Figure 2 illustrates how RPA and a cognitive tool might work in tandem to produce end-to-end automation of the process shown in figure 1 above. Illustrating the benefits of cognitive RPA, a leading global bank used cognitive RPA to automate 57 percent of its payments work in the highly regulated area of foreign trade finance. Challenges of automating this process end-to-end included the need to work with: highly unstructured data such as invoices, bills, declarations, certificates, and letters; a high daily volume of transactions requiring same-day processing; complex business processes; and the need to interface with multiple core systems. The solution combined traditional RPA techniques with a host of cognitive technologies to automate most steps in the process, reducing the number of full-time staff required to perform the process from 110 to 47.[13]

Other examples of cognitive RPA are appearing in a number of industries:

- Virgin Trains has deployed cognitive RPA to automatically refund customers for late running trains. As customer emails arrive, a natural language processing tool reads, understands meaning and sentiment, categorizes, and then recognizes key information in the text to service the customer quickly and cleanly.[14] From discerning the customer's complaint with cognitive computing to actively issuing the refund with software bots, the entire process has been automated. The cognitive automation solution has reduced daily processing time and manual labor involved in dealing with customer emails by 85 percent.[15]

- A US bank turned to cognitive RPA to automate its billing system and thereby eliminate revenue leakage due to mismatches between rate cards and client invoices. Among a number of challenges for traditional bots, client invoices and contracts were in paper form or PDFs and in multiple languages, and reconciliation between paper documents was manual-intensive and prone to error. The bank utilized natural language processing techniques to scan fee schedules and invoices and translated process requirements into an automated, executable business process workflow, identifying billing opportunities and breaks. As a result, managers uncovered revenue leakage of 9–10 percent; they recovered 3–4 percent.[16]

- A global information services firm has deployed a cognitive automation platform to automatically handle its 7 million annual faxes from clients. The platform's OCR process structures data by converting the document images into machine-readable text. Subsequently, the system uses user-defined rules and machine learning capabilities to extract the data and categorize the faxes accordingly.[17]

RPA vendors embracing cognitive

To extend the field of application of RPA tools, leading vendors are investing in cognitive technologies such as machine learning, speech recognition, and natural language processing.[18] For example, RPA developer Automation Anywhere has developed computer vision technologies and machine learning capabilities in-house. In loan processing, the company has used natural language processing techniques to extract sentiment from supporting documentation in order to establish loan applicants' creditworthiness.[19] UiPath says it is working with cognitive technology tools from third parties, including open-source machine learning libraries, to craft point solutions for clients. Blue Prism's cognitive strategy centers on partnering with cognitive technology specialists. The company has announced a partnership with IBM Watson, with the goal of integrating cognitive technologies into process flows.

While many large enterprise software vendors have begun to incorporate cognitive technologies into their products, and applications of machine learning that provide greater insight to organizations are proliferating, we believe that enterprises have been relatively slow to implement cognitive process automation applications. This is because architecting and building custom solutions based on cognitive technologies can be complex, and the required skills scarce. The growing RPA market is likely to increase the pace at which cognitive automation takes hold, as enterprises expand their robotics activity from RPA to complementary cognitive technologies.

Deploying cognitive tools via bots can be faster, easier, and cheaper than building dedicated platforms. By "plugging" cognitive tools into RPA,