
WHITE PAPER

Co-innovation and the ABB Drives experience





Connect, Collaborate, Commercialize

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1. Introduction

Digitalization is hastening the pace of technology development, forcing companies to assess and engage with an ever-widening set of potentially disruptive topics, from artificial intelligence to blockchain and quantum computing. To remain competitive, incumbents such as ABB must become more agile, proactively engaging with external players to increase the speed and effectiveness of their own innovation programs.

Innovation is at the core of ABB and many of the technologies that underpin modern society were pioneered by ABB since its founding over 125 years ago. In addition to a \$1.5B annual R&D budget and a global network of corporate research centers and software development centers, ABB has long supported open innovation – the process of searching outside a company’s walls for technology and solutions that will keep the enterprise well ahead of its competitors – working with leading universities and labs around the globe. Both a complement and accelerant to this broader open innovation platform, corporate venturing – or CVC – has become an increasingly important R&D tool in ABB’s quest for growth.

Nearly a decade ago, ABB established its strategic corporate venture capital investment arm, ABB Technology Ventures (ATV). ATV serves

the innovation needs of all of ABB’s businesses, scouting for, engaging with, and ultimately investing in a subset of startup partners from which ABB can benefit strategically. Emergent models such as SynerLeap, an innovation growth hub and startup accelerator located in the heart of the ABB Corporate Research Center in Västerås, Sweden, serve to quicken the pace of startups working with ABB and to fill the deal funnel for ATV investments and for the ABB business units hungry to engage with fast-moving, entrepreneurially-minded startups.

This paper shows how ABB’s Drives business, one of the business units (BUs) within ABB’s Robotics & Motion division, works with and complements ATV to achieve ABB’s full digitalization potential. The paper explores how the BU’s co-innovation model, **Connect, Collaborate, Commercialize**, or **CCC** for short, has introduced an effective and promising mechanism for engaging with highly relevant startups and maintaining the energy and momentum in working with them from initial contact through tactical collaboration. Programs such as CCC should then be considered as critical tools in the innovation arsenal for companies such as ABB and expanded to encompass additional BUs and broader forms of startup collaboration.



2. Context

ATV targets \$50M USD annually in startup investments. Since its founding in 2009, the group has invested in nearly 30 startups spanning a range of sectors relevant to ABB – including robotics, industrial IoT (Internet of Things), machine learning, distributed energy and smart buildings – and hailing from North America, Western Europe, Israel and China. ATV also invests in strategically aligned venture capital funds which, like SynerLeap, expose ABB to an even broader set of startups.

While these venture investments are structured much like traditional VC investments and deliver to ABB the promise of best-in-class financial returns, it is more important that the investments offer tangible strategic value to ABB. This can come through enhanced understanding of a new technology like additive manufacturing or blockchain, delivering to ABB an early glimpse of a new sector – such as drones – where ABB may want to participate, challenging internal thinking, driving product pull-through, or simply filling a portfolio gap and helping ABB get to market faster.

Whether the extraction of strategic value begins prior to the ATV investment or as a result of the investment, the rule always applies: ATV cannot invest without a clear and convincing strategic narrative for how the startup will drive synergistic value with ABB. Once ABB approves an investment and that company or solution becomes part of the active ATV portfolio, ABB supports and mentors them, often via a combination of ATV investment professionals, R&D and business unit personnel (depending on the stage of the startup), and a new set of startup ‘concierges’, Startup Collaboration Leads (SCLs) who act as key account managers to help the startup navigate and engage with ABB. Through this battery of technologists and engagement specialists, ABB assists with technology road-mapping, refinement of business model and finding product/market fit. ABB also assists directly with deeper technology development, giving the startup access to ABB’s R&D bench, and making introductions to ABB customers and partners. This helps them become commercially viable faster.

From the outset of working with potential investments, ATV and other ABB venture programs act as a bridge between the startup and the key

ABB players: global business and technology managers, any of ABB’s seven corporate research centers, as well as local and global business units, sales groups and product groups. This ensures that there is a full alignment of expectations and goals and maximizes the ease with which a smaller company can tap into global network of ABB expertise and resources.

In addition to ATV investments, there are many other venture initiatives run at ABB, either within an ABB business unit or at country level. These initiatives mainly focus on tackling a certain challenge that an ABB business is facing and seeks help for through open innovation. One example of a venture initiative sits within the ABB drives business; its ‘Connect, Collaborate and Commercialize’ (CCC) venture program takes on the challenge of increasing the intelligence or connectivity capabilities of variable speed drives (VSDs) or they way how they are operated.

VSDs, developed by ABB in 1969, adjust the speed of electric motors to match the actual load they must handle, rather than having the motor run at full throttle regardless of load. The result was a dramatic reduction in power consumption – typically by around 50 percent in pump, fan and compressor applications – and a considerable improvement in process control.

Alongside millions of motors, VSDs run everyday operations supporting today’s society – from getting water from a tap to air conditioning of commercial and industrial buildings, to running process equipment in manufacturing plants. The CCC program aimed to find solutions which may include improving the design, use and operation of VSDs or finding entirely new use cases for them.

As the largest supplier of industrial motors and drives, the largest provider of generators to the wind industry and the largest supplier of power grids in the world, the ABB network is a powerful asset for a startup at any stage. ABB helps companies in rapidly accelerating their paths to the commercialization of products and services through access to ABB’s R&D manpower and facilities, global sales channels and wide-ranging partnerships.

3. ABB drives business and co-innovation

Rapidly evolving digital technologies, increased connectivity via Bluetooth and Wi-Fi, and lower costs for components are fueling a strategic transformation in the industrial manufacturing sector. As a major player in this arena, ABB understands how important collaboration and innovation are when it comes to dealing with this faster pace of change, and the new business models and diverse customer requirements that are emerging as a result.

With technology developing at break-neck speed, it is important to be able to assess and advance collaboration projects faster than ever before. But the speed required to innovate with startups can be at odds with decision-making processes in corporations. Successful collaboration requires startups to move beyond their view of corporations as slow, and corporations to move beyond their opinion that startups are risky.

Traditionally, drive technology has followed a classic internal path of research and development. ABB's drives business has long been the market leader, but digitalization raises some key strategic questions:

- What is the role of drives in an increasingly digital future (connectivity, data, usability)?
- How do we deal with the impact on our industry of lower-cost technologies from consumer domains (sensors, chipsets from consumer electronics)?

Although ABB has found some of the answers to these questions within the organization, historically its capabilities and strengths have not been in the digital domain, and our industry structure and value chain for product manufacturing has been quite insular. ABB knows that to achieve the full potential of its drives, it needs to work with innovators and entrepreneurs around the world.

In its interactions with startups (regardless of the technology domain areas), ABB drives business found common trends. All ventures needed revenue (through sales), funds (through cash investment) or some form of business support to help grow their firms. A variety of different options available to startups for **funding, support and sales**, depending on the development stage and needs of the venture, are outlined in illustration 1. In some instances, they need a combination of all these levers.

In result, ABB discovered that there was also a need to provide sales and later stage support for ventures. ABB drives business therefore chose to position its Connect, Collaborate and Commercialize (CCC) program (see next page) as a model to engage ventures who were seeking sales and later stage support.

To work with new startup companies, we split the approach into three key steps.

Step 1 – Connect: How do we position ABB as the desirable corporation for startups? How do we scout for the most appropriate ventures? How do they find *us*?

Step 2 – Collaborate: How do we contract with ventures? How do we develop mutually agreeable motives and projects for collaboration? How do we manage the evolution of the relationship? How do we make the collaboration work?

Step 3 – Commercialize: How do we pilot and test an idea in the market?

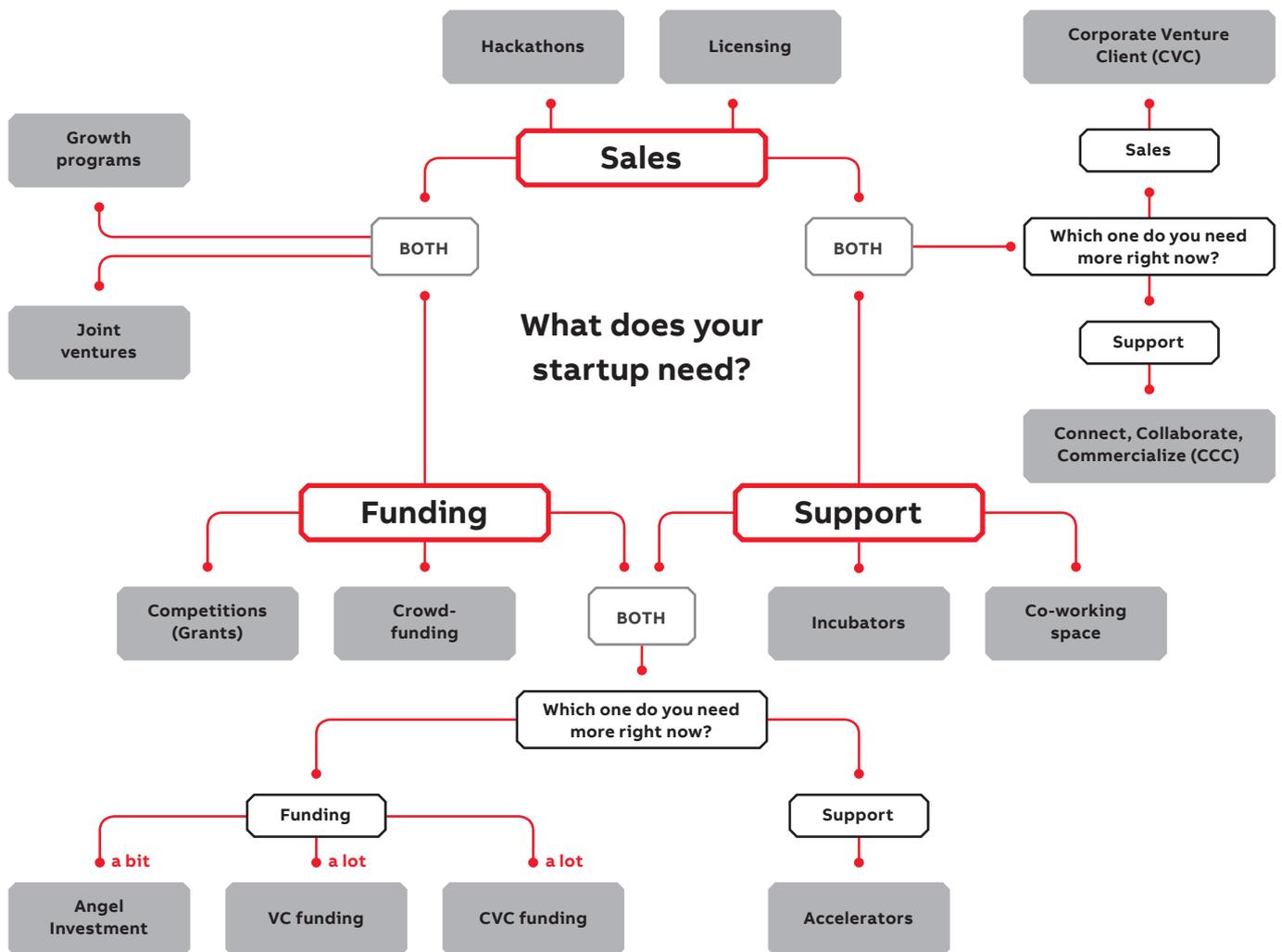


Figure 1. Customer view of corporate-startup collaboration models

Connect

ABB connects with startups via its partnerships with universities and other educational institutions, among others. ABB also engages in social media outreach programs to find suitable candidates for the challenge it seeks solution for with startups.

Collaborate

ABB has technical and commercial centers of excellence across the world, including in Silicon Valley, Helsinki, Beijing and Bangalore. From the outset, ABB drives business chose to make use of this global expertise as part of the collaboration support program.

Commercialize

ABB works with ventures by adopting one of the two strategic paths: to implement a solution to ABB’s own business to improve operational efficiencies, or to commission a solution to ABB’s offering portfolio. The path taken is evaluated case-by-case with each venture and in commercialization phase the project is executed as any other business project at ABB.

The focus of this paper is on the **Collaborate** aspect of the ABB drives business’ co-innovation program. Co-innovation needs to be aligned with a corporation’s strategy if it is to gain the support of senior executives across the business and be successful. The key strategic themes for ABB drives business in an increasingly digitalized future are artificial intelligence, connectivity, and enhanced human interaction.

4. Considerations when identifying ventures for collaboration

The innovation team comprising of ABB staff and Venturebright, an innovation advisory firm, worked closely with the participating startups to create specific and actionable collaboration projects. We conducted working sessions and identified a series of key considerations to identify the best innovators with whom to work. These included:

- Clarity of goals (corporations and startups must agree on key strategic themes)
- Joint plan development
- Find balance on commercial agreements
- Carefully manage stakeholders
- Obtain internal corporate support
- Have a sponsor.

4.1 Clarity of goals

At the start of collaboration there is often limited information and it isn't easy to know how far a partnership will progress. In the first few interactions with the participating ventures, ABB explained the complexities and potential of its business and markets, and how it created value.

ABB also encouraged the ventures to challenge it and find better ways to navigate the strategic path ahead, particularly in new digital domains where our operating model was less developed. In this way, both ABB and the ventures clarified their specific and joint goals into a collaboration project within a timeline that suited both parties.

4.2 Developing a joint plan

ABB and the participating ventures learned that it was essential to discard the 'us' and 'them' mentality and to accept that they were in this together and equally responsible for any success or failure.

To help identify mutually suitable opportunity areas, both groups viewed the collaboration as an extension of ABB's own capabilities and its capabilities as an extension of the startups'. A key tool in enabling this was the creation of a joint collaboration plan for a pilot with the venture. This plan clearly laid out the basis for collaboration:

- the opportunity or problem we were trying to solve in the pilot project
- its strategic growth relevance for both ABB and the venture partner
- clear KPIs on what success should look like.

4.3 Striking a balance on commercial agreements

This can be a difficult and time-consuming element of any venture collaboration or engagement program. ABB realized the importance of registering startups in a corporate procurement system with a simple and initial contract of work, which made it easier to implement a more complex project at a later stage.

ABB and the ventures also learned to make all processes for collaboration simple, standard and modular, and to ensure clear processes that are easy to communicate. Using 'light touch' contract terms and conditions in the initial stages facilitated quick progress.

4.4 Careful stakeholder management

Stakeholder management focuses on the buy-in and sponsorship from key departments and individuals within the corporation, such as sourcing, marketing, product or R&D. However, ventures come with an entire eco-system of additional stakeholders that can have an impact on the collaboration.



Among these are lawyers, universities, and other technology partners that the startups are involved with and, of course, investors in their venture. It is essential to understand this influence from the start. For example, some of the intellectual property held by a venture might be shared with a university.

4.5 Internal support

Every collaboration requires a different level of internal support and it is helpful to think about when different skills might be needed at different stages of the collaboration. Key questions to consider are at which point and how much involvement is needed from functions such as legal, procurement or technical R&D.

Working with a startup venture is often new for these corporate functions, so it is helpful to make them aware as early as possible of the ultimate goal of the venture. For ABB, providing early

visibility to these departments was a key enabler in successful outcomes. It meant that much of the administration and infrastructure was in place before starting the actual project.

4.6 Having a sponsor

For each collaboration project, ABB sought to find a project sponsor within the corporation who acted as the single point of contact and who remained with the venture throughout the journey.

One of the key frustrations for new ventures when engaging with a corporation occurs when significant time is spent developing a personal relationship with an individual, only for that individual to leave the company or transfer to a new role, resulting in lost momentum. The corporation should ensure that there is continuity of commitment from the people involved in the collaboration.



5. Introducing ‘Connect, Collaborate and Commercialize’ program

The joint team from ABB and Venturebright applied the approach for ABB drives business and framed the **Connect, Collaborate and Commercialize (CCC) program** as an innovation challenge, with success at each stage being rewarded by progression to the next level of the relationship.

ABB launched the program at SLUSH 2016, one of the world’s major startup events and articulated its offering clearly as can be seen in Figure 2.

The program consisted of three distinct steps, each one contributing to the common goal of accelerating the process of bringing an innovation to market. Reaching this goal in turn accelerated the rate at which new value could be achieved.

5.1 Connect

ABB launched a focused, systematic, rigorous outreach and social media marketing campaign to engage its audience. The application period ran for two months and ABB received almost

a hundred applications during that time ([see this blog post](#)). ABB and its Venturebright partners identified three core challenges facing the next generation of drives and controls:

- **Connectivity:** There are as many connected devices as people on the planet. New ways are needed to securely bring all industrial devices into the connected conversation. Innovation will involve industrial sensors, networks of devices, or new cost-effective wireless technologies.
- **Intelligence:** There has been exponential growth in the volumes of data produced by people, machines, sensors and devices. However, this data needs to be transformed into insight and action. Innovation will involve making sense of data to predict future events.
- **Simplicity:** Innovation will mean simplifying the installation, operation or maintenance of drives and motors in industrial settings. It will include the delivery of “plug-and-play” technology to simplify the user experience or the way that humans interact with machines.

Figure 2. Elements of an ABB offer from the campaign site

What's in it for you?

Successful applicants will be invited to pitch their ideas and prototypes directly to ABB Drives and Controls at a live pitch event in April for the opportunity to be selected to receive an IdeaHub offer.

<p style="text-align: center;">Funding</p> <p>Investment in return for a share of equity - the level of funding will be based on what it takes to get your concept or business to the next significant milestone</p>	<p style="text-align: center;">Drives and shared lab space</p> <p>We can provide access to industrial drives to further test, refine or prove your solution - we can also provide access to world-class technology experts and provide shared lab space if required</p>	<p style="text-align: center;">Venture support</p> <p>Benefit from the advice and expert support of an experienced technology team to develop and accelerate your concept or venture towards funding and revenues</p>
<p style="text-align: center;">Market Access</p> <p>If you are ready, we can provide support to access global markets or provide direct access to customers for in-market testing or initial sales.</p>	<p style="text-align: center;">Funded concept sprint</p> <p>If relevant, we can help frame and fund a focussed concept acceleration sprint to help your technology break through to the next level.</p>	

5.2 Collaborate

The CCC program selection involved interviews with the applicants and a screening process with wide scoring from within the business to ensure the finalists offered the most strategic fit. As part of this, 10 finalists were invited to a day-long session with the management of the ABB business unit. Startups gave presentations, received feedback and engaged professionally and socially with the corporation.

Six ventures were selected after this session and collaboration with them began. The cohort proved manageable in size with respect to initiating projects and agreeing targets. The global diversity of people and approaches was evident during the common working sessions, with participants from across the west coast of the United States, and throughout Europe and Asia.

Projects with all six ventures began within three months of the first meeting with management.

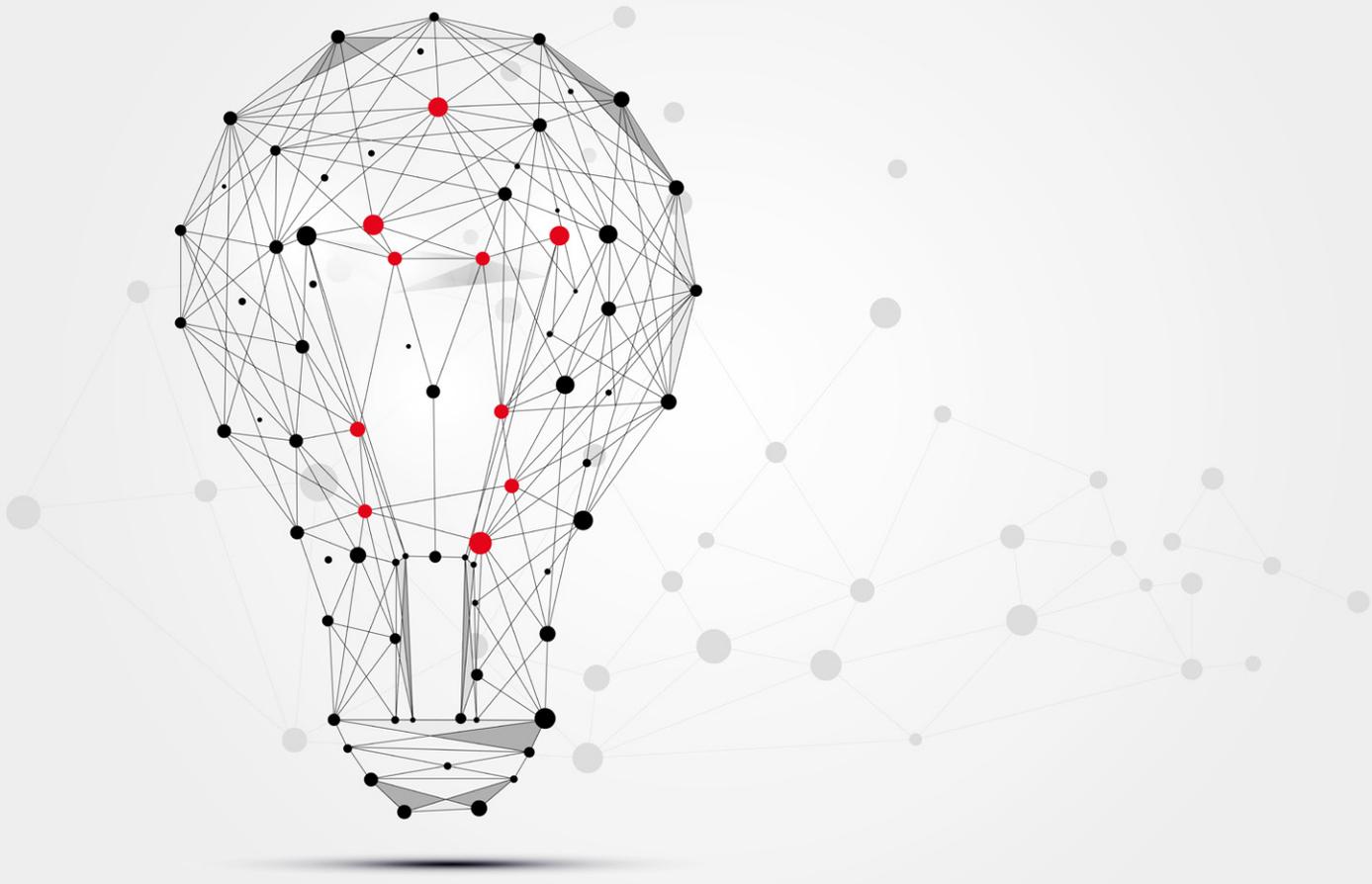
Each project was assigned an executive sponsor, a business unit management team member from the presentation day and a project manager with the necessary resources internally. From each of the startups, the founder or CEO who had the connection to the sponsor at ABB was typically involved, as well as a project manager with the venture team working with the ABB team.

ABB eventually initiated seven projects but later stopped two of them. One of the projects was discontinued because ABB could not see a way forward to fit the project's outcome within the ABB group hierarchy as a similar solution was being developed in-house at headquarter level. This experience highlighted the importance of identifying the 'use case' first – in other words, understanding where the solution will fit within the corporation.

After all the initial projects in the collaboration program had finished within around six months, ABB continued with two of the ventures to implement them.

Figure 3. ABB Drives' CCC cohort 2017 in numbers





5.3 Commercialization

When a collaboration enters into commercialization, new set of rules apply. On the corporate side, there is a need to balance with the project portfolios, priorities and alignment on many fronts. Rubber hits the road when positive outcome of a pilot needs to be implemented in real operations with possible changes in everyday behavior. On the startup side, this may be seen as a delay and inability to take decisions. Going forward with the implementation, terms and conditions of the relationship also need to be agreed on. It is worth taking into account that aligning all these aspects does take some time even when facilitated by a program such as ABB drives business'.

At the time of writing, ABB is in the process of implementing the first solution through the CCC program into drives service operations. Artificial Intelligence will help in identifying reasons and right containment action in case of a faulted equipment.

5.4 ABB drives business' co-innovation example: collaboration towards use of Artificial Intelligence

Artificial Intelligence (AI), machine learning, and deep learning are all subject to inflated expectations for emerging technologies.

Two of the ventures in the 2017 collaboration cohort offered a solution based on AI. ABB drives business sought to explore through the program how it could benefit from these proposed solutions and whether it could help the startups in question create value in this still largely unrealized domain.

Working with the team from ABB, the two ventures embarked upon a use case of failure root cause analysis and support. For the first POC, ABB framed the following problem statement: How can AI help identify a cause of failure and restore customer production faster and more accurately? This statement was chosen because it was a pressing business issue for ABB and an area where ABB had the volume of data required to make an AI project meaningful.

The POC project ran for approximately three months. One of the biggest learnings for ABB was around the operational changes ABB needed to make to fully extract value from the data. Much of ABB's historic data was in different formats and had been designed for inspection and interpretation by human beings (rather than machines). That said, both ventures provided great value in speeding up fault diagnosis and ABB is now discussing with one venture of the future commercialization of their technology.

6. Learnings from the CCC program

ABB drives business' experience with the CCC program provided useful insight into how co-innovation could be successful. Collaborating with startup ventures and participating in open innovation can be challenging and you may wonder whether you should persevere. Here are some learning points:

6.1 Become a corporate innovation entrepreneur

It is important to uphold organizational values, business ethics and to operate in line with organizational goals. However, be prepared to take calculated risks. Existing corporate structures and systems are not conducive to external co-innovation and practices might need to be tested.

The prevailing view in corporations can often be: we can do better in-house. Resist this and keep an open mind to how co-innovation can bring new value to a business by adding solutions faster. However, any decision to change course must be based on facts about market traction, actionable metrics and ideally, feedback from customers.

6.2 Have a winning sales pitch

As a corporation, having an engaging and winning sales pitch is critical to effective collaboration. Corporations embracing the open innovation mindset need to attract startups. Innovative entrepreneurs often seek a big disruption in the very market the corporation is active in. We learned that there were a number of key elements to any successful sales pitch to a venture:

- Highlight the benefits of scale
- Value their time
- Share the challenges
- Understand the value of support.

Lets examine each of these in more detail.

6.2.1 Highlight the benefits of scale

In the case of industrial manufacturing, the systems are large and complex. No single, small company without the economy of scale can address or change these systems alone.

The scale benefit of a large corporation means that it can help the startup create a bigger system impact – the disruption they aim for.

6.2.2 Value their time

Time is the most limited resource a startup has. A good business model and a decent product can attract some funds and people but nothing replaces the time they spend with an account that asks them to do a lot without giving anything in return. Working with large corporations can be slow and sales cycles long. Corporations can also resist actions that might outbalance their status quo of market leadership.

Having a structured collaboration means that the time the startup invests will be worthwhile and not wasted. Corporations need to bring benefits far more quickly in terms of sales, investment or support to show traction within this limited time frame.

6.2.3 Share the challenges

Startups can see their role as providing technology to be developed and incorporated into a large company's portfolio. However, the larger and well-established company may want a market-ready solution. This gap can be significant and startups often don't appreciate the time and cost involved in moving from proof-of-concept to fully-supported product.

Conveying this gives the startup real market and commercial experience that is far more valuable than investment alone. Using the corporation's technology strategy or roadmap to position the startup's solutions within the broader range of activities would show what else is needed to bring the technology to market, and how this need may change over time.

6.2.4 Support is more valuable than investment alone

Offering ventures access to market with support is perhaps single most important factor for success in co-innovation program. Corporations need to present themselves as more than just a sales channel for the startups solutions.

7. Conclusion

Today, businesses such as ABB face a choice: disrupt or be disrupted. Taking an active approach and seeking to disrupt requires a rethinking of a corporation's new products, services and business models, as well as adapting behavior to the startup way of working.

Corporations have many options available when it comes to collaborating with external innovators. Far too often, however, corporations merely pay lip service: lofty plans, laid out in vague terms and soon forgotten. This paper has explored the ABB drives business' experience of the **CCC program**, while presenting a framework within which to establish a co-innovation program:

1. What do you want to achieve?
2. How do you attract the best innovators?
3. How to successfully execute the program?

ABB executed its **CCC program** according to this approach with concrete results and endorsement from both the business and participating ventures. The program consists of three distinct steps, each one contributing to the common goal of accelerating the process of bringing an innovation to market. Reaching this goal, in turn, accelerates the rate at which new value can be achieved.

ABB drives business believes that strategic alignment and business stakeholder management can help maintain the momentum from the initial contact between a corporation and a startup through to the collaboration phase. We believe that the **CCC program** model is a highly promising and effective model of corporate-startup collaboration within the wider discussion of corporate innovation management.

About ABB

ABB is a pioneering technology leader that is writing the future of industrial digitalization. For more than four decades, we have been innovating digitally connected and enabled industrial equipment and systems. Every day,

we create improvements in efficiency, safety and productivity in utilities, industry, transport and infrastructure. With a heritage of over 130 years, ABB operates in more than 100 countries and has around 135,000 employees.

About the authors



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Tanvir Mufti is a founding partner of Venturebright, an innovation advisory firm. A key part of Venturebright's work is enabling connection and collaboration between large corporations and startup ventures. Tanvir has worked with several FTSE 100 and Fortune 500 companies in different industries to help them navigate this path.

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