USER-DRIVEN BUSINESS MODEL INNOVATION – NEW FORMATS & METHODS IN BUSINESS MODELING AND INTERACTION DESIGN, AND THE CASE OF MAGITACT

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ABSTRACT

The primary goal of economic activity is the creation of value, and business models describe how to create and capture such value. An informed and systematic variation and extension of fundamental business aspects such as value proposition, user experience and partnering not only helps to focus new business, attract investors, and bring new products to the market, but also feeds back on the original concepts and design. We present a human-centered process and action framework, and user-driven innovation methods for modeling new business in IT and telecommunications. The approach and potential results are exemplified through the MagiTact project. The case shows how workshops with lead users and domain experts lead to new business models for touchless near field communication and inspired technological advancement of the original ideas. Finally we explore the dynamic interplay between user-centered idea generation, business modeling and technological development in innovation projects.

KEYWORDS

Business Modeling, Process Framework, Innovation Management, Interaction Design, Human-centered design, Touchless Near Field Communication.

1. INTRODUCTION: BEYOND TECHNOLOGY & MARKET

The traditional dichotomy between technology-based and market-driven respectively customer-driven innovation is currently being replaced with a systemic view on a multitude of innovation constituents within a business ecosystem (Teece 2009). Business Model Innovation has developed towards a prime technique of innovation management, complementing other forms of (technological, product, process, disruptive, user-driven, grounded ....) innovation. The idea is a systematic variation and extension of fundamental business aspects such as value proposition, user experience, partnering, and delivery of solutions. In the last decade the trend has been pushed through variety of new business models enabled through the internet.

This paper briefly describes conceptual cornerstones of business modeling and introduces a framework for the user-driven generation and elaboration of business models in IT and telecommunications. We present a rough process framework, a set of three distinctive, i.e. project-, workshop- and game-based, formats and experiences with several user-centered methods of modeling aspects of new business in technology oriented companies and small entrepreneurial teams. This framework not only modifies a well-known mapping tool (Osterwalder & Pigneur 2010) and enriches ideation through user-driven methodology (Steinhoff & Breuer 2009), but also takes initial steps into the iterative experimentation that is needed to study emergent markets and enact in them. Business model innovation in that perspective is not a matter of ideation but of iterative experimentation (Thomke 2002) with increasing degrees of fidelity, costs and time in order to generate usefully approximate information and evaluate concepts. In fact, not only information is generated here, but technological requirements are elaborated upon and implemented as we will see in a case study – just like the vision of a personal computer was a business model long before the suitable technology existed.

Analyzing the case of MagiTact, a set of applications for touchless near field communication, we reflect upon the dynamic interplay between user-centered idea generation and technological development in innovation projects. Within an ideation workshop with lead users, and a business modeling workshop with domain experts, business models and promising new application fields resulted. The case yields insights into

potentials, limits and challenges for the successful cooperation between user-centered, business-oriented and technical work streams in innovation projects.

2. RELATED WORKS AND CONCEPTUAL BACKGROUND

Business applies various means to deliver services and products but its ends rely on the values that even daily operations provide to customers and society: The primary goal of economic activity is the creation of value. Our framework combines a strong user focus with a value-oriented business modeling approach in the IT and telecommunication industry. Since Porter (1980) described the value chain of activities for a firm operating in a specific industry, information technology and web-based applications fuelled the creation of new business models. Beyond product and (internal) process innovation new business models emerged and became a new toehold for innovation strategy. Meanwhile software development methodology was increasingly challenged by the risen impact of user requirements and web based business models (IconProcess was one of the answers to this challenge). Interactive value creation places formerly peripheral activities – the design of interfaces to customers into the center of attention. Customers and users extend the producers knowledge, competences and resources – becoming a strategic factor for the creation of value. Operational efficiency became a necessary but insufficient competitive advantage (Reichwald & Piller 2009).

Within a research and consulting unit for "User-Driven Innovation" we leverage heterogeneous sources of knowledge to sense and seize opportunities for new business and fill the gaps in ongoing innovation projects. Informed decisions, which innovation topics to pursue, and which business opportunities to exploit, increase focus and reliability of investment decisions. Starting with the detection of new search fields for innovation through to the observation of users in their living environment and the joint effort of different disciplines in creative workshops, new business potentials are being identified and comparatively processed. A fast realization, check, and revision of tangible prototypes and new methods of user research permit an optimization of the most promising approaches and a reliable assessment of their market potentials. Trying to mature from a technology driven innovator to a creator of human-centered solutions we contributed individual components of future business models. One example: In order to support the crucial phase of starting-up the device and developing first using usage routines in a profitable way, easy-to-implement measures of the product packaging and introductory team exercises for users were developed (Breuer et al. 2009). Within corporate research and innovation as well as entrepreneurial initiatives we observed and responded to a growing demand to go beyond the generation and evaluation of new products ideas into modeling business ecosystems. One of these requests came from a group of researchers working on new technologies and interaction paradigms for touchless near field communication.

Business models lay out an organizational architecture within a business ecosystem. According to Chesbrough & Rosenbloom (2002) the function of a business model is to articulate the value proposition, select the appropriate technologies and features, identify targeted market segments, define the structure of the value chain, and estimate the cost structure and profit potential. In the last 20 years, associated with the rise of the internet and its potential to disrupt traditional business models, business modeling has gained attention in the corporate practice and academic literature (e.g. Staehler 2001). A variety of constituents, conceptual frameworks and how-to approaches have been proposed (e.g. Bouwman et al. 2008). The new complexity calls for simplified frameworks and easily accessible plans for action. We adapted such a reference model that assembled previous findings into the visual mapping tool of a "canvas" (Osterwalder & Pigneur 2010). This reference model was modified in several ways: Most distinctively it was redesigned from a user-centered and stakeholder-driven point of view that also serves as a consistent anchor for modeling entrepreneurs and engaged business leaders. On the one hand the mapping tool was driven to the extreme of simplification lowering entry barriers for young entrepreneurs and engaged business leaders: A game-like do-it-yourself starter kit is the result (see playground in figure 1). On the other hand the reference model was enriched through user-centered methodology and extended into a flexible process framework focusing on the demands of user-driven innovation projects in the information and communication technology industry.

Both approaches support small teams in thinking about new business in a structured way, and enable first hand experiences in the attempt to create or renew business models. Still, unlike some of the "how-to-model" literature we do not suggest that in depth user research, market study or organizational development of dynamic capabilities may be neglected. On the contrary inquiry into each of the building blocks (e.g. Breuer

& al. 2009) and their interaction within a business ecosystem are indispensible. Last but not least only repetitive, applied "experimentation" overcomes the barriers and engages in the potential that alternative business model ideas hint to and create and capture the value that new models promise.

3. MODELING NEW BUSINESS IN IT & TELECOMMUNICATIONS

In order to support research and innovation projects and entrepreneurial initiatives trying to develop new and suitable business models three formats were developed:

- Business Model Game: A self-explanatory, game-like do-it-yourself starter kit supports small teams in thinking about new business in a structured way. It enables first hand experiences in the attempt to create or renew business models providing a value- and user-centered playground, instruction and challenger cards, and a brief quick start guide to the basics of business modelling methodology and moderation. Its user-centered layout provides a consistent anchor and easy access even for novices.
- Instant Business Modeling: Instant business modeling is a moderated workshop format. Half day sessions with basic templates enable a rapid turnaround of results. Out of scope is an in depth elaboration of business models, its building blocks and their interaction. Just like in the last gaming format the focus is on knowledge sharing rather than creative development of innovative business models.
- Full Scale Business Modeling Project: The full scale business modeling project covers a five step process including an initial domain research, a user and a modeling workshop, a model test, model specification and finally illustration and storytelling, making it easy to communicate the business model. A toolbox of user-driven methods allows exploring and refining each dimensions of a model by generate ideas and provoking valid assessments from users and experts.

3.1 Business Modeling Process Framework

The business model process framework consists of five steps that are taken in an iterative fashion:

1. Domain Research: Domain Research includes trend & business model research, industry benchmarks, & blue ocean analysis (Kim & Mauborgne 1997) to create ideas and capture new demand in new uncontested market space. Goal of an initial domain research is to understand and current trends in the business ecosystem. We gather domain relevant trends, customer insights, and competitive market analysis (to inspire learning from other brands and blue ocean analysis) through desk research and expert interviews. Related business models can inspire the following activities

2. Ideation & Deep Dives: Ideation workshops generate and differentiate new business ideas with users, experts and stakeholders in two steps. First, using a range of creativity methods potential usage scenarios are developed together with lead users, and prioritized by means of innovation market research or management decision. Second, once usage scenarios and rough value propositions exist, we use a mapping tool and creative exercises to identify future customers and the value created for and with them. Supported by lead users, customer touchpoints (Rogers 2003), an intended user experience, and a viable revenue model are elaborated upon. Finally domain experts participate in the definition of solutions and costs including (dynamic) cost structure and dynamic capabilities, and key partner relations.

3. Illustration and storytelling consolidate and communicate the model to stakeholders. Starting from the needs and closing with the solution stories convey the big picture, make the models tangible, and perform a fictional reality check. Storytelling prepares entrepreneurs or business owners to acquire support from additional stakeholders and investors. Beyond simple elevator pitches we developed a range of visualization formats in order support the understanding of innovative business models and to enable valid evaluations. Visual storyboards on medium level of abstraction illustrate usage scenarios & interaction flows. Videos demonstrate motion sequences and prototype interaction. For the promotion of "information cards" technology we created a small comic of the early days of the internet providing context and contrast to show the potential of the innovation and its open business ecosystem.

4. Stakeholder Reviews: The initial model or single critical aspects are reviewed from multiple points of view involving lead users and/or domain experts from related fields, or potential customers, partners and/or investors. Various formative evaluation methods apply an increasing fidelity of business model prototypes and granularity for stress tests, ranging from simple challenger questions and stand up role playing games (to

enact a business model and use the actors and audience experiences as feedback channels) to the analysis of hypothetical future scenarios, to comprehensive user clinics and test markets applying customer analytics.

5. Model specification and experimentation: Operationalization sketches out a business processes model and its evolution. Quantification of activities with price tags feeds into a business plan. Through iterative remodeling and live experimentation an actual business may be developed. In order to refine the model we are working on a simple notation to visualize flows and relations. This graphical notation builds on known modeling languages. Boardofinnovation.com proposes six players and ten objects to exchange, IconProcess.com defines workflows, activities, (primary & supporting) roles, artifacts, and their relations. Different roles, artifacts and activities are visualized as icons - their elementary transactions are shown. An overview highlights distinguishing features, simplifies streamlining and recombination.

The proof of the pudding is in the eating. Experiments (Thomke 2002) and feedback loops should be integrated from early on paving the road to new business. “Emergent opportunities typically lack the deep wealth of data that are used to justify corporate actions in the mainstream business” (Chesbrough 2010). Early feedback from potential customers, partners and stakeholders is one approach to obtain such data. A complementary approach has been called effectuation (Sarasvathy 1996), not analyzing an environment but taking action to create information and reveal latent opportunities.

3.2 A Customer-Centered Mapping Tool and Methods

User driven innovation methods (Steinhoff & Breuer 2009) provide a consistent customer focus transform the mapping of prevalent ideas into trigger for the value driven generation of innovative business models. Thus, they work against the natural tendency to map conventional ideas and old business models onto new technologies and solutions, and help to explore and elaborate upon innovative business models providing real value. We start with the future customers and the value created for and with them, two sides of the initial coin. The second steps addresses customer needs and value creation by means of customer touchpoints and user experience (comprising not only channels and relationships but also holistic aspects including product expectations and emotional bonds) and revenue structure. Finally solutions and operational costs are covered including (dynamic) cost structure and dynamic capabilities of the company, and key partner relations.

1. The value proposition addresses the use value that an innovation satisfies. The notion of value has a long history in philosophy, sociology, psychology before taking over the business world. From a customer perspective we focus on the usage or use value and its resulting benefits, and the exchange value representing the sacrifice a customer is willing to make. The usage value not only contains the functional utility, or what something can do, but also more personal values such as self-expression or social influence. Through these business is linked to the existential needs and motivations for different groups of people, and thereby the existential reason for the whole endeavour, the job to be done. The initial value proposition is often based on expected benefits of a new technology or configuration, but the initial guess is rarely the best to establish strong links between value and proposition (Rorhrich & Lierna 2011). Deep dive methods include the Basic Driver Analysis, Futures Workshops and Attribute Value Maps.

2. Customer segments refer to archetypical personas or target groups of people. Beyond the usual demographic, attitudinal or psychographic segments of people one may also start from individuals or stereotypical personas (Cooper 1998) as chances are good that if one customer is served perfectly the offer is likely to fit for others as well. Value proposition and segments highly depend on one another; the most interesting target segment for a seamless aid for elderly may be their mid-aged sons and daughters wanting to be caring kids.

3. Customer Touchpoints: Users encounter new products and services along seven touchpoints. Spreading the word to get the proposition known customers become aware of an opportunity, inform themselves about tradeoffs, acquire what they choose, start-up new devices, applications and services, and they use, change, and drop or renew them (Rogers 2003; Breuer et al. 2009). Investigating touchpoints we intend to stress the customers’ perspective and interactive value creation more than a distribution of industrial good through marketing and delivery channels such as postal or online delivery, or live events. Touchpoint analysis and customer journey are proven tools for deep dives. While touchpoints deal with the product entering and living in the world of customers, complementary distribution channels may be addressed: the companies view how to get there. Beyond classical delivery channels online and mobile mediation, and intermediaries such as agents, retailers, and wholesale need to be considered.

4. Revenue Models: They describe how value is realized by the firm; including pricing models such as fixed and variable pricing (to the value) on an individual or subscription base (see Popp 2011). Here as with the other fields on the value driven side of the map blue ocean analysis (Kim & Mauborgne 1997), informed by previous domain research into industry benchmarks may lead to new approaches.

5. Capabilities include resources & skills, activities & processes. Various taxonomies of organizational resources are available. Since intellectual capital and intangible assets play a major role not only in the recent literature but also in information and technology intellectual performance drivers (Marr, Schiuma & Neely 2004) are likely to play a pivotal role (and may be used to dive deeper into the topic). In addition to hard and soft skills needed with the teams on a steady or temporary basis activities and processes may be addressed here. Learning from other brands, companies, and business model patterns critical capabilities may be identified.

6. Partnering: Thinking about value networks and potential assets and input that may be outsourced partner relations come into play. New win-win situations with potential suppliers and business partners need to be invented. Co-innovation may be required with new alliances. In the MagiTact project we successfully worked with stakeholder maps in order to sketch out potential partnering networks.

7. Cost structure: Summing up the cost-drivers of the model initial costs and their development are considered. Operational expenditure (OPEX) for ongoing expenses such as legal or software licensing fees, advertising and supplies, insurance and utilities, and capital expenditure (CAPEX) such as investments in infrastructure and acquisitions of equipment need to be considered and might provide chances for saving.

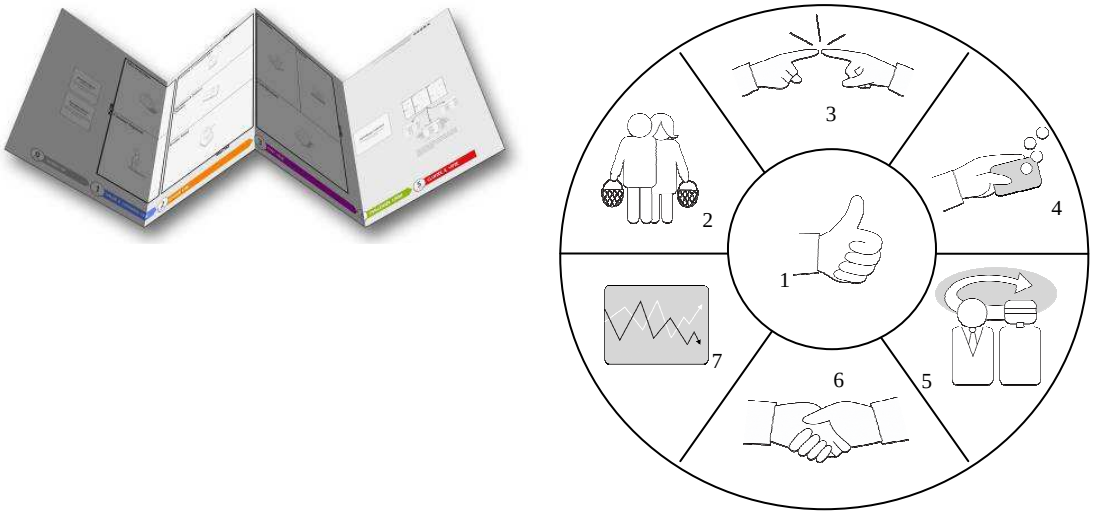

Figure 1. User-centered mapping tools for ideation with value and personas as key and starting turning points. The wheel (right) fosters thinking in relations and may be used on a table. The playground (below) may be used on a wall (below). Minimum required fields are: value proposition (1), customer segments (2), customer touchpoints (3), revenue model (4), capabilities (5), partnering (6) and cost structure (7).

4. THE CASE OF MAGITACT

The user-driven business modeling framework was developed through a number of business modeling projects conducted since the beginning of 2010. They addressed new business potentials around information card technologies, new voice logging products, identity management, and touchless nearfield communication. Due to its uncontested market space the latter project provides an outstanding case to demonstrate key aspects and methods of our approach. In order to understand the base line and challenges we briefly describe the MagiTact technology before going into the business modeling case.

4.1 Touchless Gesture Based Interaction using an Embedded Compass

To overcome the limited size of the interaction space in small mobile devices, Around Device Interaction (ADI) techniques have been introduced. They extend the interaction space beyond the physical boundary of the mobile devices. As most vision-based ADI methods suffer from the lighting conditions and environments changes we propose a touch less gesture-based interaction framework based on magnetic field. Magnetometer, originally embedded for the navigation purposes, measures the strength and direction of the magnetic field. It can sense slight changes of the device orientation with respect to the Earth's magnetic field. Such magnetic field can be deformed due to the movement of any local magnet in the vicinity of the device. If a user takes a properly shaped magnet in hand and makes 3D gestures in the space around the device, the movement of magnet changes temporal pattern of magnetic field sensed by the embedded magnetometer. These temporal patterns can be used to establish a touch less interaction framework, independent from lightning variations and obstructing materials. This property is useful especially when the device is held by hand or is in a pocket or bag. Interpreting signals at the output of the magnetometer is far less complex than applying computer vision techniques. Integrating the cheap, tiny magnetic sensor does not impose major change in hardware and physical specifications of even small mobile devices.

We have investigated the application of our proposed magnetic based interaction to infer simple user gestures by monitoring the movements of the magnet held in the user's hand (Ketabdar, Yüksel, & Roshandel, 2010). We have designed and implemented several applications based on the proposed magnetic interaction framework for mobile devices as proof of concept and in order to show the wide range of potential applications. The applications are ranged from general gestural interaction with computing devices to text (digit) entry, 3D signature (3D Magnetic authentication solution), and entertainment applications.

4.2 Modeling New Business for Touchless Nearfield Communication

The MagiTact Business Modeling project started in 2010 with an innovative technology and interaction paradigm looking for a promising business model. Only rough ideas existed on how to use the touchless nearfield technology, and the project team defined as its goal the generation and evaluation of new use case scenarios and business models for touchless near field communication (NFC). In order to come up with promising usage scenarios, value propositions and business models, we started with an extensive desk research and an ideation workshop with lead users. Within the desk research we reviewed recent developments on touchless NFC devices, applications, and contexts. Results showed that the few studies regarding 3D gesture control focus on technological aspects, but also demonstrate the usefulness of gesture-based device control especially in the context of consumer electronics. Within the ideation workshop more than 60 ideas were generated including 10 top rated ideas. Three ideas were prioritized to be evaluated by customers in an online study and to set the basis for a business modeling workshop.

- Silent Reply: With the help of a gesture you signal a caller that you are busy or do not want to be disturbed. You may indicate in how many minutes the call will be returned.
- Swipe a dime: A safe authentication of payments is a unique gesture. Two devices are needed: One communicates the amount to transfer, the other one issues the transfer after the swipe.
- Smart controlled home: MagiTact allows you to control almost everything in your home via gesture-based interaction e.g. switching on and off lights or moving the vacuum cleaner.

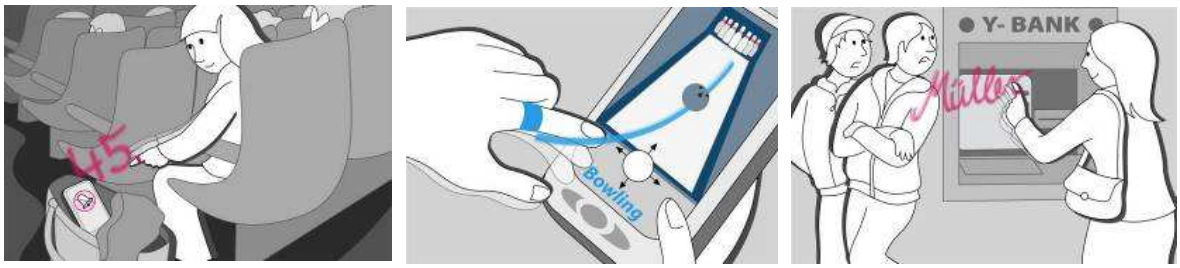

Figure 2. Illustrations for silent reply, gaming & payment from the usage scenarios as basis for business modeling

Deep dive methods included attribute-value mapping for the value proposition and stakeholder mapping to explore value networks and identify critical partner relations. Exemplary cornerstones include:

Silent Reply market introduction may be based on three steps:

- 'Light Version' for free to try MagiTact technology & 'My favored magnet Competition' in addition.
- Multifunctional 'Premium Edition' & additional magnetic devices in collaboration with partners.
- Software Development Kit for licensing.

Gaming:

- Game for free to demonstrate the features; distributed through special interest magazines.
- Software Development Kit for a developer contest to create new games and to acquire first licensees.
- Revenue arises from licenses to game developer firms.

Invisible Signature:

- Focus on B2B (vendors, banks and developers), but based on providing unique value to end users
- Preconditions: market preparation, customer education.
- Revenue arises from licenses to system providers, transactions or fixed fees for small and medium enterprises and subscription fees for end customers.

4.3 Interaction between Business Modeling and Technological Development

For the technical team, the main influence from the user driven business modeling workshops was to get a deeper understanding of the entertainment potentials of the MagiTact technology – multiple ways to entertain customers and to market the product could easily be identified and discussed. Additional reasons to believe in the entertainment potentials were found in the data drawn from the domain research and experts in the business modeling workshop. Still, deepening the understanding of the target group it was also worked out that initially focused gaming or even niche markets need to be addressed to generate a timely return on required investments and capital expenditures and thus a market proof of concept. Within the entertainment field both gaming and mobile music synthesis applications provoked several usage ideas and business potentials. Based on the feedback and experience in the workshops the team pursued the entertainment aspect as a business case with three major outcomes: First, the team was offered to setup a spin off based on MagiTact results for gaming and music synthesis. The final market approach is still being discussed. Second, the invisible signature concept and its rough B2B business model was handed over to other teams working on future payment and authentication systems. Finally we developed a new tailored series of entertainment cases, mainly in the form of what we call as "AirGuitar" (as iPhone application and as real instrument) and "AirDrum", along with other similar cases. The AirGuitar, AirDrum and other Air Instruments (Ketabdar & al. 2011). The work on AirGuitar has received full positive feedback in scientific forums and well as business cases, and also covered by media.

5. CONCLUSIONS

Experiences from the MagiTact case and more than a dozen other modeling activities showed that the proposed framework is easy to handle and understand for developers and entrepreneurs not coming from a business background. Focusing on developing a viable business model we learned that it also helps to create a common ground or shared understanding of the fundamental assumptions within teams regarding the purpose and usage scenarios of technological developments and new service ideas. It may be applied to a wide range of ideas, concepts or technologies trying to evolve into valuable markets. Its flexibility allows to either dive deep into single aspects (as typically needed with respect to the value proposition and value network), or to analyze the interaction of elements and take the first steps into real options and markets. However, while the entrepreneurs we worked with, but also most of the related literature happily engage in the creative development of new models, one issue that has been widely neglected in the resolving of conflicts that naturally result from the implications of new models – within the entrepreneurial team or the larger corporation and its related and competing business streams. Regarding such internal issues and the proof of concepts on the marketplace only repetitive, applied experimentation overcomes the barriers and engages in the potential initial, alternative business model hint to.

Only live entrepreneurial engagement may capture the value new models promise. Future research should address the development of refined tools and benchmark measure for experimenting with and driving real markets and analyze entrepreneurial patterns and turning points during these first steps. “A mediocre technology pursued with a great business model may be more valuable than a great technology exploited via a mediocre business model” (Chesbrough 2010). At the Laboratories we have the chance to start with great technologies, and end with superior models. The success of this endeavor depends on iterative experimentation and cumulative learning that cannot be delegated or externalized.

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