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Gartner for Customer Service & Support Leaders

Drive Self-Service by Automating Knowledge Management

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Demand for assisted service remains high as investments in self-service fail to meet customer expectations. Application leaders supporting customer service must improve the timeliness and fidelity of self-service content by integrating knowledge management that is enhanced by AI-enabled automation.



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Overview

Key challenges

- Despite investments incurred in customer self-service, including recent deployments of chatbots, demand for agent-assisted support remains high due to ineffective self-service adoption and containment strategies.
- The process of converting insights from support conversations into reusable knowledge is inefficient. Entries submitted by advisors must be reviewed and curated by subject matter experts (SMEs), reducing the timeliness and relevance of information published to self-service channels.
- Recent advances and mainstream adoption of natural language technologies — a subset of enterprise artificial intelligence (AI) tools — present technically viable paths to automate knowledge management processes in customer service.

Recommendations

Application leaders responsible for customer service should:

- Increase the timeliness and fidelity of self-service content by strategically funneling transactional knowledge back into self-service channels.
- Collaborate with your peers in data and analytics to position knowledge management automation as a business value driver within larger, enterprisewide AI programs.
- Develop a human-in-the-loop (HITL) machine learning (ML) practice to automate knowledge capture and curation — capitalizing on vendor expertise to improve AI technology awareness and capabilities over time.
- Deploy AI-enabled automation to enhance the capture and curation of transactional knowledge.

Introduction

Application leaders responsible for customer service continue to invest in digital self-service capabilities, with the dual goals of call deflection and improved customer experience. However, Gartner research shows that less than 10% of customer service journeys are fulfilled using end-to-end self-service (see *Delivering on the Digital Promise*). This apparent inability of digital self-service to deliver on the promise of significantly reducing assisted service demand is caused by customer abandonment of self-service. This can be traced back to a number of root causes. Key among these root causes is a suboptimal knowledge management capability within the customer service function.

While there are some digital self-service solutions that offer sophisticated capabilities, many (including basic chatbots) are built to surface answers from a static knowledge base or FAQs. The processes necessary to keep these knowledge bases updated with current, relevant knowledge are built upon manual knowledge management practices and models. This approach — while adequate to maintain static and periodic types of knowledge — makes it difficult for customer service teams to capture, curate and maintain the rapid influx of transactional knowledge.

Recent advances and mainstream adoption of natural language technologies — a subset of enterprise AI tools — present viable paths to automate knowledge management processes in customer service.





Analysis

Increase Timeliness and Fidelity of Self-Service Content by Funneling Transactional Knowledge Back Into Self-Service

In order to continually keep self-service results relevant to customers, credible and current knowledge assets have to be made available to them at a rapid and consistent pace. Of the four different types of knowledge assets in the customer service environment, transactional knowledge represents the highest potential value to the organization in terms of new intellectual property created. Even more importantly, it is the type of knowledge that is of immediate value to customers — such knowledge can serve to inform the customer before a question or problem comes up (see Figure 1).

Transactional knowledge assets typically take the form of quick tips, workarounds, innovative use cases and insights surfaced during problem solving. They cannot be found in product documentation, user guides and other similar predeveloped knowledge assets. It is possible to find instances of transactional knowledge in “wisdom of the crowd” sources, such as user forums and comments in customer reviews. However, the knowledge generated in the assisted service transaction is unique and of higher value, because it is generated in the dialogue between a person from the problem domain (that is, the customer) and a person from the solution domain (that is, the advisor or SME). This type of knowledge also serves to enrich proactive and preemptive support activities. For these reasons, strategically funneling transactional knowledge back into the self-service channels should be a priority for application leaders responsible for customer service.

Figure 1. Knowledge Type Categories From a Customer Service Perspective

Knowledge Type	Attributes	Examples	Effort vs. Value
 Transient Knowledge	Situational, quickly changing, short-lived.	Service outages, product shortages.	<ul style="list-style-type: none"> • Moderate effort to capture. • High immediate value, but no value after the event.
 Transactional Knowledge	Created in the process of answering questions, and through insight synthesis.	Workarounds, quicktips, how-tos, unique use cases, domain insights and innovations.	<ul style="list-style-type: none"> • High effort to capture. • High immediate value. • High reusability value.
 Periodic Knowledge	Tied to product life cycle, marketing campaigns, etc.	Release notes, user guides, recall notices, promos.	<ul style="list-style-type: none"> • Low effort to capture. • Moderate initial value. • Low reusability value.
 Static Knowledge	Tied to policies, procedures and regulations.	Return and refund policies, billing terms, partner info and compliance info.	<ul style="list-style-type: none"> • Low to no effort to capture. • Moderate to low value to clients. High internal value.

Source: Gartner

However, application leaders are faced with two dilemmas:

1. Transactional knowledge is the most difficult type of knowledge to capture, for several reasons, including:

- Conventional knowledge management processes place the entire burden of sharing knowledge on the holder.
- The knowledge may be so commonly held and ubiquitous to a situation or group, that it gets taken for granted (that is, no one in the group recognizes that it is of value).
- Advisors may not know that they individually possess knowledge that is of use to others.
- High workload and a lack of time can prevent advisors from submitting entries to the knowledge management system.
- Advisors may be reluctant to codify their knowledge because of the perceived cost to the holder of sharing this knowledge with others.
- Advisors may be apathetic toward sharing knowledge because “it’s not my job.”

2. For the knowledge assets that do get manually captured, it takes further time and effort from SMEs to curate the captured knowledge into reusable knowledge artifacts. This is expensive and leads to more delays in getting any content of value presented to the self-service channels.

Conventional knowledge management processes and tools are not enough to overcome the practical challenges presented by these dilemmas. The net result of these shortcomings is that customers do not embrace self-service due to the inability to complete their goals using the content they find in self-service channels.

While application leaders responsible for customer service are familiar with the transactional knowledge reuse dilemmas, they are not familiar with:

- Insight engines
- Text and speech analytics
- Ontologies
- Natural language processing
- Other similar AI-enabled functions

However, while application leaders may not be familiar with these technologies, their peers in data and analytics are often responsible for AI initiatives deploying these technologies to enhance enterprise capabilities. Together, they have a shared interest in finding viable use cases that have been identified by the business that can be included in the enterprise AI strategy. Application leaders responsible for customer service should use this opportunity to collaborate with their peers in data and analytics.

Position Knowledge Management Automation as a Driver of Business Value Within Enterprisewide AI Programs

The AI-enabled functions discussed here are at varying stages of maturity and adoption (for more information, see Hype Cycle for Natural Language Technologies, 2020). It is important to note that vendor products may have overlapping functions. They may not offer some or all of the capabilities as discrete functions, but rather, they may offer them embedded within a vertically defined solution. Other vendors may have a number of these functions (for example, insight engines, ontologies and text analytics) built into general purpose natural language processing (NLP) or conversational AI “as a service” platforms. Application leaders responsible for customer service should collaborate with their peers in data and analytics to first understand enterprise AI strategy in the context of this technology landscape, and then to optimally position the use case for knowledge management automation, so that it can demonstrate its business value.

Develop a Human-in-the-Loop Machine Learning Practice to Automate Knowledge Capture and Curation

Compared to computers, humans are slow to process data and can be inaccurate and inconsistent when completing repetitive tasks. However, humans have deep cognitive abilities that computers do not have. HITL ML models bring together the accuracy and speed of computers, and the cognitive ability of humans, to “train” an AI algorithm. The human participants iteratively shape how the algorithm behaves by inspecting the results it produces, and entering feedback about the magnitude and frequency of errors. This cycle of “reinforcement learning” improves the accuracy of the algorithm over time. HITL models are used in many AI development scenarios, including when there’s little initial data present or when there’s no margin for error. HITL models are therefore particularly well-suited for knowledge capture use cases.

Application leaders for customer service should identify and capitalize on areas where vendors can provide assistance. Many vendors have deep expertise in these specialized tasks.

Even organizations with data science teams are unlikely to have the needed specialist skills in-house to fully architect knowledge capture automation. Engage third-party vendors to lead these tasks. Application leaders responsible for customer service should:

- Design a proof of concept (POC). Invest in these relationships by committing domain SMEs to work with the vendors. Once the POC is outlined and initial data expectations are understood, engage stakeholders from IT, data and analytics, and business functions to outline expectations of the POC.
- Recognize that ML models need to be trained with initial datasets. Some models can be trained with sparse data, but most ML models need large training datasets. Vendors can usually bring their own domain-specific datasets to initiate model training.
- Establish validation criteria for the machine-generated knowledge artifacts by incorporating and adapting the manual knowledge management criteria. Criteria should include accuracy, relevance and timeliness, duplication and obsolescence. Incorporate domain-specific criteria that are already in place for manual knowledge management processes.

Deploy AI-Enabled Automation to Enhance the Capture and Curation of Transactional Knowledge

Deploying sophisticated AI-enabled functions to a business automation use case is not a trivial task. It is important to understand some of the key technologies and concepts involved in order to fully capitalize on vendor expertise in specialized areas.

These are the key technologies and concepts involved:

- Insight engines enable search, augmented by semantic and ML technologies. Vendors with mature insight engine products offer the ability to traverse and index a variety of data sources, leading to discovery of meaningful

insights contained within structured and unstructured data. There are a number of established vendors offering insight engines either embedded within their solution suites, as vertically aligned applications, or in the form of foundational technology that can be integrated with other enterprise automation software.

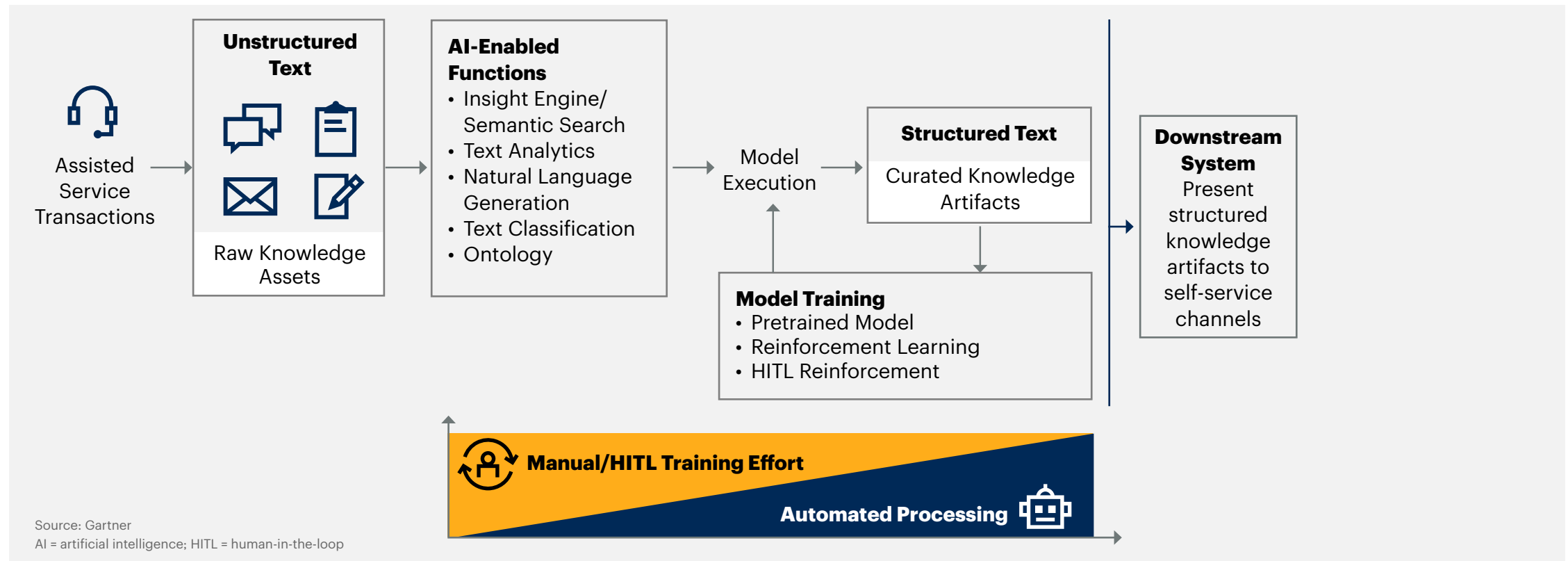
- Text analytics is a proven, well-adopted technology that enables the deriving of data from structured and unstructured text. Such data can be used to extract business information or trigger downstream automation. Some uses of these techniques include identifying and classifying topics in text, and resolving ambiguity in cases where the text refers to the same entity differently (for example, recognizing “NJ,” “N.J.,” and “New Jersey” as all referring to the same entity).
- Natural language generation (NLG) technologies are a subset of NLP technologies, comprising a range of techniques that automatically convert structured data into human-readable text.
- Text autoclassification is a range of techniques that automatically associate metadata with text in order to enrich the text’s content. The metadata is typically in the form of keywords drawn from a taxonomy or ontology.
- Ontologies are data models that represent a set of entities within a domain, containing information about the behavior of those entities and the relationships between them.

See Note 1 for definitions and a brief discussion of related terms.

These technologies combined can be used to index, cluster and classify ticket notes and transcripts of solved customer service calls. Themes and insights returned by the text analysis can then be used to find information that is missing from existing knowledge repositories. This processing yields data in the form of arrays of numbers (also known as vectors) representing insights and themes

contained in the original unstructured text. Structured text in the form of sentences can be generated using this analytical data. Use text autoclassification capabilities to associate metadata to the generated text. This will facilitate the processing of the text by a downstream system that then serves it back into the self-service channels. See Figure 2.

Figure 2. AI-Enabled Knowledge Management Automation



It is important to note that NLG is still an emerging technology with low market penetration. It may not be feasible to generate complete customized narratives using the current generation of NLG. However, rapid advancements in these techniques make it worthwhile to evaluate the capabilities and applicability of NLG vendor offerings to knowledge management use cases.

As noted above, not all of these functions (specifically NLG) are as yet capable of creating document-length knowledge articles containing complete customized narratives. However, taken together, these technologies present an automation path that can significantly increase transactional knowledge capture accuracy and efficiency. Choose to assign SMEs that are already focused on article curation work to the HITL model. This will serve to augment and streamline the normal day-to-day tasks that SMEs are required to do, even as they are engaged in training the AI algorithm.

Associating metadata with text facilitates the processing of the structured text by a downstream system that serves the results back into self-service channels.

The goal here is to present the customer with current, accurate and personalized information via self-service, so that they won't need to go to assisted service. The primary benefit of automating transactional knowledge capture is in reducing total turnaround time required to serve the information into self-service channels. In addition, enrichment of knowledge assets with metadata serves to increase the accuracy of the content, while improving personalization.

Cautions

The success of these initiatives will depend on the AI-enabled functions and specialist skills offered by the vendors, as much as it depends on the availability of SMEs to collaborate in the HITL ML practice.

There are a number of vendors and solution providers that offer overlapping AI functions, expertise and turnkey solutions. The application leader responsible for customer service should use a combination of such expertise, taking into consideration this additional level of complexity.

Conclusion

Application leaders responsible for customer service are looking to increase self-service adoption and containment. To do this, they should pursue a strategy to automate knowledge management. Recent advancements in natural language technologies make automating knowledge management more feasible when approached as a collaborative driver of business value within a larger, enterprisewide AI program.

Note 1: Definition of Terms

While this research does not attempt to analyze the broader subject of enterprise knowledge management, it borrows key concepts and refers to terms from the technological implementations of that discipline. Among such concepts, a taxonomy is fundamental to codifying knowledge within and related to a domain, and is defined as an officially approved hierarchy of terms. This is in contrast to a so-called folksonomy, which is an uncontrolled collection of user-supplied metadata or hashtags.

An ontology is a data model that represents a set of concepts within a domain and the relationships between those concepts. Ontologies are defined using ontology languages (such as RDF, OWL and SPARQL), enabling the machine-based modeling of a given domain. Usually there are industry-specific ontologies, which are useful for harmonizing data across repositories in a common language for that industry. A knowledge graph is the expression of an ontology as data, with attributed meanings. A distinct feature of a knowledge graph is that entity descriptions are interlinked to one another, so that the definition of one entity includes another entity. This key feature is how the graph selfforms, making it extensible. Knowledge graphs are used to power insights in real time.



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