THE BIONIC CUSTOMER SERVICE AGENT AT SIEMENS GLOBAL BUSINESS SERVICES

Sarah Burnett

Siemens Global Business Services (GBS) designs, innovates, and efficiently operates business services for Siemens AG units worldwide as well as external customers. Its portfolio comprises transactional and expertise-driven services – with a strong focus on digitalization in areas like business administration, human resources, supply chain management, sales, marketing, and engineering. In fiscal 2021, Siemens GBS provided business services worth €650+ million for Siemens AG, Siemens Energy AG and Siemens Healthineers AG. Siemens GBS serves its clients globally out of eleven major delivery locations with about 10,000 employees. Siemens GBS headquarters are based in Munich, Germany. For more information, visit www.siemens.com/gbs

Siemens AG (Berlin and Munich) is a global technology powerhouse that has stood for engineering excellence, innovation, quality, reliability and internationality for more than 170 years. Active around the world, the company focuses on intelligent infrastructure for buildings and distributed energy systems and on automation and digitalization in the process and manufacturing industries. Siemens brings together the digital and real worlds to benefit customers and society. Through Mobility, a leading supplier of intelligent mobility solutions for rail and road transport, Siemens is helping to shape the world market for passenger and freight services. Via its majority stake in the publicly listed company Siemens Healthineers, Siemens is also a world-leading supplier of medical technology and digital health services. In addition, Siemens holds a minority stake in Siemens Energy, a global leader in the transmission and generation of electrical power that has been listed on the stock exchange since September 28, 2020. In fiscal 2021, which ended on September 30, 2021, the Siemens Group generated revenue of €62.3 billion and net income of €6.7 billion. As of September 30, 2021, the company had around 303,000 employees worldwide. Further information is available on the Internet at www.siemens.com

THE BIONIC CUSTOMER SERVICE AGENT AT SIEMENS GLOBAL BUSINESS SERVICES

In this case study I describe how Siemens Global Business Services (GBS) uses AI to enhance and augment its customer services. The company has used a variety of technologies to automate its processes, but the case study focuses on what the company refers to as the bionic agent. This is an intelligent solution that uses NLP and is being rolled out to automate the processing of seven million service tickets that Siemens GBS generates each year to track, action and manage its clients' enquiries. The solution was developed in-house using Microsoft Azure Services and is on course to automate 70 per cent of the work involved in handling the customer enquiries that come into the organisation. Its accuracy is already proven to be over 90 per cent, higher than when the work is done manually.

ABOUT SIEMENS GLOBAL BUSINESS SERVICES

Siemens GBS has more than 20 years' experience delivering shared business services to the Siemens group of companies. Today it provides smart and digital services to both internal and external customers. Its current portfolio comprises transactional and expertise-driven services. It employs around 10,000 staff and delivers services to its clients from 11 major delivery locations. These are highlighted in Figure 5.1.

The services that it offers include:

- Finance:
    - Opportunity-to-Cash services including lead generation, sales, order management, cash collection, accounts receivable and after sales services.
    - Purchase-to-Pay services from purchasing to accounts payable and payment execution and supply chain services.
    - Record-to-Report services from finance records to closing reports.
- HR:
    - Hire-to-Retire services from recruiting to retirement.
    - Temporary personnel including contracting and payroll services.
    - Contingent labour administration and management.
    - Lifelong development and learning.
- Business solutions and services that are expertise driven and project-based including technical translation services, communications and logistics services.
    - The logistics business includes delivery management.
- Engineering services to provide technology-based solution design and software engineering.
- Project transformation and consultancy services to provide customers with functional process expertise and deliver operational support out of a project management pool.

THE BUSINESS CONTEXT

As an organisation that started as a shared services centre, efficiency has always been important for Siemens GBS. The means of achieving it have traditionally included labour arbitrage, centralisation of services, specialisation and scale that lead to savings through synergies, sharing of resources and standardisation. Today, there is increased focus on technology as an enabler of efficiency and innovation to drive business outcomes faster whilst maintaining the benefits of the shared services model. To this end, Siemens GBS is increasingly taking advantage of technology. Each year, it runs programmes for service modernisation to improve capacity and straight through processing. The company sees this as a necessity to stay ahead in a world where disruption can happen very quickly. New players can emerge with novel business models powered by technology that quickly capture a share of the market, leaving established corporations in a tailspin as they struggle to modernise legacy systems and service models that are difficult to change.

One of the fields of technology that Siemens GBS has invested in is IA to improve process and service efficiency. In 2019, it took part in *Enterprise Intelligent Automation Adoption Maturity | Pinnacle Model Analysis*, a study by Everest Group (Everest Group, 2020) to identify large companies that had developed best-in-class IA capabilities and were achieving the best outcomes. Everest Group assessed 49 enterprises including Siemens GBS that, after extensive assessment, was judged to be the leader in the group.

Figure 5.1 The global service network of Siemens GBS

Siemens GBS started implementing IA technologies in 2017 and by 2019 it had automated over 450 processes. Examples included an intelligent inventory recommender that used machine learning and predictive analytics combined with RPA to optimise stock levels and subsequently reduce the total inventory value for its clients by more than 30 per cent. It also provided automation of logistics for parts. Other examples include its use of IoT combined with data analytics and RPA to enable predictive machine maintenance, automated invoice processing and IT incident management where RPA robots capture incident information from different systems and create tickets in the service management software.

THE BIONIC AGENT FOR SERVICE TICKET PROCESSING

The scale of Siemens GBS' operations around the globe has resulted in the company having to deal with millions of service tickets generated each year. The service tickets are created following every customer enquiry, be it by phone, email or via other interaction channels. These add up to more than seven million tickets each year. The enquiries come in mostly by email despite Siemens GBS having implemented self-service portals where its clients can access service information and see the status of work in progress. Additionally, it has deployed chatbots provided on the self-service portals to answer customer enquiries. The figure of seven million tickets a year excludes the customer interactions that have been completed by the chatbots.

Another channel operated by Siemens GBS is email provided with function-specific mailboxes, for example for specific finance or HR services. The majority of all enquiries come in through this channel. Contact by phone is also supported. To keep track of interactions and their status and management, every customer contact that is made via the phone is logged in the ticketing system manually by staff.

The bionic agent was developed to automate the process of handling these enquiries; to make the customer services faster and more efficient. How it was developed is described in the next section.

The emails describing the nature of the enquiries have to be read, the context understood and appropriate action taken or planned. These can be simple questions, for example a client asking what the status of a PO is, or they can be more complex, such as an email informing the organisation that a whole chain of approvals is to be updated as a result of personnel changes. Sometimes they come in with documents attached, the content of which have to be read, understood and taken into account when handling the enquiry.

Under the hood of the bionic agent

The bionic agent uses NLP to handle the incoming unstructured data, that is the text in the emails. The bionic agent does what a human would do; it reads and classifies the information in the text. It then interprets the data and, in response, activates the relevant workflow. It was developed in stages in-house, initially in the Purchase-to-Pay (P2P) function to simply identify the exact nature of the incoming request and to send it to the right group of staff for processing. Siemens GBS has extended the software functionality over time to do more.

It uses a number of algorithms as follows.

Classification
Powered by text mining, the first algorithm indexes and classifies the enquiry based on its content. Through extensive training of the model with historical data, Siemens GBS reports that it has achieved over 90 per cent accuracy in the classification capability. According to the company, the algorithm has made the decision-making more objective than when humans do it. This is because of the machine's ability to rapidly relate the information to a huge volume of historical data, to compare the context and classify the incoming customer enquiry. The Siemens GBS team believe this aspect clearly demonstrates how AI can augment human activity. Some of their human service centre agents have learnt from the decisions that the machine has made, and consequently become more objective in their decision-making.

Prioritisation
After the classification, another algorithm prioritises the tickets. This is based on the nature of the enquiry and the estimated urgency. To do this, sentiment analysis is also undertaken to work out the urgency as perceived by the client based on the language used in the email or other interactions. Each ticket is then prioritised and gets assigned a response time within service level agreements (SLAs).

Entity extraction
The third machine learning model is used to extract entities that decide what action is to be taken in response, for example in a procurement context, identifying the PO number or if the approvals need changing, extracting who was the original approver and who is the new one. Other activities include data validation using predefined taxonomies and rules.

After the entity extraction the appropriate workflow is activated, and all the relevant information is passed to the automated solution that services that workflow. This can be an RPA robot that takes the information and updates the field in the relevant business system, for example changing the name of the approver in the purchasing system. Or it can be a direct data update to a business system using RESTful application programming interfaces (REST APIs).

In this way, using NLP, unstructured information is converted to structured data that can be automatically put into the relevant business system. That data update might complete the activity that was needed in response to the ticket being generated or it might activate another chain of processes, many of which are automated too, for example an update sent to a supplier.

Completion

The final step is to go back to the client who raised the service request with a response. This too is partially automated with the information being provided to a human agent to be checked before a reply is sent to the client. Siemens GBS made the decision to have humans handle this final customer interaction. It refers to it as its quality gate where humans check the work that has been done by the machine and then reply to the client.

The solution development

Siemens GBS has a large technology group as well as an innovation team that comes up with ideas for new solutions to enhance the company's services. The group can also respond to demand from the business to deal with their specific requirements. In this case, the service ticket handling was a very high-volume process that took a lot of manual effort. Consequently, the team assigned to the project scanned the market for out-of-the-box technologies that were available at the time, but they needed to develop a capability that offered them reusability. They also wanted a cloud-based and highly scalable solution. As a result, they selected Microsoft Azure Services. They have been working in partnership with Microsoft on the development of the solution.

In addition, in terms of skills, the team could draw upon AI skills within the corporate technology group as well as their teams in Portugal and Czechia.

Having set up the project and created the development team, it took nine months to build the minimum viable bionic agent. Initially, it just classified the information captured from the service tickets and routed them to the right teams for action. They ran a proof of concept for six weeks and saw that they could unlock higher value work by speeding up ticket processing times and freeing up staff from having to do that initial task. They then added the entity extraction and then the rest. They had to ensure that the bionic agent was secure and that it complied with corporate digital and HR policies, International Organization for Standardization information security standards, and regulations such as the General Data Protection Regulation. There was a lot of learning through trial and error to get the right algorithm and to increase its accuracy.

The core engine is NLP, and the design is such that it allows the bionic agent to be applied to other requirements. In future it might be trained to extract other entities and be applied to other use cases in the company.

The benefits

Siemens GBS has generated significant benefits from the bionic agent already. Where it is deployed, service ticket resolution effort has been 70 per cent automated with roll-out to more areas of business planned.

The bionic agent has enabled its staff to work on higher value processes such as complex cases that cannot be automated or analysis of customer contact data to improve services. Additionally, the company has built the foundations for an intelligent solution that can be adapted and reused to speed up and enhance other services. This work is ongoing, and we expect to see more efficiencies generated by Siemens GBS in the near future.

The company has also increased its AI skills and will be able to develop new products in its pursuit of new technology solutions to innovate and stay ahead of competition.

SUMMARY

In this chapter we learnt how Siemens GBS developed its bionic customer service agent to speed up the processing of service tickets that are generated in response to customer queries each year. The bionic agent is based on NLP and automates 70 per cent of the ticket handling processes. The rest is completed by staff who check the work that has been done before completing the task associated with each ticket by responding to the customer.

The bionic agent was developed in-house based on Microsoft Azure Services, with the ability to deploy on cloud for scalability.

This case study shows us how organisations can turn large parts of their business processes into autonomous operations while still having people involved, not only to develop the solutions, but also to manage and monitor the automated processes, to handle more complex tasks, as well as to deal with direct customer interactions. This is exactly how I believe most knowledge work in the enterprise will be delivered in the future. This is an evolution rather than a revolution because it will happen by degrees as intelligent technologies are enhanced and improved.

There are several other important lessons to learn from Siemens GBS' bionic agent:

- That it can augment the work of the human agents, for example help them to become more objective in process-related decision-making.
- AI can be combined with other technologies to scale up process automation and consequently the benefits that can be derived from it, for example AI with RPA leading to 70 per cent of service ticket processing being automated.
- That AI-based solutions can be developed with reusability in mind. They can be repurposed to operate in different business contexts, for example even in one function area that can handle PO as well as invoice enquiries.
- That if you cannot find the solution that you need in a business function toolkit, you can develop your own with much of the infrastructure needed provided by AI platform vendors.

Finally, Siemens GBS is not intimidated by the complexity of smart technology. Its approach is all about trialling things with a proof of concept, building a skills base, learning by doing and building on successes. This is an approach that I cannot recommend more.

ABOUT THE AUTHOR

Sarah Burnett is a renowned technology industry analyst and international speaker who advises enterprises on intelligent automation, ethical uses of technology, competitive strategies and market trends. She helps intelligent automation technology vendors successfully formulate their product direction, go to market strategies, and apply ethical policies.

She gained her masters degree in applied optics in 1982 from Reading University, and has worked in the computer industry ever since, the last eight of those in the field of intelligent automation.

Sarah is a strong advocate for women in technology. She chaired BCS Women for four years and continues to work with the group as chair of AI Accelerator, which she founded in 2017. AI Accelerator is a programme of free AI events by experts, to inform participants and make AI accessible to more people.

Sarah is a Fellow of BCS.

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