LIVE

Precaution Pays Off
How to Detect the Maintenance
Requirements of Your Machine
Using Digital Services

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From Ancient Mom-and-Pop Stores to Retail 4.0

Nothing will be like before in the food industry and the retail sector due to digitization. From the field to the plate, almost all manufacturing, logistics and sales processes and procedures will be affected.

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Some scenes still seem futuristic although they have long become reality in many places. Just think of deserted warehouses where full-automatic conveyor vehicles commission the most varied goods as if guided by magic. Many of the things that are put into the shipping containers were weighed, portioned and packed under computer control in advance.

In comparison, digital technologies in the shipping industry appear rather unspectacular, although they are no less effective—from app-based route optimization to end-to-end cold-chain control using programmable RFID chips. Storing temperature values from A to Z, the chips ensure full transparency, thereby guaranteeing the freshness of the shipped goods. At the end of the value chain, the signs of digitization are also plain to see: in supermarkets, more and more customers use their smartphones for their payments at the self-service checkouts.

The concept of self-service and supermarkets was introduced in Germany only fifty years ago. Previously, most consumers bought their everyday goods in small stores, including butcher shops, bakeries and vegetable stores. People knew each other, and retailers were aware of the personal preferences of their customers.

Quite often, going shopping also was a good opportunity to share the latest news. Sometimes, the small talk in the mom-and-pop store may even have been more important than buying goods.

Supermarkets, in turn, were one-stop shops where customers found everything including meat, fish, bread, fruit, vegetables, deep-frozen food and canned food. Looking back, this evolutional phase of the retail business is called retail 1.0, although the first supermarket is said to have opened as early as in 1930 in a former car repair shop near New York. Starting there, the new shopping experience gradually conquered the entire world.

In the next step, large retail chains were established in Germany, ushering in the retail 2.0 phase. Then, shortly before the millennium, the emerging internet brought the next paradigm change when Jeff Bezos founded the first online book store named Amazon in 1994. The rest is history: Amazon grew to become a giant department store, a retail 3.0 Mecca.

The Shopping Experience Makes the Difference in Today's Competitive Environment
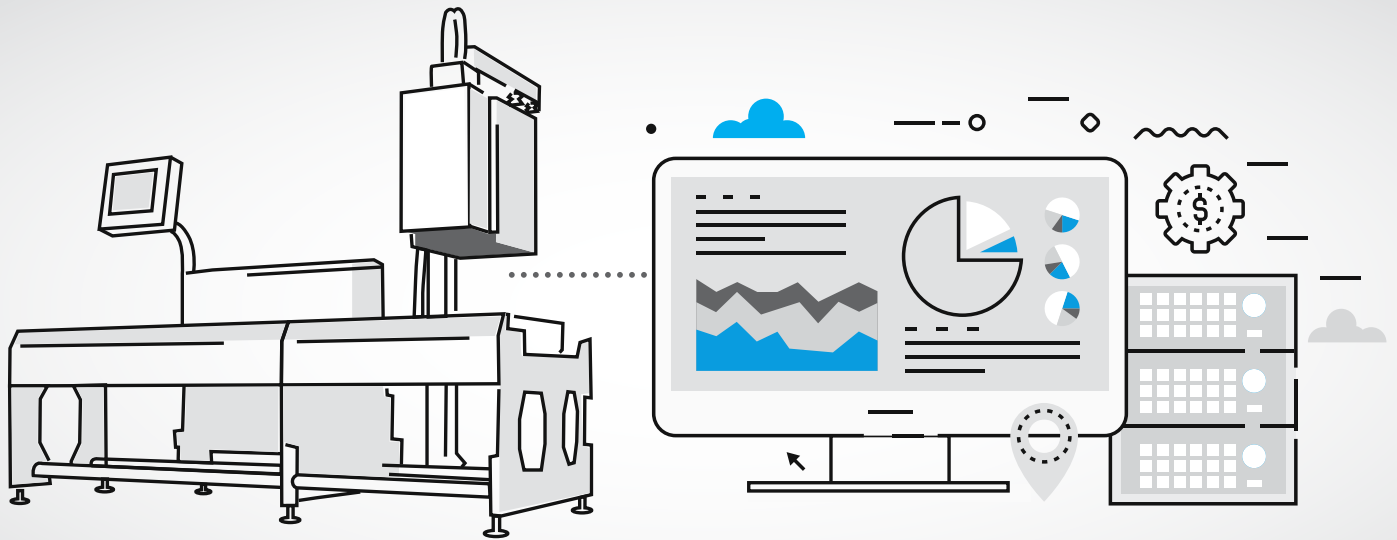
In the current 4.0 phase of the retail evolution, different interaction paths including online trade, stationary trade, call centers and live chats merge to become a universal omnichannel. For customers, retail 4.0 therefore is a cross-channel, customized brand and shopping experience. Much like the sales personnel in the ancient mom-and-pop stores knew the preferences of their customers, retailers in the digital age are also increasingly aware of the personal needs of consumers. Among others, this is achieved by intelligent data analyses using algorithms to anticipate the future needs of customers based on their previous shopping behavior.

Thus, digitization fundamentally changes the expectations of consumers. On the internet, millions of different products and services are available 24/7. In the future, retailers therefore will increasingly need to match their offer in the omnichannel to the personal needs of each individual customer. Thus, the customer focus emerging in the digital space will resemble the experience of the ancient mom-and-pop stores. Providing a consistent customer journey across all contact channels thus will be one of the most important competitive factors.

Needless to say, that all this requires extremely flexible and cost-efficient digital processes along the value chain—supported by Bizerba's Digital Services for the retail and food industries.

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Condition-Based Services as the Enabler for Predictive Maintenance

The Retail Business and the Manufacturing Industry Face Similar Digitization Challenges.

The manufacturing industry is another sector where digitization revolutionizes the way how players interact within increasingly connected supply chains. More and more, suppliers deliver their parts to purchasers on a "just in sequence" and "just in time" basis, thereby eliminating the time and cost required for intermediate storage. Furthermore, production lines will not be halted just because a specific component is not available anymore. For suppliers and purchasers alike, this precise interaction requires an extremely high degree of machine and equipment uptime because even the timeliest just-in-time delivery is useless if production must be halted because maintenance requirements are detected too late. Thus, highly flexible production scenarios require equally flexible maintenance processes. In the context of industry 4.0, smart data analyses to determine the current maintenance requirements play a similarly important role as forecasting the needs of individual customers does in retail 4.0.

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Status Data are a Raw Material

Which data will specifically help to determine the possible maintenance needs of a food-production operation at an early stage? In general, a proactive maintenance scenario will benefit from all data that provide insight concerning the current status of a specific machine. For a price labeler, this includes the pressure values of the vacuum pump required for holding the labels. In case of poor vacuum performance, price labels will not be held sufficiently, resulting in inadequate package labelling.

Normally, the vacuum performance of the pump will gradually degrade without a sudden loss of suction.

By uploading the pressure values of such pumps to the manufacturer's service team via IoT (Internet of Things), the manufacturer's monitoring system can automatically issue an alert whenever the values fall below a critical threshold. The service team in charge can then schedule the replacement of the specific pump as part of the next regular maintenance visit. The sudden failure of a non-monitored vacuum pump, in turn, will often require a costly special service visit.

Sustainable Reduction of Maintenance Costs

The example of the pump clearly illustrates the general principle of condition-based maintenance consisting of capturing, aggregating and continuously monitoring all kinds of available health data of a machine in order to determine the specific maintenance needs before a failure occurs. This eliminates any downtimes that could lead to additional overhead and even impair the service offered to the customers in the worst case. At the same time, maintenance costs will sustainably go down because any necessary maintenance works can be scheduled proactively if the current state of health of each machine is known. As a result, the number of unplanned service calls will be reduced, leading to lower maintenance costs. In addition, the stability of all supported processes will benefit from reduced machinery downtimes.

One might think that capturing and transferring these health data will result in disproportionate overhead. However, the opposite is true because many relevant status data are readily available in a digital format in many modern slicing, weighing, packing and meat-processing machines. To take the step towards condition-based maintenance, it is only necessary to connect these machines to the manufacturer's monitoring solution via IoT.

Benefits of Condition-based Maintenance at a Glance:

+ High equipment availability
+ Elimination of downtimes
+ Significant reduction of maintenance costs
+ More efficient scheduling of repairs
+ Elimination of unplanned service calls

In Addition, Predictive Maintenance Enables:

+ Definition of machine usage parameters correlated to specific usage conditions
+ Detection of weaknesses and error sources in the processes
+ Extended lifetime of components and machines
+ Process stability due to optimized machine uptime
+ Process optimization based on the analysis of expansive health data

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New Insights Generated by AI Algorithms

The more status and environment data are aggregated, the greater the impact. Using appropriate algorithms, different machine-usage patterns can be extracted from the growing information repository related to specific usage conditions.

Pattern-recognition algorithms are among the standard procedures available in the Artificial Intelligence portfolio. In the future, they will pave the way towards predictive maintenance scenarios that will literally potentiate the benefits of the condition-based services currently offered by Bizerba. This is because Artificial Intelligence algorithms link and correlate the usage patterns and environment data of many machines of the same type.

The new insights thus generated extend transcend the scope of traditional statistic results. For the vacuum pump mentioned above, estimating its failure probability will not only be based on a single parameter (e. g. pressure or vacuum), but on a variety of additional information. Thus, instead of scheduling a replacement based on crossing a specific threshold value, additional environmental conditions including humidity or temperature will have an influence on whether an alert is issued. Furthermore, additional factors can also be considered, including usage frequency or usage intervals (many continuous hours per week or a couple of times a day for several minutes each).

This is critical because each component replacement inevitably raises the question of how long the replacement could have been delayed without the risk of a functional impairment. The reason for this question is the ambition to achieve a maximum lifetime with the component in question, resulting in a maximum utilization of the investments involved. From Bizerba's view, predictive maintenance will be the key to achieve maximum process stability (due to improved equipment uptime), minimum maintenance costs and longer usage periods. The groundwork for this is laid by Bizerba's condition-based services that lead to sustainably reduced maintenance costs and increased uptime.
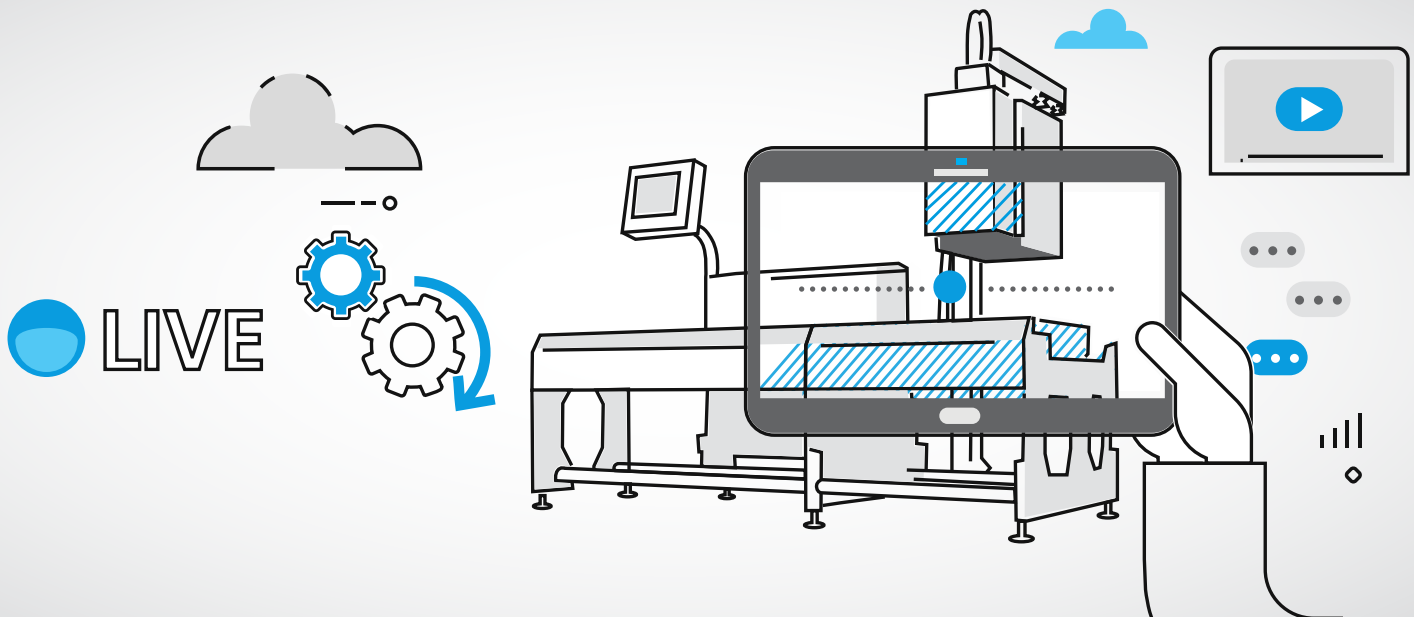
Identifying the Potential for Process Improvements

In addition to all kinds of cost and uptime effects, analytics of health data also yields valuable insights concerning optimization opportunities around the machine in question. For instance, it is possible to determine the root cause of frequent separation faults occurring in a price labeler with an integrated scale.

In this case, health-data analysis reveals at which speed the number of supplied packages becomes too high, so that the machine is operated outside its optimum performance area and becomes unable to process the packages individually. In this context, data analyses deliver concrete insights for a purposeful optimization of such processes. Furthermore, process parameters of similar machines can be compared with such analyses. Optimum conditions can be determined and transferred to machines of the same type in order to eliminate interruptions and to save many hours of work.

All in all, Bizerba's condition-based services are based on a highly pragmatic approach aimed at generating a tangible added value from the multitude of readily available machine data. Traders and manufacturers alike can thus lower their maintenance costs and increase the lifetime of their machines and components, all while pinpointing process weaknesses and eliminating sources of error. In addition, the concept of condition-based services is an intermediate step on the way towards predictive maintenance.

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Augmented Services: Expert Knowledge Closer Than Ever Before

Digital Services can not only be helpful in case of any technical failures, but for everyday machine usage as well. Many failures can even be avoided beforehand by extending the existing remote service and by providing immediate contact via Augmented Service.

For instance, a Bizerba app can provide contact to a service technician if a price labeler should not operate properly for an unknown reason. Instead of giving lengthy explanations on the phone, the operator in charge for instance can "point" to the problem by aiming at the printer with the smartphone camera.

In most cases, "virtual" service calls like these only take a couple of minutes. Using the camera image, support technicians can immediately see that maybe the paper roll is inserted in the wrong way, enabling the problem to be solved with a simple hint. In the past, however, even relatively minor problems like these triggered real service calls entailing real costs. For instance, this was the case when a campaign was scheduled in a supermarket the next morning. As the price labeler had to be functional as soon as possible, nightly service calls over distances of 200 km or more were made for repair works taking only a few minutes.

A Picture is Worth a Thousand Words

The app just mentioned goes by the simple name of "AS-App", with AS meaning "Augmented Services". While virtual reality aims at full immersion into a digital world, Bizerba's augmented-reality-based AS initiatives try to enhance the real perception with context-related multimedia content. This content may include live information concerning the machine in question or the opportunity to contact Bizerba's first-level support via the app.

Apart from being helpful for customers, app-based visual communication also supports technicians working in first-level support in quickly pinpointing the root cause of any faults. This is because visualization can help to avoid any misunderstandings that cannot be eliminated completely with verbal descriptions of complex technical problems. For instance, on-site service personnel can use the app to access the collective expertise of Bizerba's entire service team, no matter if the colleagues are working at a customer's premises or in Bizerba's service center. For instance, if a technician is unable to solve a problem in a control cabinet, he or she does not need to waste any time to find the right words to describe a problem via phone. Instead, an experienced colleague can immediately see that the red light in the upper right corner of the cabinet is off. A contactor must thus be switched on in order to continue the maintenance work. Conversely, the AS-App also supports verbal descriptions of a problem-solving approach, thus helping on-site technicians to adequately follow the instructions.

AR as a Cost Saver

Augmented reality enables better efficiency and increasing fault-resolution rates without any immediate access to fellow technicians, for instance with the help of graphically enhanced step-by-step instructions. Using specialized data glasses, Bizerba's AS-App will provide this kind of interactive supplemental information in the technician's field of view, leaving both hands free for carrying out the actual maintenance work more efficiently.

Bizerba also uses the advantages of AR combined with video, chat and remote software for up-front analyses of upcoming maintenance activities. It is thus possible to schedule the necessary work and the components required beforehand, enabling technicians to optimally prepare themselves. Having all the necessary equipment, they can be sure to have all the tools and spare parts at hand. Furthermore, AR-based up-front analyses reduce the frequency of repeated maintenance activities, which also contributes to lower maintenance costs.

In summary, what applies to the communication between service teams and customers is also valid for the cooperation within the maintenance team itself: a picture is worth a thousand words, and Bizerba's AS-App helps resolving problems quickly and efficiently.

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Simplified Operation

By developing practical AR applications, Bizerba is already able to reduce the response times experienced by customers, effectively resulting in increased machine uptime. In addition, Augmented Services will soon be able to improve the convenience and usability of Bizerba machines by means of interactive operational support. In the future, for instance it will be enough to point the smartphone camera to a specific component of a slicer to make the app provide relevant multimedia instructions. Operation will be illustrated by visually enhanced content including 3D animations, reducing the frequency of operator faults. Furthermore, the use of data glasses will result in more elbowroom in scenarios of this kind.

Unlimited Opportunities

It is for a reason that Augmented Reality is deemed to be an industrial megatrend. As a manufacturer, Bizerba pulls out all the stops in order to drive ahead its internal digitization process all the way from product development to maintenance and customer support. AR enables significant improvements of service quality, accompanied by minimized costs.

In addition, AR will change the user experience provided by Bizerba machines because the app will provide tutorials and manuals at the swipe of a finger.

In addition, AR solutions from Bizerba can serve as suggestions and blueprints, for instance for a supermarket chain aiming at digitally enhancing the shopping experience of its customers. For example, an AR app in the chain's branding could navigate every customer through the store, providing dedicated hints regarding campaigns that fit into the customer's shopping profile. Alternatively, the app could suggest specific dishes with the option to provide an inter-active shopping list including a floorplan showing the shelf spaces where the ingredients can be found. Imagination virtually has no limits for applications of customer-specific augmented reality in a store.

Benefits of Augmented Services at a Glance:

+ Improved service efficiency
+ Faster troubleshooting using visual assistance
+ Visualization avoids miscommunication
+ Minimized costs
+ Minor failures can be remedied by the customers themselves
+ Access to the collective expertise of an entire service team
+ Up-front analysis of maintenance visits avoids repeated visits

Conclusion

Bizerba's digital services assist retailers and manufacturers in successfully coping taking on the challenges of Retail 4.0 and Industry 4.0. Condition-based services and Augmented Services Solutions significantly improve the uptime of Bizerba machines, resulting in maximum process stability accompanied by a sustainable reduction of service costs. This, in turn, provides the headroom that today's retailers need to enhance the customer journey and to gain a competitive edge by providing a unique brand experience. In the manufacturing industry, increased uptime of machines and equipment lays the groundwork for the necessary flexibility of manufacturing control with the goal of just-in-time and just-in-sequence production.

Consequently, Bizerba's digital services act as a catalyst for the digitization process of the customers.

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Brief Portrait of Bizerba

Bizerba offers its craft, industry, commerce, and logistics customers a globally unique portfolio of hardware and software solutions centered around the physical quantity of weight. The customer base includes global commerce and industry companies, regional retailers and medium-sized bakeries and butcher shops.

Since more than 150 years, Bizerba is significantly shaping the development in the area of weighing technology. Today, the company provides an unmatched portfolio including solutions and products for optimizing all kinds of processing steps like slicing, processing, weighing, cashing, checking, commissioning and labeling all kinds of food. In addition, Bizerba provides customized services ranging from consulting and the delivery of labels and consumables to flexible leasing and maintenance contracts.

Being family-owned since five generations, the group of companies headquartered in Balingen in southwest Germany currently has 4,100 employees. Bizerba production facilities are in Germany, Austria, Switzerland, Italy, France, Spain, China, and the U.S. Bizerba also has a global network of sales and service locations and is represented in more than 120 countries around the world with additional service and sales offices.

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