

How Midsize Companies Can Compete in AI

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Summary. Artificial intelligence (AI) as an upcoming general-purpose technology is poised to create many new business opportunities and to disrupt entire industries. Startups and large corporations are seizing AI opportunities and strengthening their position. But what about midsize companies that often lack access to big data and AI talent? These midsize firms risk being left behind in the age of AI. As a remedy, these firms should consider pooling their data and talent in joint AI ventures.

In the upcoming age of AI, two very different classes of companies appear well-positioned to leverage AI's capabilities: startup ventures and multi-billion-dollar giant corporations. Promising AI startups are being launched at an increasing pace in areas like health care, finance, retail, media and cross-industry tech, to name a few. And alongside tech giants like Google or Microsoft, traditional large corporations are employing AI to digitalize their business model and processes. Examples of AI-driven automation and augmentation range from automated customer loan approval and smart infotainment systems at car manufacturer Daimler to predictive maintenance at oil and gas behemoth Shell and AI-assisted medical image reading at industrial manufacturer Siemens. Corporate AI innovation is fairly concentrated with the top-10 patenting firms in the world accounting for more than 15% of AI patents in the period 2011 to 2016.

These two breeds of companies — startups and giants — are also building strong partnerships in the field of AI. A recent study reveals that, while in 2013, AI startups were rarely targeted by corporate venture capital (CVC) investment, only five years later these AI startups received more than \$5 billion in CVC funding (approx. 10% of all CVC investments). While much of this money is coming from Asian and U.S. tech giants, like Baidu and Google, big non-digital corporations are increasingly making such investments to access startups' AI talent. Big data and AI talent (e.g., data scientists, machine learning engineers) are two of the most critical resources for building successful AI applications. By combining the innovative talent of AI startups with the vast amounts of process and user data held by giant corporations, strong synergies can be created.

In this field, midsize companies — many of whom are family-controlled — have difficulties keeping up. Earlier research documented how midsize firms were already struggling in last decade's winner-takes-all economy. That struggle is likely only going to intensify.

These midsize companies, which have between €50 million and €1 billion in annual revenue, are of sufficient scale and complexity to derive substantial value from an AI strategy, but often lack the data and talent resources to implement such as strategy. Using German firm-level data collected in 2019 by the Leibniz Centre for European Economic Research (ZEW), we were able to gauge how many firms per size category have adopted AI technologies in their business. In a representative sample of more than 6,000 firms across sectors, we found that only about 10 to 15% of midsize firms have adopted AI in their business so far. That's better than the less than 5% of German SMEs (up to €50 million in revenue) that have, but significantly behind the one third of giant corporations with more than €1 billion in annual revenue that are implementing AI solutions.

Considering the importance of midsize businesses for national economies and employment across the globe, it is critical to envision how they can strengthen their AI competitiveness. One lesson we have drawn from our research is that midsize firms should consider joining forces by pooling data and talent in an AI-centered joint venture structure.

How Joint AI Ventures Can Help Midsize Companies

If midsize companies want to thrive in the AI era, they need to look for new ways to compete — including options that they may never have considered before. Pooling data and data analytic skills from across firm boundaries may be one of few options available to midsize firms to remain competitive in the new data-fueled economy. These joint AI ventures can be set up by vertical value-chain partners, horizontal sector partners, or a combination of both. We see three important benefits for midsize companies in setting up such a structure.

First, joint AI ventures can source and organize data from across multiple participating firms to train and deploy machine learning (ML) algorithms for a variety of cost-saving and revenue-boosting business applications. Similar to data integration efforts across the business units of a single large corporation, cross-firm data pooling holds great potential

for midsize companies lacking the large data lakes that giant corporations have access to.

Through data pooling, the vertical approach to these joint ventures can convert a fragmented view of value-chain activities into a cohesive thread, with ML algorithms using rich user data from downstream partners to inform firm operations, or input data from upstream partners to inform dynamic pricing. Likewise, the horizontal approach can exploit partners' pooled data to increase the accuracy of ML-trained back-office systems or the quality of AI-augmented offerings.

Horizontal data pooling can be done by sector partners who are not in direct competition with each other (e.g., serving different geographic areas), but may even make sense for direct competitors whose survival is threatened by big digital players. (We return to this thorny issue of data pooling below.)

Second, it can help address the bottleneck of attracting talent that firms of all sizes, but especially the smaller ones, often face when pioneering new AI applications. Executives have the option of buying off-the-shelf technologies from AI vendors, and for many smaller firms or applications requiring little customization, this may suffice. But as business processes increase in complexity, and AI applications turn increasingly specific and strategically important, an in-house team of experts trained in AI can help develop unique solutions. Indeed, companies that fully outsource AI, and rely solely on plug-and-play AI solutions, put long-term value creation at risk.

Building successful AI applications requires a critical mass of data scientists and ML engineers, who are in high demand — and attracting the necessary talent is particularly challenging for midsize firms lacking the appeal of startups and the resources of giants. By sharing financial resources in an ambitious joint AI venture initiative, these companies will be better able to build in-house AI talent and ML algorithms capable of leveraging unique cross-firm data lakes.

Third, while data and talent pooling are the primary aims of a joint AI venture, at a later stage they also enable wider and deeper startup engagement by connecting a pooled CVC fund to the venture. Numerous novel and disruptive ideas in AI are developed at startups, and many giant corporations have built strong links with these innovation hotbeds, particularly through CVC investments. By connecting an AI-focused CVC fund (like Gradient Ventures at Google) to their joint AI venture, participating midsize firms can pool financial resources as well as technical and business expertise to scan and invest in the AI startup scene.

By offering access to an interconnected network of firms, rather than just a single firm, these joint ventures may also be more interesting partners for startups seeking financial and complementary resources.

Good Agreements Make Good Friends

Data and talent pooling in a joint AI venture is not free of risk. As with any type of joint venture, executives must carefully evaluate decisions along each phase of the joint venture partnering process — including decisions on partner selection, time horizon, invested resources, IP management, performance assessment, and conflict resolution mechanisms. Of particular importance for joint AI ventures is the security and management of firm-level data.

Partners can agree that the joint venture only outputs ML-based predictions to participating firms, but never shares their raw data with others. For instance, partner firms can pool labelled customer loan application data in the joint venture's central database to train and test a deep-learning algorithm. New loan applications would be processed centrally by the trained algorithm, and then the decision to accept or decline would be returned to the firm. In such a model, firm A never gains access to firm B's data but only to the predictions of the ML algorithm trained on cross-firm data. The terms of these agreements should always be formally written down, upfront, in a joint venture agreement.

When negotiating joint venture agreements, including data protocols, for international joint AI ventures, a complicating factor will be (supra)national differences in data regulations. As a case in point, whereas the EU regulatory framework in relation to collecting, sharing, storing, and analyzing user data is relatively strict, companies located in China face fewer constraints related to data privacy. Not only may this put European joint AI ventures at a disadvantage compared to their Chinese counterparts, differences in regulations also create difficulties when setting up joint ventures involving parties from multiple regions. Moreover, in countries with strict data regulations that give users more control over their personal data, things get particularly challenging for midsize companies because users are more inclined to trust large corporations with their data and refrain from sharing it with smaller players. Considering the critical role of well-crafted joint venture agreements and expertise in (international) data regulations, legal counselors will have a role to play in implementing joint AI ventures.

Despite these challenges, the potential benefits of setting up a joint AI venture outweigh its risks. This collaborative approach involves a shift in focus from an individual firm's short-term self-interest to a network- and ecosystem-centered perspective. In the era of AI, it may be better for midsize companies to join a winning team than to try and stand their ground individually. Notwithstanding their collaborative nature, joint ventures allow participating firms to remain largely independent and to continue their legacy — which is of the utmost importance for the many midsize firms controlled by families. Several AI applications have already been introduced, but the biggest opportunities still lie ahead. Midsize companies are not too late to the party!

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