

Revamp of On-Call After-Sales Service for Corrugating Machinery



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Despite being a key point of contact with customers in our after-sales services, on-call support was faced with issues such as the operator's high workload caused by nighttime call handling and call log registration, and inconsistent support quality due to varying levels of individual proficiency. These issues were especially pronounced in the North American market, where the paper converting machinery business is expanding markedly. Therefore, an online call center was set up independently considering the characteristics of the work needed thereof, with the aim of improving customer satisfaction and reducing employee workloads. The use of digital technologies such as generative AI has brought quick on-call responses and consistent support quality without compromising the customer expectations for after-sales services.

1. Introduction

On-call support is a key point of contact with customers in the after-sales services, receiving inquiries 24/7 regarding the operation of our products. On-call support is also important because it can determine the customer's opinion about our after-sales services as a whole.

However, there were issues such as the operator's workload caused by nighttime call handling, inconsistent support quality due to varying levels of individual proficiency, and extra burden of call log registration. These issues became especially pronounced in the North American market, as the paper converting machinery business therein expanded.

A joint development was then conducted between Mitsubishi Heavy Industries, Ltd. (specifically, the System Integration Department of Digital Innovation Headquarters) and Mitsubishi Heavy Industries Machinery Systems, Ltd. (Printing & Packaging Machinery Headquarters). The goal of this joint development was to create an online call center service using multiple digital technologies such as generative AI, with the aim of solving the above-mentioned issues faced by the North American market of paper converting machinery, as well as improving customer satisfaction and reducing employee workloads.

This report describes the background on the joint development and the effects resulting from the introduction of the service, in addition to our future directions.

2. Analysis of conventional on-call handling procedure

Paper converting machinery is the core equipment for cardboard box manufacturers. Although the number of on-call inquiries regarding this machinery is lower than that of consumer goods or services, the necessary quality of support is technically very demanding. Because of this, a special team of operators for such support, which was formed in-house, is in charge of handling inquiries by phone or any other means.

Ahead of the service revamp, our conventional on-call handling procedure was analyzed to extract derailing factors. The identified issues were mainly five-fold, each of which will be described below.

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(1) Two different contact numbers for inquiry

In the conventional on-call support, different contact numbers were given depending on the time of inquiry, that is, during or outside office hours. Customers therefore had to take the trouble to choose the right number when calling.

(2) Manual allocation of inquiries by operators

Once received, an inquiry call was transferred to the operator who was considered most fit to handle it based on the details of the inquiry. This allocation of inquiries was at the discretion of an operator who first took the call.

(3) Nighttime on-call support cost

During nighttime, the outsourced call answering served conventionally as the primary contact point for inquiries. The cost became too much to ignore.

(4) Burden of call log registration

The call log has been centrally managed using a common database on the operational system. However, each data entry had to be made by the operator based on his/her recollection after the inquiry was handled on the phone. It was impossible to completely rule out inaccuracy or omission in the records.

(5) Varying levels of individual proficiency, causing inconsistent support quality

Which operator should be assigned to a given on-call inquiry was determined based on the work schedules. However, their varying levels of proficiency resulted in inconsistent support quality, which led to customer complaints in some cases.

3. Setting up of online call center

To address the issues listed above, an online call center service was developed based on the four frameworks described in the following sections.

As shown in **Figure 1**, calls are transferred and transcribed using a cloud-based general-purpose service (i.e., software as a service or SaaS). The functionalities that are required but difficult to obtain with the SaaS standard service, such as AI functions for summarization and drafting of answers to inquiries, are supplemented by combining with managed functions through the cloud-based platform as a service (PaaS). This made it possible to set up a highly flexible system within a short period of time. The whole process is covered in such a way that this new system can be linked up with the existing operational system.

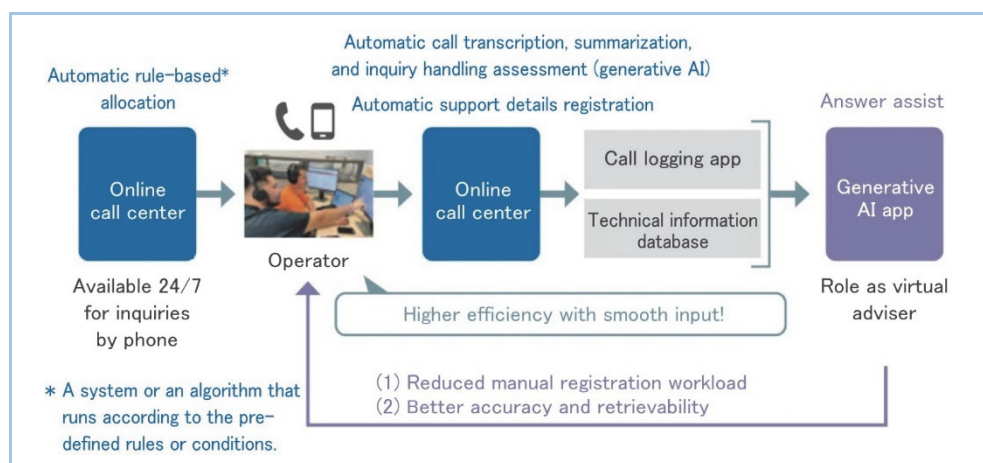


Figure 1 Schematic drawing of chamber-free PBF process

3.1 Framework (1): one contact number, and automatic operator allocation

Being cloud-based, the call center needs only one contact number irrespective of the time of inquiry whether it is during or outside office hours. Operator allocation is automated based on the pre-determined work schedules. Moreover, as this call center support is linked up with another online service (i.e., customer portal), customers can now chat or video-call to ask about an ongoing condition. It is therefore possible for the call center to handle all the inquiries despite the contact means – whether by phone, chat or video-call.

3.2 Framework (2): automatic call transcription and summarization

Once received, calls are recorded to allow AI to transcribe and summarize automatically. From the standpoint of privacy protection, summarization is designed in such a way that personal information including customer names and contact details is omitted intentionally. Moreover, prompts are optimized according to the contextual characteristics of inquiries about product operation, so that technical terms and situation description are properly reflected in summaries.

3.3 Framework (3): automatic call log registration

The transcribed calls and summaries, which are obtained by framework (2) in the previous section, are automatically linked to our operational system, before being added to the call log. The log entries are not only used by AI to draft inquiry answers (as in the following section), but are also shared with customers through the customer portal. Every entry is managed as a ticket, making it possible to visualize and track the processing of any inquiry.

3.4 Framework (4): AI's suggestion on how operator can answer inquiry

Retrieval-augmented generation (RAG), in which retrieval technology is combined with generative AI, is enabled using the accumulated log entries and prearranged technical information as external knowledge sources. Thus, answers to customer inquiries can be drafted for the operators.

4. Effects of service introduction

With the newly introduced online call center service, all call transcripts and summaries are now recorded automatically. This has substantially reduced the operator's burden caused by making a call log entry from his/her recollection, while considerably improving the coverage of recorded information. The number of entries more than tripled from a conventional rate of 150 per month to 500 per month. Customer complaints, whose root cause lies in omission of information in the entries, were significantly decreased.

Moreover, AI's capability of drafting answers to customer inquiries has enabled the operators to respond quickly and provide support of consistent quality, despite varying levels of individual proficiency. The call center has been in service for a while, the experience of which made it clear that the relevance of AI's drafted answers can be effectively improved by narrowing the technical knowledge sources down to closely related information such as collections of expected questions and their model answers, rather than simply following the idea of the more the better.

5. Future directions

The online call center was set up for the North American market. Its deployment to the existing markets of other regions such as domestic, Asian and European is being considered. Another plan under consideration is expanding the network of our after-sales services in the Global South where the market is expected to grow in the coming years.

6. Conclusion

This report pertains to the on-call support, which is a critical factor determining the customer's opinion about our after-sales services as a whole. What was especially focused on is the online call center set up with the aim of addressing the issues with the conventional support system and improving customer satisfaction while reducing employee workloads.

The online call center service was developed by combining the latest cloud functions, such as call handling and RAG, and integrating them into the existing operational system. This made it possible to agilely realize the functionalities characteristically required by the targeted line of business within a short period of time.

As a result, quick on-call handling and consistent support quality were successfully achieved without compromising customer expectations for our after-sales services, even during the expansion phase of the paper converting machinery business in the North American market.

As a best practice, the deployment of online call centers will be promoted for other regions as well as other lines of business.