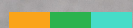




# Inside the digital gap in New Zealand's food manufacturing industry.



An industry report





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# Why this report?



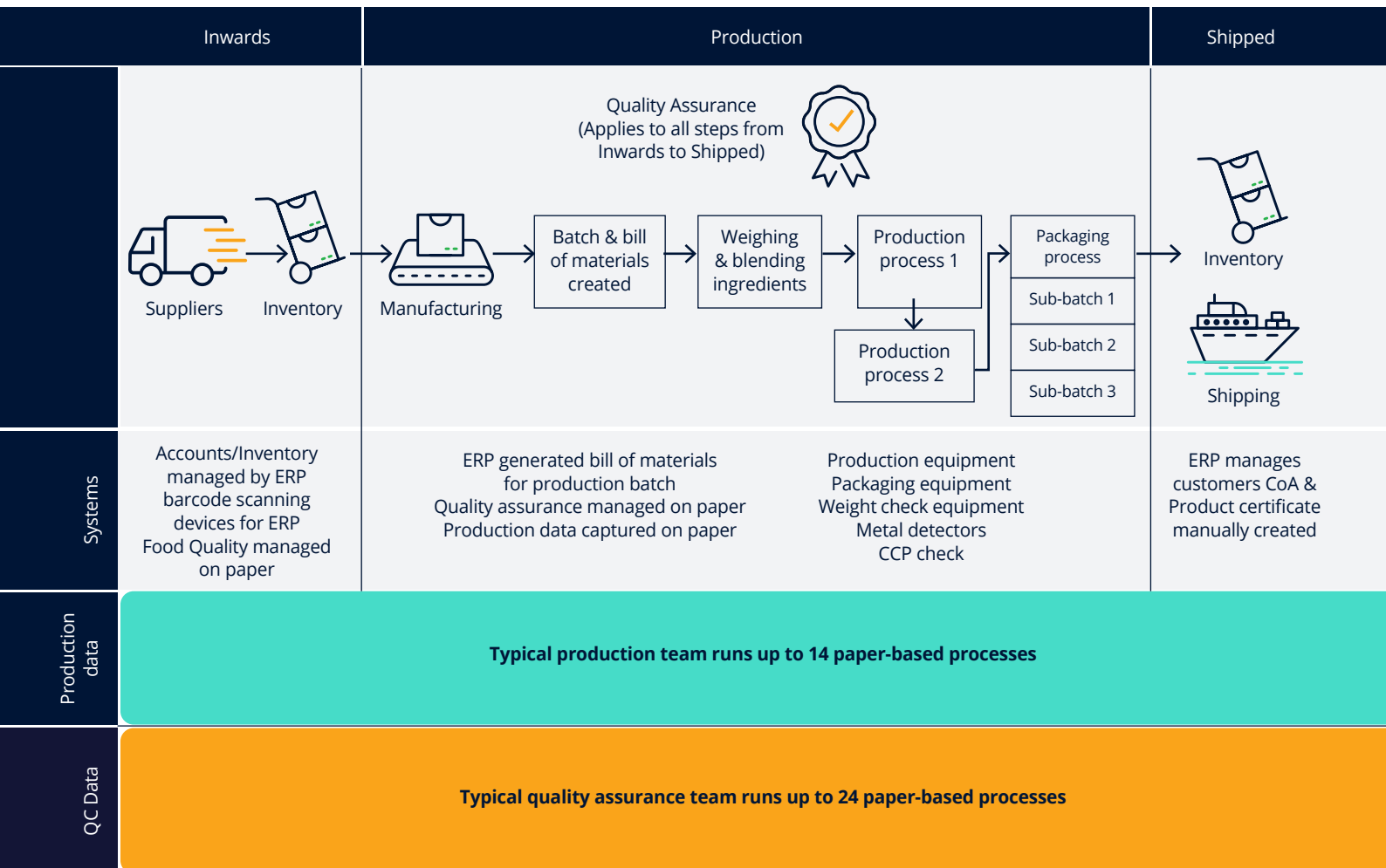
The global digital revolution is well and truly underway across industries. Manufacturers of all stripes are employing the principles and tools of digitisation to streamline and increase efficiencies across operational and production processes – reducing waste, lowering costs and improving control. Manufacturing and production in the food industry is no exception, having turned to the tools of technology to manage unique levels of demand on quality. The imperative is high: The political, social, cultural and economic importance of food production is as unrivalled as the regulatory scrutiny to which the manufacture of food is subjected. For the food industry, digitally-led manufacturing is not simply a cost-saving strategy, it is directly linked to risk and profitability, traceability, population health and public accountability.

New Zealand has a significant stake in this commitment to quality assurance. Our food and beverage manufacturing industry represents the highest overall contributor to our country's GDP (MBIE, 2020). We export to the world. We have a reputation for quality that is envied by many. This level of importance underpinned the decision to invest in this industry research. To understand the level to which New Zealand food manufacturing

businesses are digitally enabled to deliver quality, and to uncover any gaps, we undertook two sets of research. First, we surveyed 57 manufacturers end of 2020, to obtain a current state snapshot of digital capabilities around quality and production management on the manufacturing floor. Secondly, we conducted a set of in-depth interviews to take a deeper dive into where technology change is being enacted, to identify any difficulties being experienced with migration from current systems and to determine what participants see as the digitisation priorities to address.

The results were enlightening. While food manufacturing companies have embraced technology in many ways - and long used software systems (ERP or Inventory Management Systems) to manage quality control of their products and processes - there remains a major site of challenge: the production floor itself. And here's the problem. When it comes to the food production floor, most manufacturers have a major digital gap, relying on manual processes and paper records, with all their attendant risks and limitations. This report will look at how big the gap is, why it continues to exist and the priorities that must be addressed to take New Zealand food manufacturers on the road to end-to-end digitisation.

## Uncovering the paper trail: Current state summary



# Living in a manual world



Paper-driven record-keeping currently dominates food safety processes: Almost half of the surveyed food and beverage manufacturers still relied on paper - and the other half on Excel or Word documents to record in-process control data (see figure 2). Eight in ten manufacturers interviewed also stated that the recorded in-process data is then required to go through the additional process of supervisor verification. A typical production team runs up to 14 paper-based processes and the quality assurance team up to 24 paper-

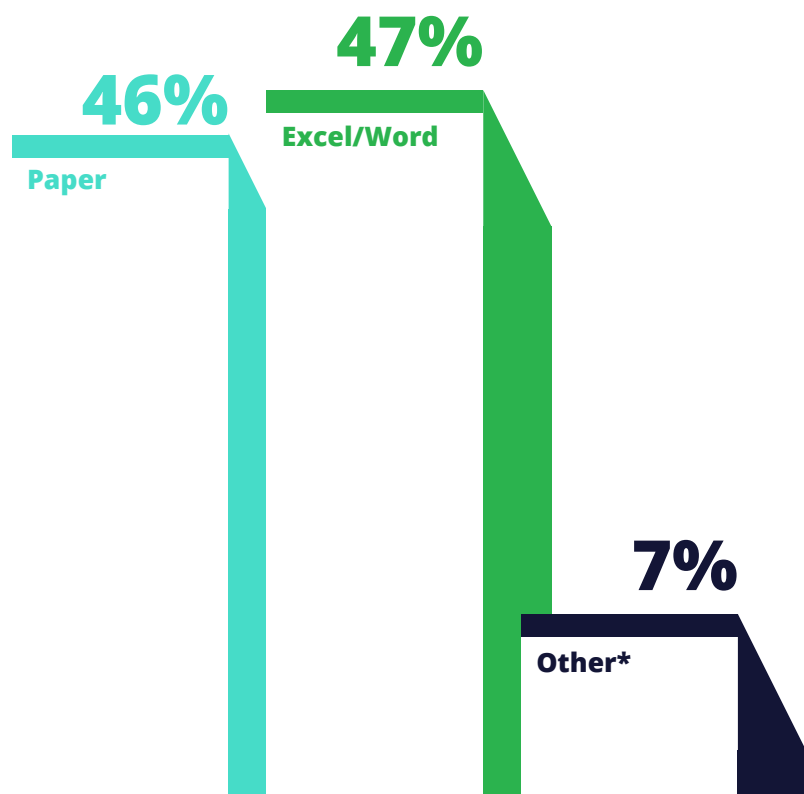
based processes to assure quality and compliance (see figure 1).

Unsurprisingly, with paper-driven processes still dominant, participants report manually recorded food quality and compliance data is inherently difficult to maintain and keep accurate. Acute examples were repetitive results that cannot be assured as free of falsification, which for critical control points like temperature taking represents a key risk.

## Recording of in-Process Control Data

**Figure 2:** Medium of recording in-process data in food manufacturing.

% of industry



\*SAP, Ostendo, AX computer recordings, automated reporting system

# The silo gap



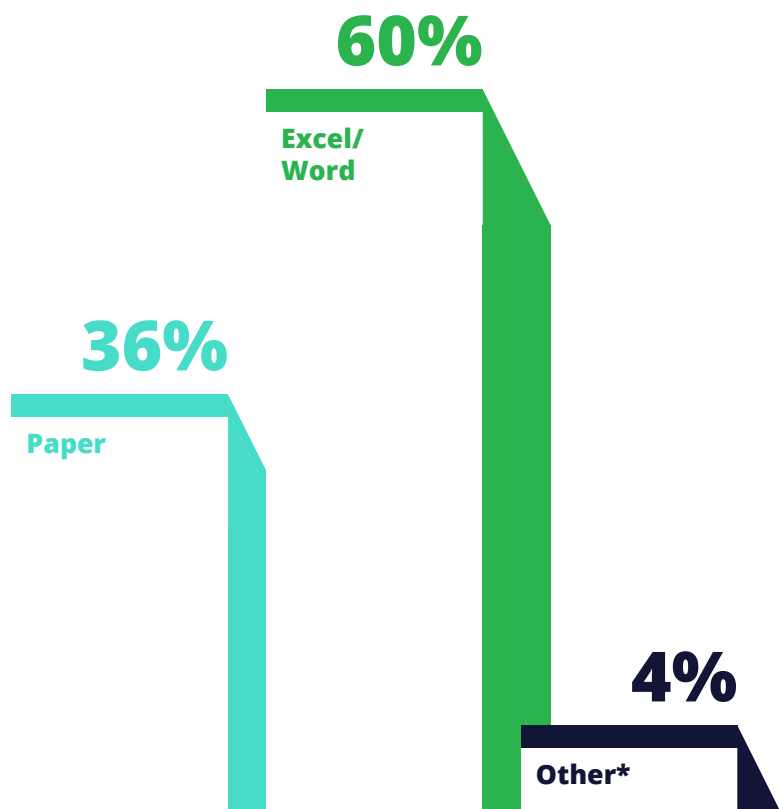
The transformation of raw materials into a finished, consumable food product can involve complex and interlinked processes. Yet for many, quality management across wider departmental production processes are reported as treated as separate. A key drawback being described of this separation lies in the processes and sub-processes carried out by a single department being optimised to deliver on unique as opposed to aligned Key Performance Indicators ( KPIs ). One example given was for a department receiving goods.

A key performance driver is speed and reduced time taken to receive goods, with tools and systems therefore tailored to time drivers, raising concerns over the potential impact on food safety and quality management outcomes that are not KPI driven in this space.

For food safety and quality, all processes and sub-processes across departments must be carried out within consistent required constraints. For assurance data to report to this standard, data needs to be captured by personnel

## Current Implementation of Quality Management

**Figure 3:** Medium of quality management implementation in food manufacturing.



\*ERP, MES, Intranet, Sharepoint, other software.

within different departments, while operating the wider process. However, it seems that, at present, data flow between departments is often restricted (if happening at all) due to the manual nature of the system. All of the surveyed food manufacturers run at least some part of the wider chain of quality management through manual entries (see figure 3), with no automation of interdepartmental data flows. A significant gap. Similarly for reporting, three in four manufacturers reported quality control as performed continuously or at each step of the production, and not as a final result at the end of the production run. They were left with no opportunity to react in real-time to emerging trends, with dependency on the periodical collation of food safety information to attempt to

draw any insights from historical data.

This current silo gap is usually addressed through individual roles, either a compliance manager or a food safety manager with primary responsibility for creating connectivity between the different departments, working to collate and compile relevant information for analysis and reporting. This approach nonetheless describes a high degree of risk: Manual, person-dependent and with cross-departmental 'accountability'.

By contrast, the few that were digitising this part of the processes, and using a central system, described good information flow between departments and timely visibility allowing high levels of operator and team proactivity.

# The challenges of non-conformances



Non-conformances can occur at any stage, with timeliness of corrective actions key to avoiding major recalls. Such investigations are reported as potentially complex undertakings that can include multiple areas, for example, products, processes, personnel and equipment. Respondents report vulnerabilities across:

- Time to respond
- Expertise in corrective actions
- Training

According to our survey, the general reliance on paper (51%) or Excel and Word templates (46%) extends to tracking and recording of any non-conformances. Currently, the industry is also reporting relying heavily on an operator's experience to know what to do if things go wrong. Any more serious non-conformance often becomes a point of escalation for a more senior role to address. As a result, non-conformance investigations for a large brand are currently reported as overly

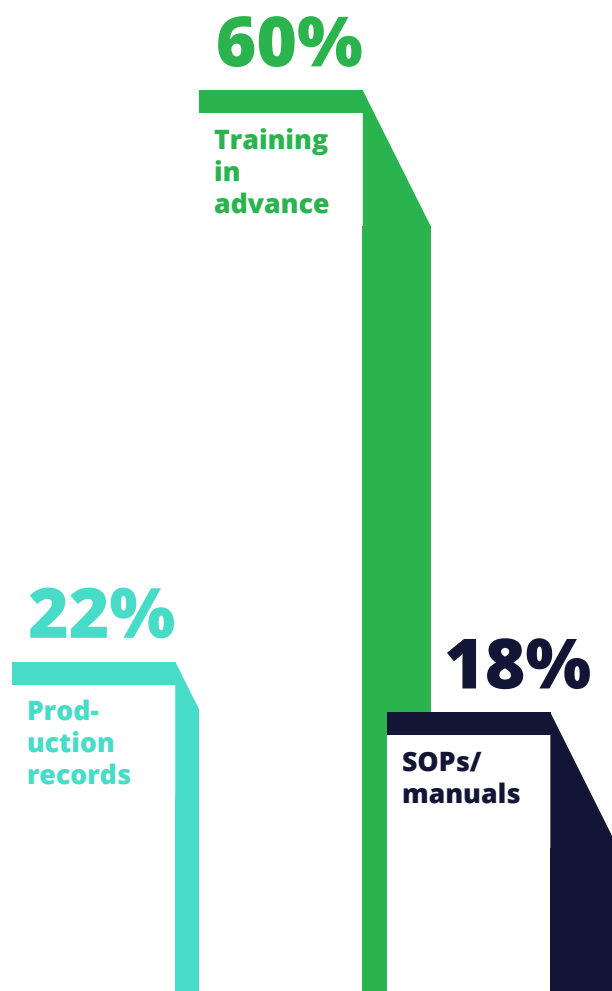
lengthy (taking weeks), purely because of how inaccessible information is for the person carrying out the work. This time lag can carry significant cost and reputational risk consequences.

Currently, most food manufacturers rely on staff training to guide their operators through non-conformance events (see figure 4). Of those manufacturers who use Standard Operating Procedures (SOPs) to guide their operators in situ, most still do so on paper. While half of all respondents used electronic means at some stage to provide SOPs, the other half still provided manufacturing formulas, recipes, processing instructions or non-conformance event management via hard copies.

This reliance on paper-based training and support for problem-solving could be shifted to digital on-demand processes to provide immediate answers in expected non-conformance situations as well as supporting pre-emptive actions to prevent such events from occurring.

## Direction of Operators Through Their Tasks

**Figure 4:** Method of operator guidance in food manufacturing.





# Tackling traceability

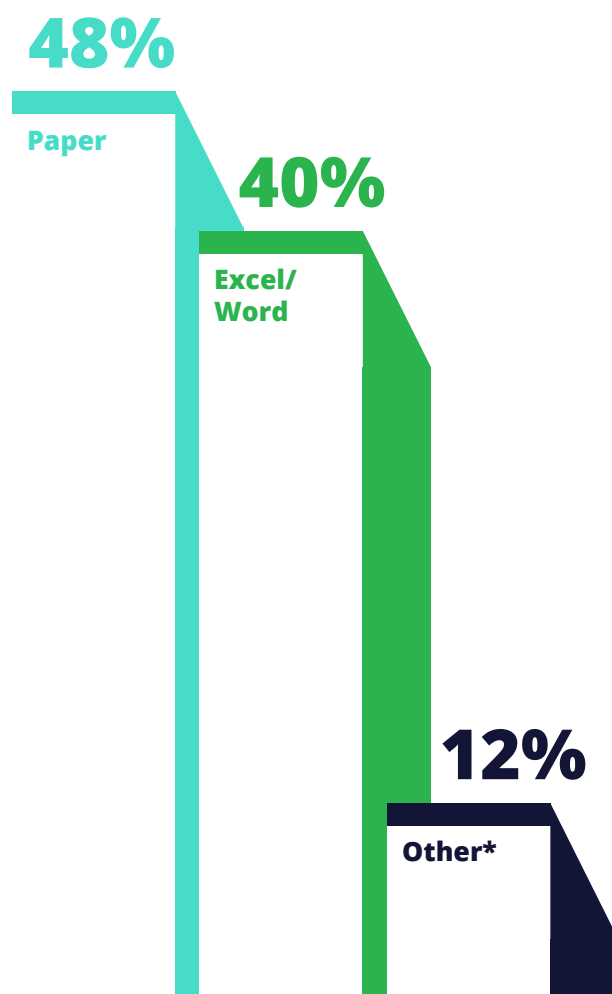


The food and beverage industry has long acknowledged the high importance of traceability and has a good understanding of traceability at the product level. When a product is being made, companies can commonly trace ingredients and who a product has been delivered to. However, what is emerging in the market more recently is how extensive traceability now needs to be. Traceability demand is shifting to

require an end-to-end, all-encompassing capability, covering ingredients, products, CCPs, processes, personnel, and equipment for each specific organisation. This level of granularity simply cannot be delivered on existing systems. Our research identified that half of the companies still rely on paper when they track product recalls (see figure 5).

## Tracking of Product Recalls

**Figure 5:** Medium of tracking of product recalls in food manufacturing.



\*SAP, GS1, Navision, Ostendo

# Inconsistent reporting



Food manufacturing companies must comply with local, country-specific food safety standards, plus any additional standard that is relevant in the addressed market, such as BRC or ISO 22000. All standards have slightly different frameworks. With each new standard, there is a correlated

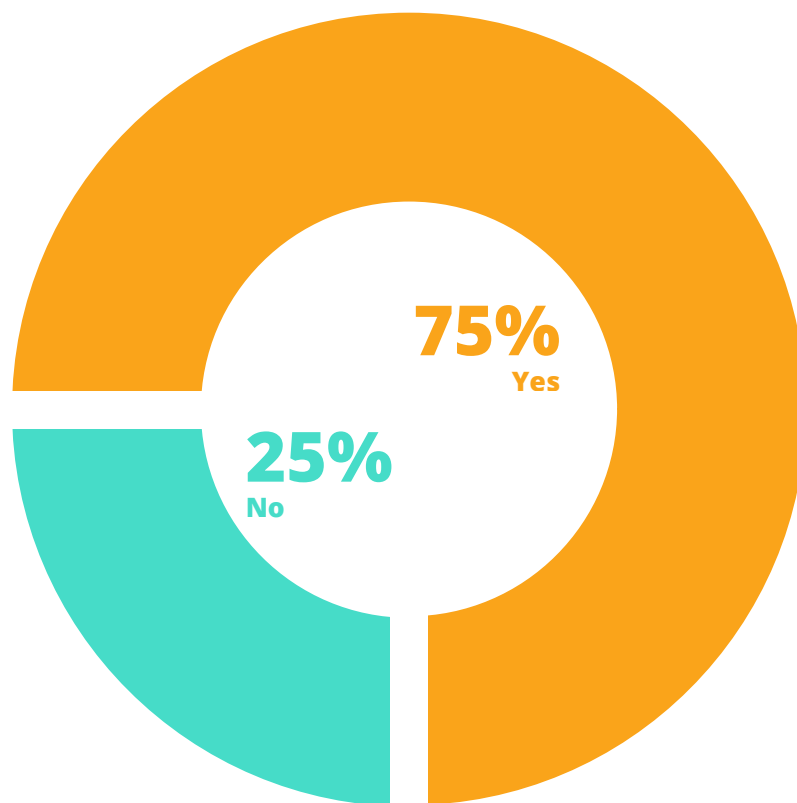
increase in workload to manage food safety mechanisms and an increase in the number of audits, with no easy methodology available to present what is essentially the same data, formatted differently for the different standards. Something digital systems could address.



**Figure 6:** Food manufacturing standards that need to be met.

Companies are also reporting a wide variance in the actual audits being undertaken. 40% of participants conduct audits monthly, another 22% conduct audits annually and 18% only audit on a biannual basis. Audits offer an important way to reveal strengths and weaknesses in a food safety programme. However, they are point-in-time assessments that represent a small fraction of food production time and volume. Any independent auditor is analysing a fraction of the product

flow, not the entire production. As a result, a company can only address issues with delay and not as they form. Still one in four of the surveyed food manufacturers do not carry out long-term trend analysis as they are all relying on audits (see figure 7). The organisations are waiting for the auditor to walk in on-site and tell them what is working and what is not and then go and fix it rather than identifying and addressing an issue before it becomes a major problem.



## Use of Trends Analysis

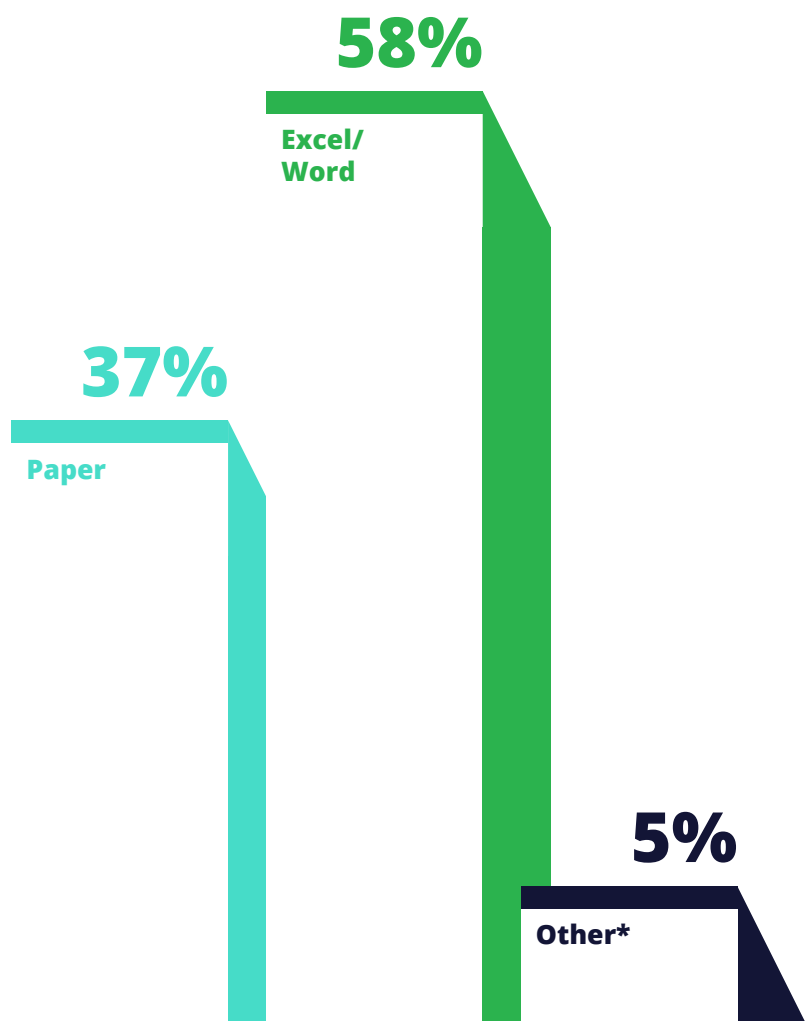
**Figure 7:** Use of trends analysis in food manufacturing.

In addition, most of our surveyed manufacturers still use paper-based processes to analyse batches that have failed to meet established specifications. The capability of real-time data capture with built-in response triggers to facilitate continuous reporting in real-time for performance improvement is very low.

The same procedures are still in place when it comes to recording supplier validation data. Figure 8 shows that almost 60% of manufacturers use Word or Excel and almost 40% still used pen and paper.

## Recording of Supplier Validation Data

**Figure 8:** Medium of recording supplier validation data in food manufacturing.



\* Online, email, electronic system



# The big problem, existing infrastructure



Digitisation of the production floor data is a challenge across the industry. The heavy reliance on manual and/or paper-based systems is fraught with risk, inefficiency and losses (data, analytic opportunities and profit) – the exact opposites of the drivers to improvement being described so strongly in industry. So what is the real entry barrier to a digitally enabling shift in this space?

The key issue uncovered in our research was that of existing infrastructure. It is not a lack of appetite to enact change – it is a fear of the level of investment required and a fear of causing a greater risk

through wider infrastructural failure. Because significant operating system investment has occurred across operational silos with technologies not designed for the production floor, any shift to include this aspect of the business now requires retroactive integration. Until recently such an effort would have required major investment from the business to introduce new and/or integration-capable technologies. There is low awareness that this problem has been solved with the advent of agnostic systems that can sit across any existing system. Part of the problem at hand is getting players up to speed with such emerging opportunities.

# The priorities ahead



The food manufacturers we surveyed identify strongly with being on the lookout for ways to make their organisation more efficient, to bring more integrity into their data, make it more traceable and accelerate the time to market. In the interviews, respondents identified a range of related priorities of this drive to improvement going forward:

- 1.** Finding ways to decrease dependency on manual inputs on the production floor that do not add a burden of risk to existing systems.
- 2.** Enabling data-driven decisions based on real-time reporting and trend analysis to uncover potential process improvements and cost savings.
- 3.** Automation of BOM calculations, activity prompts, alerts and event response.
- 4.** Reducing the time of traceability exercises and audit preparation from weeks or days to minutes.
- 5.** Automating the flow of data to accelerate product release times.
- 6.** Storing data in a cloud-based system to reduce over-reliance on a single

person.

The appetite to achieve these objectives across different sizes and types of organisations is present. Progress on a journey towards them is varied - it is clear that many have a long way to go. To track that shift and document the learnings and changes ahead, we will be repeating this research as an annual assessment of our industry and its progress. If you would like to be involved – contact us and we can add you to the respondent base. If you have questions you would like to see asked – let us know. If you'd like to talk to us about how you can digitise your production floor, get in touch.

Visit <https://www.imonitor.net/contact>

Or call us today on 0800 274 7014

## *Reference*

<https://www.mbie.govt.nz/assets/manufacturing-factsheet.pdf>

**Want to learn more about  
how you can increase your  
bottom line by digitising  
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Local (NZ only) 0800 274 7014



International +64 (9) 274 7014



[sales@imonitor.net](mailto:sales@imonitor.net)



3A / 142 Broadway, Newmarket,  
Auckland, New Zealand



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