform to non-customer but make them pay to be connected</p> <p>The platform is data collection opportunities. There are consulting opportunities by combining this data collection with machine learning</p>
Johnson Controls	<p>Create value for a Business partner by being known and attractive to the Business partner's customers. Digitalization allows to crowdsource solutions to the partner's customers' needs and connect to social influencers</p> <p>Use digitalization to make each product individual and unique (e.g. like apps make each phone unique) or ecosystem (i.e. inter-connected and place to exchange data).</p> <p>Use digitalization to develop a new channel: virtual reality</p>	<p>Offer platforms for the new companies can be initially perceived as a threat (e.g. the start-up which offers an integrated solution)</p> <p>Offer platforms for the sharing economy (e.g. works for energy, you can sell the surpluses when you are on holidays)</p> <p>Shift from selling to customized and renting contracts (i.e. the use of digitalization allows to create a short life cycle on a product as energy that did not have one, by offering a renting contract, the company can offer a continuously improved product)</p> <p><i>Remark: failure in digitalization is a learning opportunity and might be explained by an ecosystem that is not mature enough (need to work on the ecosystem)</i></p>
Siemens	<p>Use digitalization to be a consulting company in circular economy and IoT</p> <p>Rethink the key activities:</p> <ul style="list-style-type: none"> - Develop trade platform for the key product (here energy) 	<p>Rethink the channel to access the customers: capture value by eliminating utility companies</p> <p>Rethink the way the customers pay:</p> <ul style="list-style-type: none"> - Mobile apps with advertisement - Resell of data

	<ul style="list-style-type: none"> - Invest in of Electron transport & dissemination - Leverage the market with the use of the cloud - Develop transparency about energy source - Develop “movable solution” (like in ‘milk man’ or ‘air drop energy’) <p>Rethink the key resources:</p> <ul style="list-style-type: none"> - Consulting versus energy seller - Explore new sources of energy (e.g. salt water) 	<ul style="list-style-type: none"> - Customized service <p>Multiple new types of partners due to the digitalization:</p> <ul style="list-style-type: none"> - Hardware (e.g. Tesla) - Algorithms Market place - Public-private-partnership (e.g. win-win relationship with government)
Goodyear	<p>Use digitization to offer services, which enhance the base product and respond to high-value segment’s needs. Sensors can be used for developing preventive capabilities of recycling the products creating a second-hand market (with sensors performance evolution, the product cycle can be reused)</p> <p>Use digitalization for regionalizing the services</p> <p>Use digitalization to collect data and thus attract new client (e.g. Google with direct information on the traffic), or to become complementary to new entrant in the industry (e.g. electric vehicles)</p>	<p>Great emotional digital bridge by offering service that connect to individual safeness or “environment-friendly”</p> <p>Rethink who is interested to pay for the sensor services as the end-user safeties (not only the end user: insurance, the end user company, the state)</p> <p>Give the sensors for free to end-user and competitors (to become a standard); and sell the data (inside-out process)</p> <p>Develop subscription model (coupled process)</p>