ComplianceMate™
HACCP Compliance & Temperature Monitoring

A steady diet of "Big Data" will nourish your restaurant and help it flourish. Here's how.

"Big Data" is taking the restaurant world by storm, where it is helping owners and executives to understand what works and what doesn't in their organizations. It also means restaurants are virtually turning into their own data centers as they suddenly find themselves managing a breadth and depth of data never before available. What does this mean for the future of restaurant operations?

It is the "Internet of Things" (IoT) that is driving this data revolution. Specifically, all those "things" – smart, Internet-connected devices ranging from wireless temperature sensors and probes to point-of-sale (POS) terminals – can continuously collect valuable information and communicate seamlessly with both restaurant workers and executives in the back office or headquarters, all via any Web-enabled device.

Use of such IoT devices is skyrocketing. Market analysts at IDC have predicted that the global IoT market will more than double to $1.3 trillion by 2019. By 2020, they estimate the IoT will include as many as 50 billion endpoints worldwide. [i] The information produced by those devices can then be parsed and analyzed by restaurants ready to undertake this task.

For example, based upon the sensors placed in the store and the data that they gather, it helps restaurants to become that much more efficient in their overall operation.

But how? And how can restaurant operations take advantage of the benefits of data-rich decision-making? This paper will answer those questions.

A data-rich business environment lets restaurant owners see the road ahead rather than staying fixated on the rearview mirror.

Historically, most restaurants track and react to *lagging*, rather than *leading*, performance indicators and data points. That forces restaurants into a "break-fix" mindset where they respond to problems only after they have happened, be it a food temp falling out of spec or an order being filled incorrectly.

Data enables restaurants to focus on leading, forward-looking indicators instead, which has profound implications for everything from equipment maintenance to preventing food-borne illnesses. With continuous monitoring and data analysis, it becomes possible to get ahead of the curve and begin predicting outcomes.

In restaurants, this applies directly to the most critical equipment any kitchen uses: freezers and coolers. Temperature sensors, for example, can help restaurant owners spot equipment malfunctioning (or running warmer than what it should) so that they can take proactive action – perhaps cleaning the condenser coils or scheduling other maintenance – *before* they face equipment failure. A study by the ARC Advisory Group found:

> "[IoT] and advanced analytics provide the basis for a shift from predictive to proactive maintenance – appropriate particularly for critical assets. Unfortunately, humans tend to overlook or forget long-term issues; alerts get lost in the flurry of daily activities. Manual processes for transferring an alert … become problematic and can contribute to overall business process failure."

By contrast, greater automation and more information can facilitate "resolution prior to failure." Even more specifically, they found using data for predictive or proactive equipment maintenance reduced equipment downtime and significant reduced the total cost of ownership. Their findings are summarized in the chart below.[ii]

Impact of Data on Equipment Maintenance (Source: ARC Advisory Group)

Approach	Method	Applicability	Comparison
Reactive	Run to failure and then repair	Non-critical assets with low impact from failure	10X plus when failure occurs
Preventive	Service in a fixed time or cycle interval	Failures increase with age or usage	2X maintenance costs
Predictive (condition monitoring)	Monitor process data, identify bad trends, & alert prior to failure	Simple systems where single variable math predicts a failure	1X maintenance costs
Proactive (analytics & multiple variables)	Equipment-specific data acquisition with algorithms, analytics, and/or a model	Complex systems where multiple variables and analytics can predict failure	Unscheduled downtime approaches zero

More data means greater clarity and transparency, and it can increase a food provider's menu of options when they are needed most.

The U.S. Centers for Disease Control (CDC) still doesn't know what caused the nationwide 2015 Chipotle E. coli outbreak; the government agency concluded its investigation without ever determining the source of contamination.

Chipotle was faulted for an initial lack of transparency, but it can be difficult for restaurants to be transparent when they themselves don't know the answers to questions being asked. Without the right data at hand, these questions can sometimes prove impossible to answer.

And such transparency and in-depth insight is more important than ever: "Millennials in particular want to know what they are putting in their bodies," Eve Turow Paul, author of *A Taste of Generation Yum*, told *Fast Company*.[iii]

Paul consults with food companies about how to reach this target market, and she notes, "[Millennials] are anxious about an uncertain world and lack trust in the big companies that dominate it. Often the only thing they feel they can control is what they eat, or don't eat."

Technology provides the data that can feed that transparency. For example, as part of its remediation plan, Chipotle introduced some high-tech solutions, and today Chipotle can track which ingredients come from which sources using tracking technology. That way, they can procure food safety information at a moment's notice.

Indeed, if restaurants can identify the source of a problem, not only are they more likely to be able to answer the most immediate, urgent questions, they'll be in a stronger position to prevent it altogether or at least remediate the situation should it still occur.

Automating temperature tracking with wireless sensors, for example, are the perfect illustration of this concept in practice: in combination with the predictive capabilities discussed in the previous section, comprehensive and accurate temperature monitoring allows restaurants to pinpoint exactly where (and with whom) any problems began.

The menu is another example where data can provide insight. A Cornell University study found that vivid visual imagery matters in menus, as well as other design and content considerations (color, vivid descriptions) that help the diner clearly imagine how the food will taste.[iv]

But how do you know if the food you serve consistently meets the expectations created by those visuals? Incorporate photos into your checklist procedures, which is only possible with smart devices, to create a new, trackable data point. That way, restaurants can both confirm and document that plates and foods are being prepared according to brand and safety standards, with visual proof at hand.

Not only does this added data expand your diet of raw information, it ensures brand consistency and customer experience.

From top-line revenue to bottom-line performance, data can enrich any restaurant's operations and efficiency – and much of the process happens like magic.

In fact, that's the secret ingredient in the Internet of Things: very little human intervention is required to procure all this useful data.

"Imagine a scenario where technology collects the data, analyzes it and then creates a list of action items for managers to tackle or assign to staff members," writes *Hospitality Technology*. In fact, we don't have to imagine it; that scenario is here. Automated temperature sensors, for example, continuously capture the data and can trigger action if the temperature goes out of custom-set spec.

Another example: checklist data can be parsed and subjected to simulations to identify, say, areas of risk or personnel in need of training. From there, restaurant owners and executives can determine solutions, often even using the system itself to prompt remediation techniques, e.g. was that soup was out of spec? Try stirring it.

That then becomes yet another data point that can pinpoint problems and solutions. If the system is having to give the same instruction ("stir the soup") to the same user over and over, that user may need further training. Or what if it's limited a specific burner? The equipment may need maintenance. Or what if it's multiple users but all at the same restaurant? Maybe that store needs closer review.

The right data can point you at the answer and improve operational efficiency at the same time, without executives or managers having to do anything special or different.

By the same token, restaurants can test new safety or food programs in one location, test the same program in another store, and compare results to identify variations to determine what affects performance and sales. Driscoll's did something like this: by combining QR code tracking and temperature sensors, it could pinpoint weaknesses in their production and supply chains that might compromise strawberry quality. The data spelled out which truckers turned off refrigeration to save gas, which stores' refrigeration was malfunctioning, and more."[v]

Conclusion: A data-rich restaurant is better situated to keep pace with the modern marketplace.

Data enables your restaurant and its staff to move at the speed of business. While your workers focus on preparing the safest and most satisfying meals and serving your customers with style, the data-procuring technology that hums in the background gives executives the tools to predict what they should do next.

And remember: in this arena, if you don't keep up, you'll fall behind. Even health inspectors are getting in on the act: using high-tech approaches have enabled inspectors to uncover violations faster than ever. But just how you use the data is entirely up to you. From menu changes to pricing, from customer targeting to consumer safety, from revenue increases to cost mitigation, access to a full smorgasbord of data can allow restauranteurs to answer the questions that have long eluded them. Deploying your own miniature Internet of Things, and turning your restaurant into its own virtual data center, are the keys.

About **ComplianceMate™** & CM Systems, LLC

ComplianceMate™ is focused on developing food safety solutions utilizing technology and cloud computing to help restaurants successfully accomplish "real time" HACCP Compliance and food service safety for you and your customers.

ComplianceMate™ successfully launched its first product for use in kitchens in 2001. Incorporating our personal experiences as well as insights from our customers, we have developed a system that is comprehensive in capturing data, is user friendly and "light years" a head of other systems currently offered today.

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