



AWA
Alexander Watson Associates

AIPIA & AWA

SMART PACKAGING WORLD CONGRESS 2026

SMART, CONNECTED, DATA-DRIVEN:
THE NEW ERA OF PACKAGING



Embedding an unique ID QR code on every corrugated package



Michael Froschauer, Product Manager Digital Workflow, BHS Corrugated



EMBEDDING AN UNIQUE
ID QR CODE ON EVERY
CORRUGATED PACKAGE

92.0000.0000.0000

103.0000.0000

0



92.000.000.000



92.000.000.000

...corrugated sheets are produced per year globally with BHS machines

(estimation based on global production volume of corrugated board and market share data)

FROM PAPER TO BOARD: THE CORRUGATOR



up to 200 m

long

up to 3.35 m

wide

max. 450 m/min

Speed

100 to 400 million m²

produced corrugated board per year

€ 50 to 100 million

generated annual revenue

40

Container shipments

DIGITAL PRINT

Unique Process in the Market

The inline digital printing solution from BHS Corrugated is a unique process, that is an integral part of corrugated board production.

Possibility of „Preprint“

The water-based single pass inkjet system will print up to 2,800 mm working width with a speed up to 300 m/min.

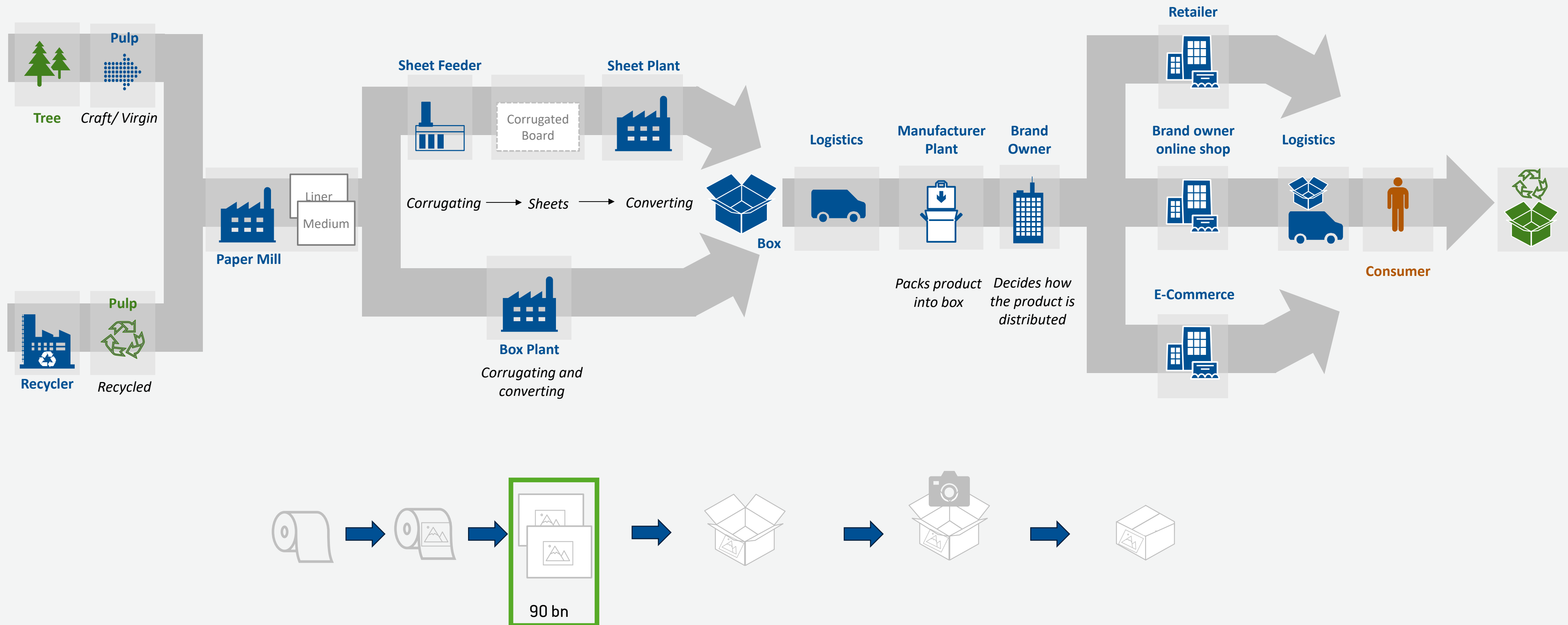
Enables variable data printing

Every single sheet can have an individual print. This enables to give corrugated sheets unique IDs and improves the flexibility



BHS Jetliner Xceed. BHS Jetliner MCP.

CORRUGATED PACKAGING VALUE CHAIN



92.0000.0000.0000

103.0000.0000

0



103.000.000



103.000.000

...corrugated sheets with serialized machine QR-codes

(source: internal production analysis)

SERIALIZED QR-CODES ON CORRUGATED SHEETS



Every sheet gets one unique QR-Code (includes an UUID)

An ID for every corrugated sheet is born



Synchronizes the cutting position with the layout

Leads to more automization and less waste



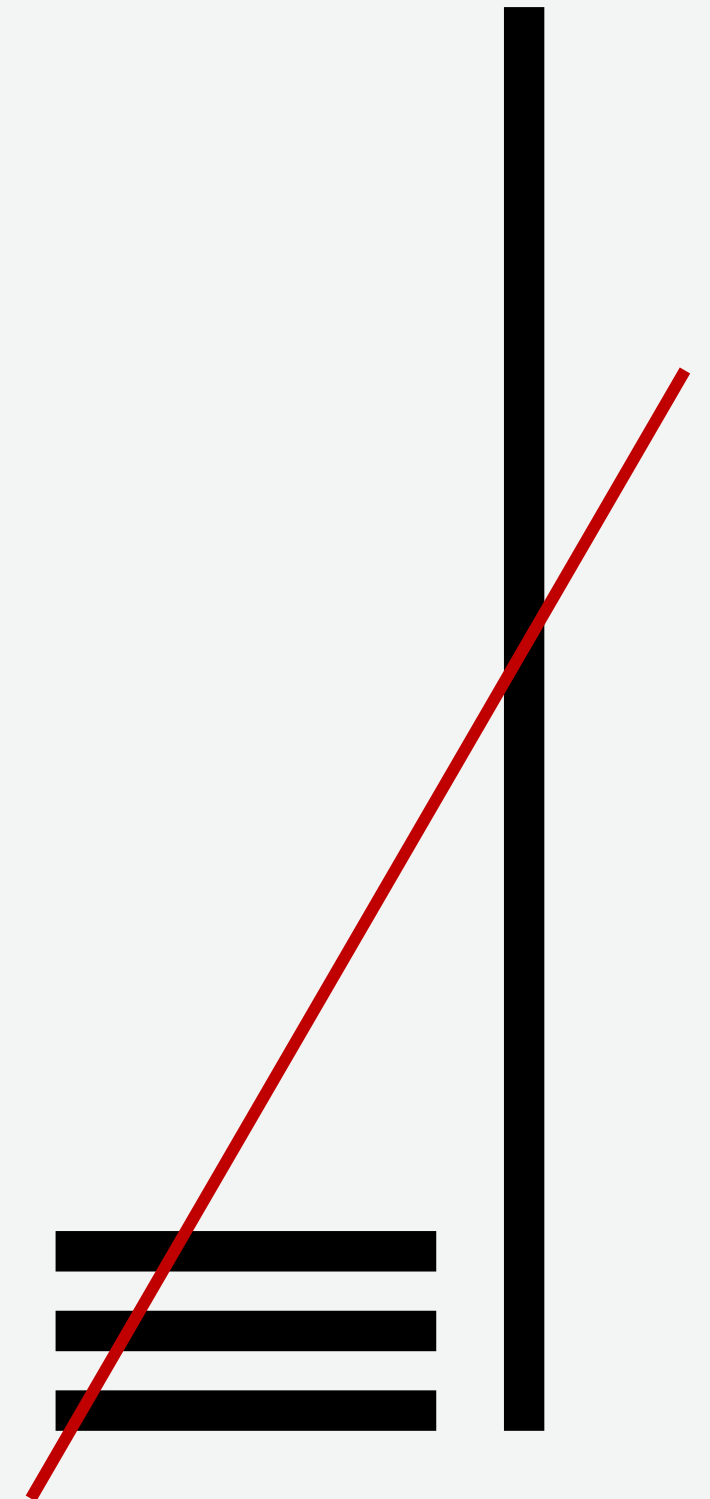
Optimizes order change

Machine can prepare for order change more efficient, which causes less waste

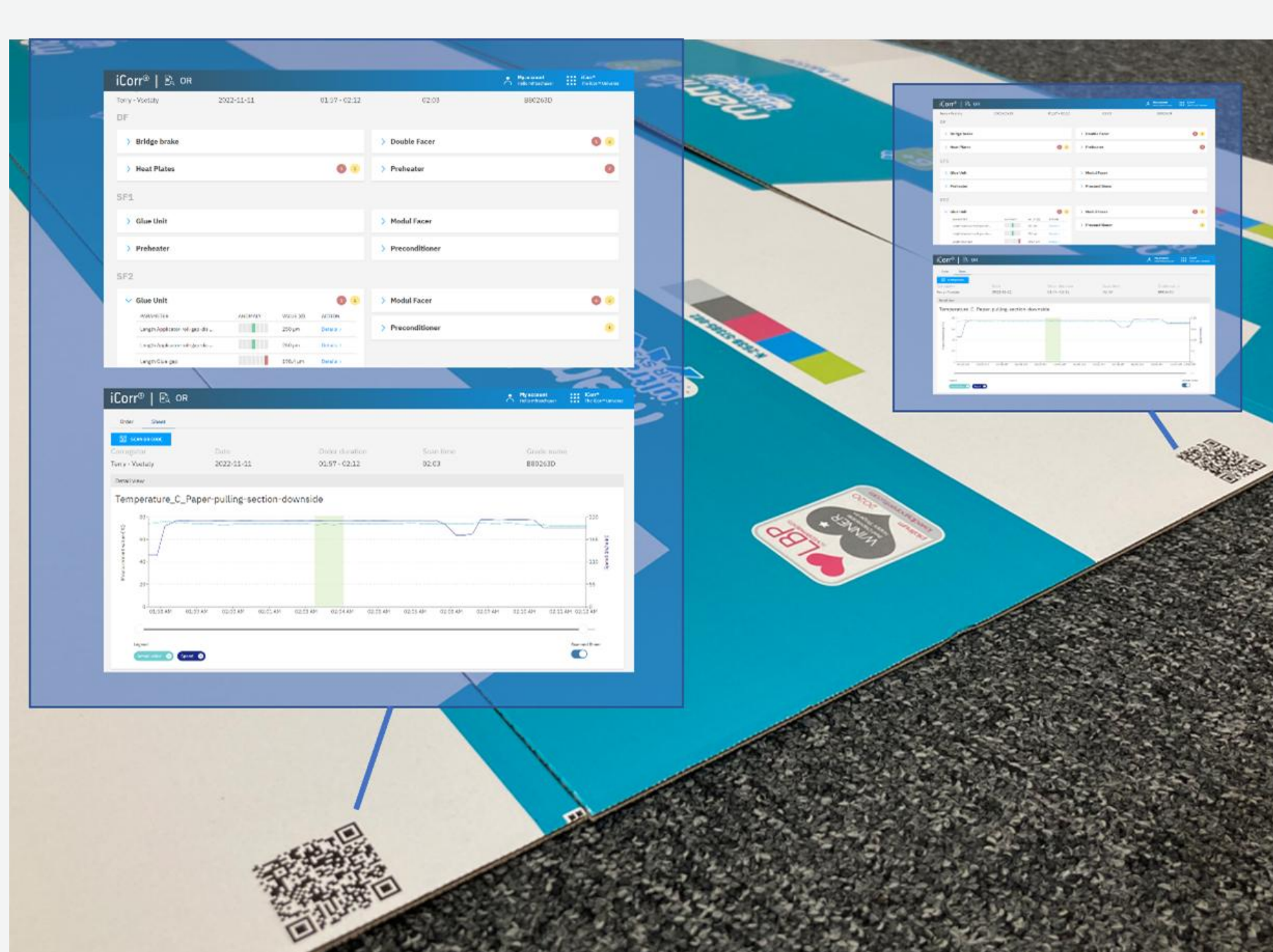


Takes less space than other marks

Other (older) print marks are taking more space, which sometimes must be cut off.
The QR-code can reduce this waste



USE CASE: SHEET REVIEW



Serialized Codes

Connection of every sheet
with its production data

Review every sheet by
scanning the code

Usable on mobile devices

Anomaly detection

ADDITIONAL USE CASES IN THE BOX PLANT



Data collection per sheet for AI models

Helps to gain insights, optimize the quality of production and give more transparency to the customer



Automatization of production

Data can be provided per sheet to the machines, which can read the data and use it for automatized production



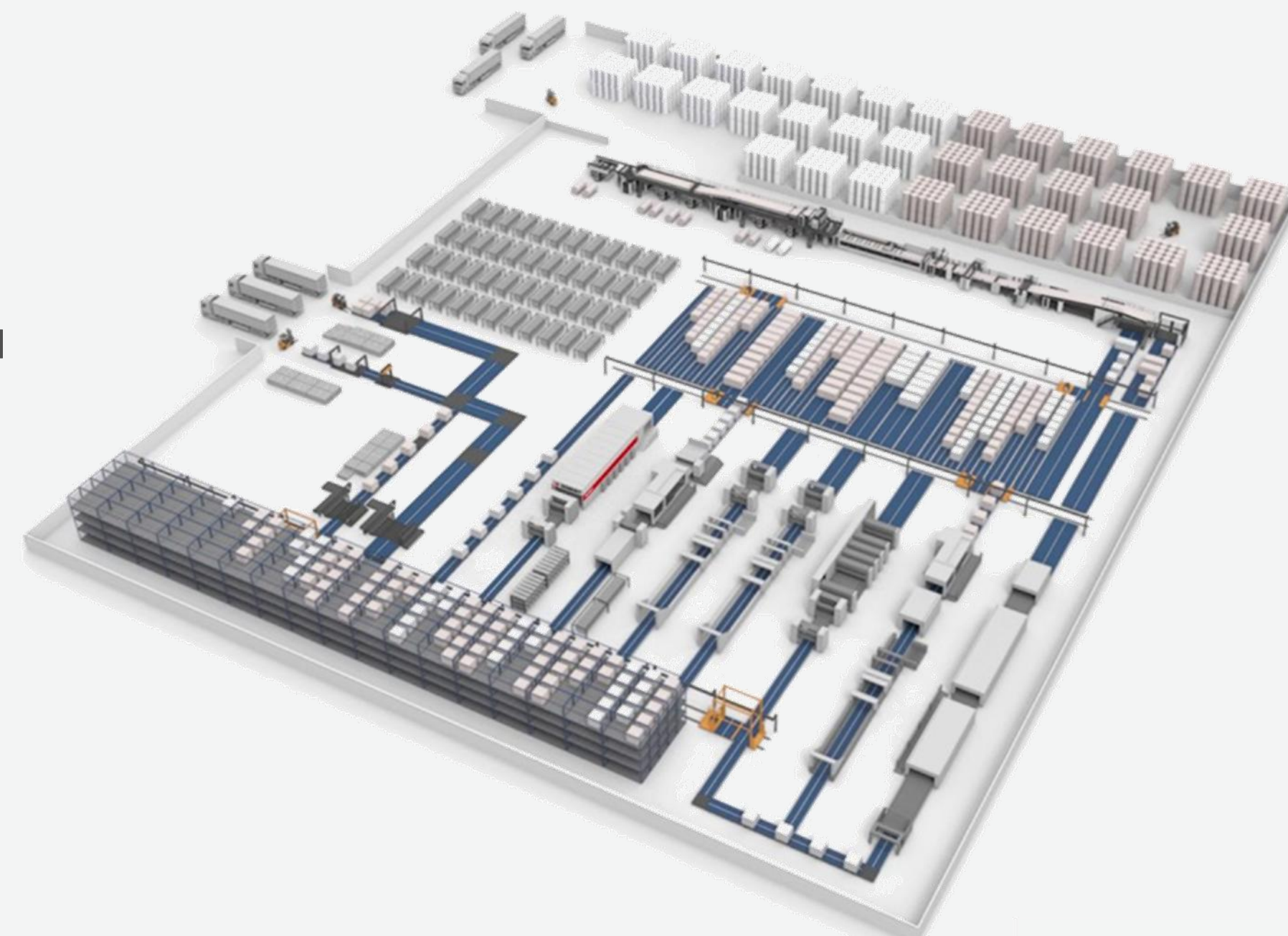
Handling of small lots

QR-codes help to handle small production quantities: separate the stacks correctly from each other

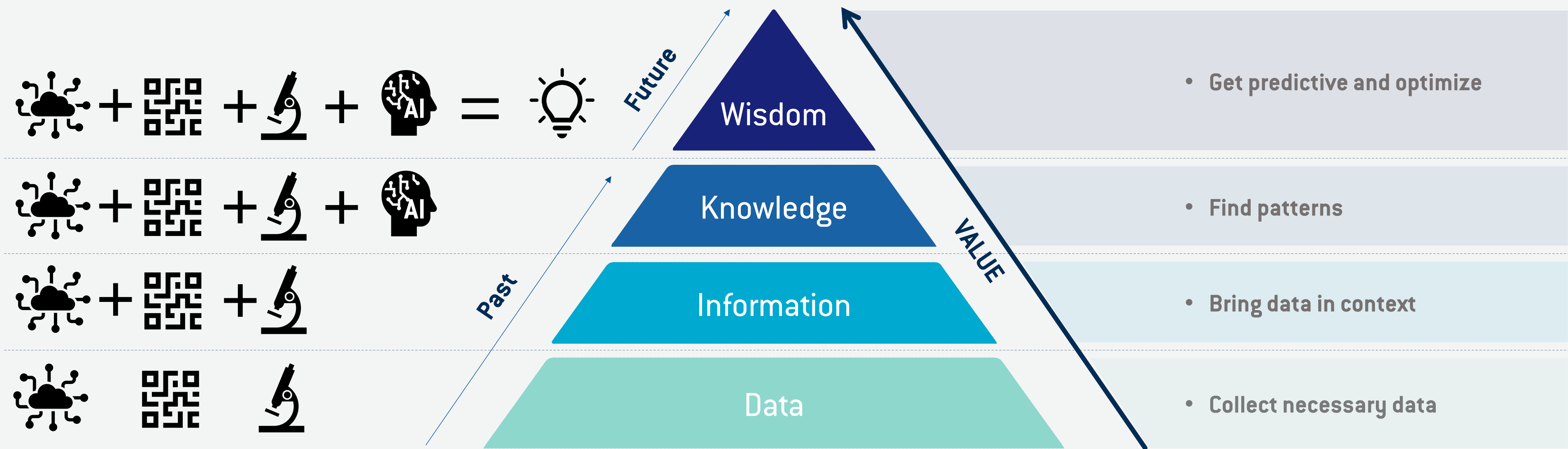


Quality assurance

Sheets and packages with defects can be identified and be extracted from production very precisely via QR-code identification



FROM „STUPID“ DATA TO WISDOM



HIGH QUALITY DATA → HIGH VALUE

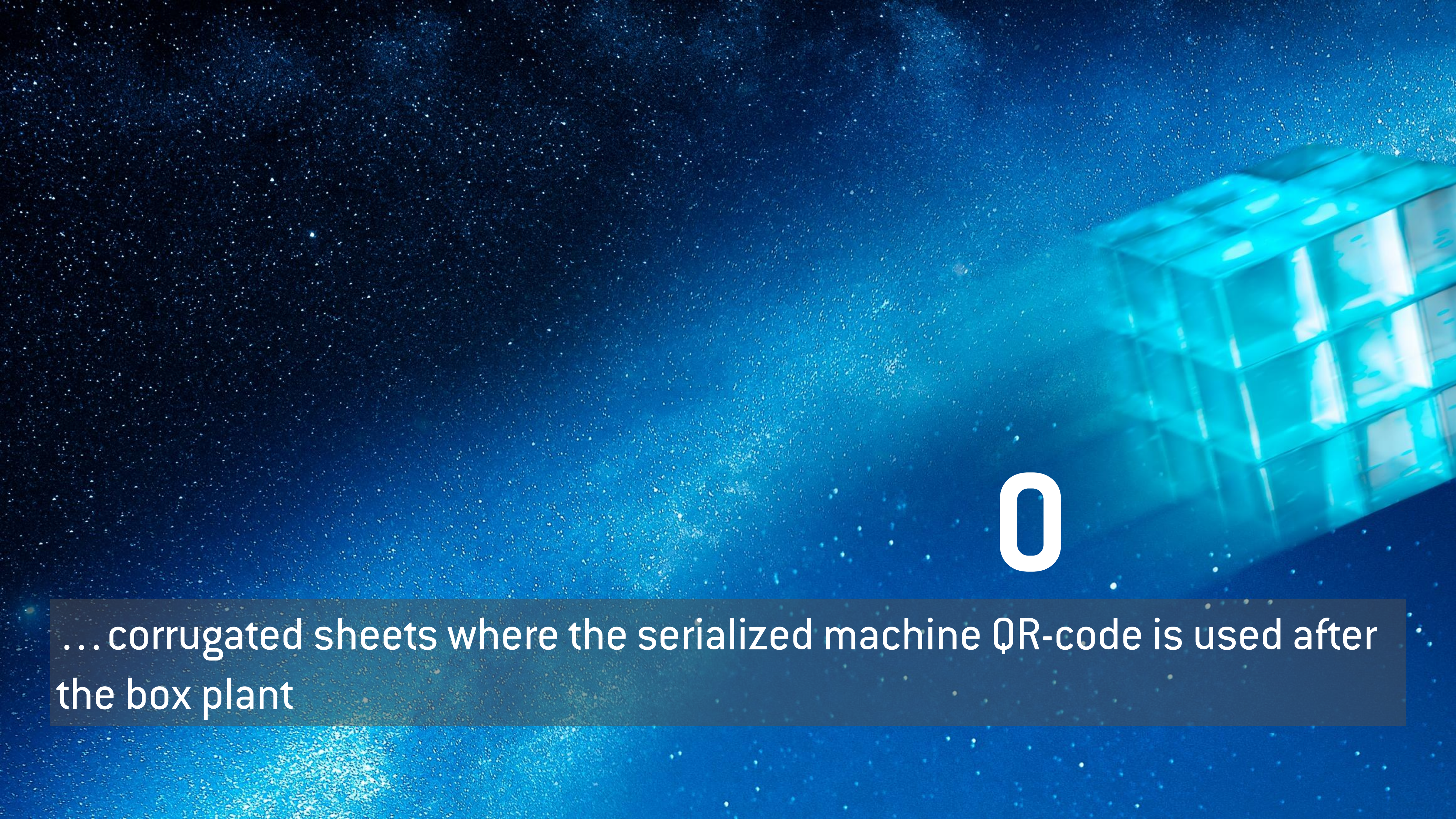
92.0000.0000.0000

103.0000.0000

0



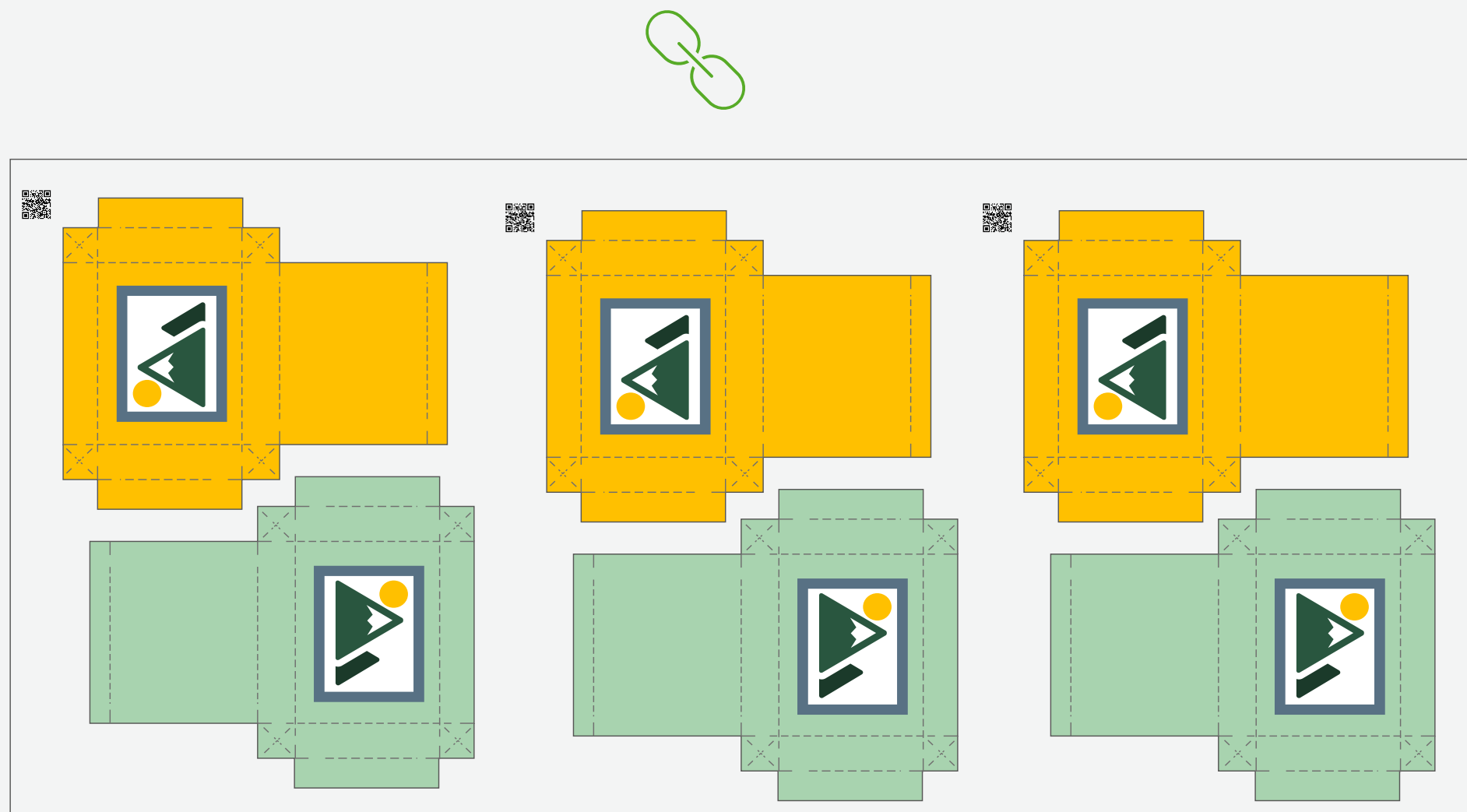
0

A large white number '0' is positioned in the lower right quadrant of the image. The background is a deep blue with a dense field of white specks, resembling a starry night sky or a microscopic view. In the upper right corner, there is a translucent, three-dimensional cube that appears to be made of glass or a similar material, with internal reflections and a grid-like pattern on its faces.

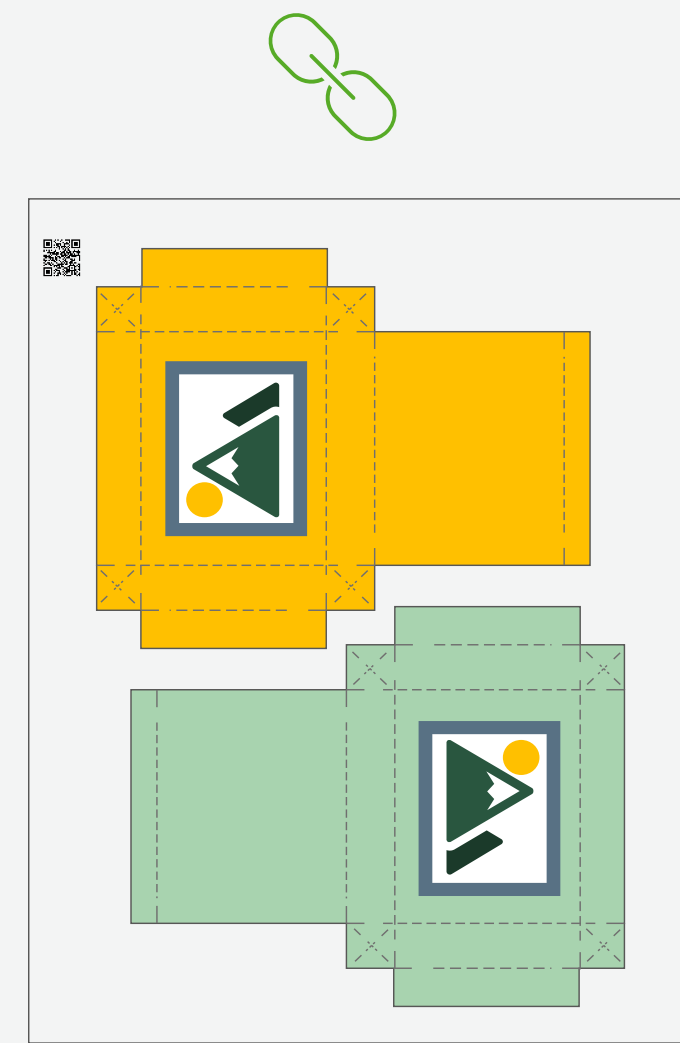
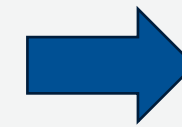
0

...corrugated sheets where the serialized machine QR-code is used after the box plant

LOSS OF TRACEABILITY

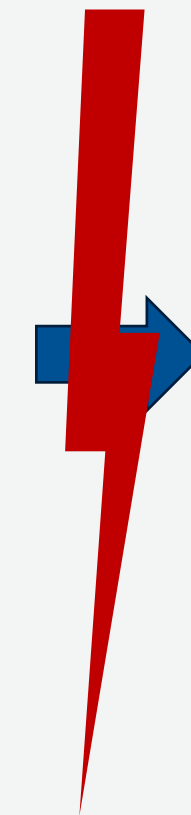


Printing of QR-codes and layout on the paper



Codes are scanned and processed at the corrugator

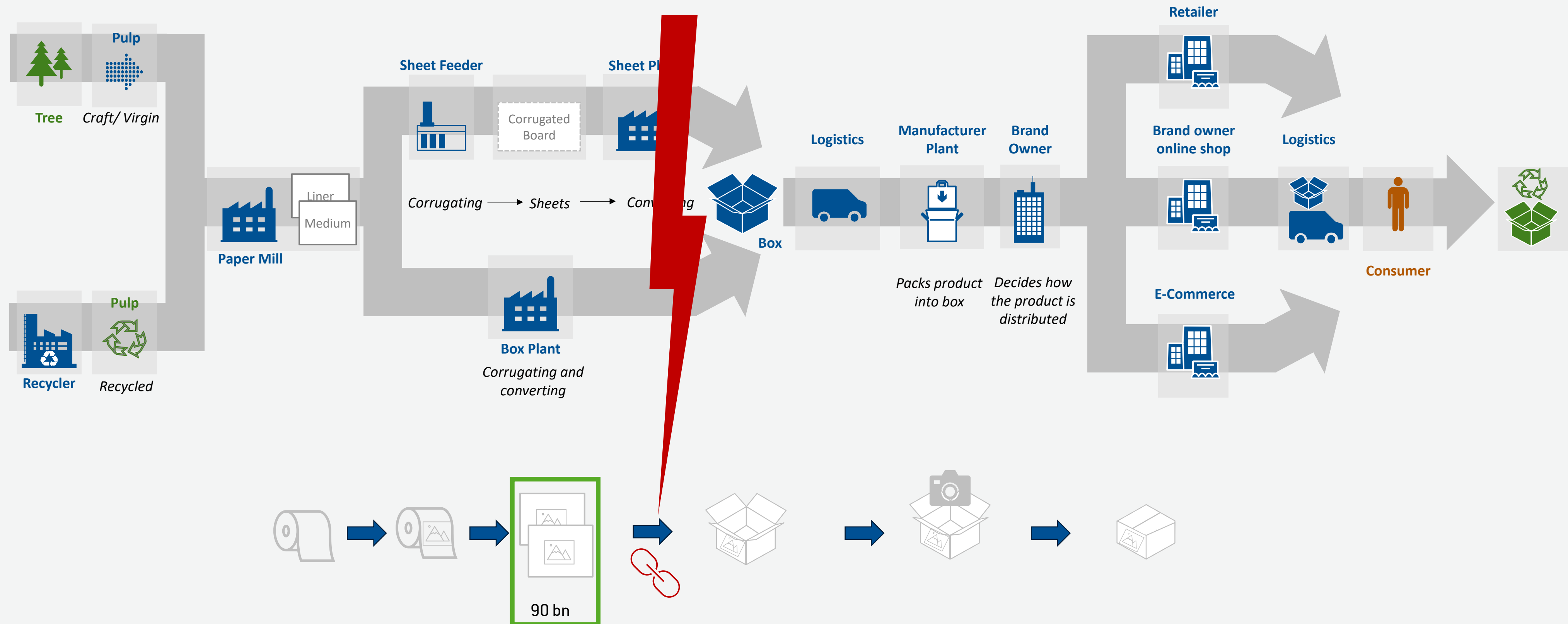
103.000.000



Codes are removed during the converting process, resulting in a complete loss of traceability.

0

CORRUGATED PACKAGING VALUE CHAIN – NOT CONNTECTED YET



Why should we pump this number up?

0 → 92.000.000.000

...or more

Because there are plenty of use cases!



No serialization needed

Digital Product
Passport (DPP)

Content
digitalization

GS1 Digital Link
(use at PoS)

Multi-language
content

PPWR content

Serialization helps

Content warnings
(fragile, this side
up, ...)

Packaging
optimization

Packaging material
optimization

Packaging strength
information

Product tracking
and optimization

CO2 footprint
tracking

Consumer
engagement

Easy reordering

Supply chain
transparency

Layout A/B testing

Dynamic content

Recall
management

Layout
optimization

Interactive content
(e.g. manuals)

Multi-media
content

Product specific AI
chatbot

Serialization needed

Replacement of
spool labels

Personalization

Learn more about
your customer

Automated
Warehouse
Routing

Digital shipping
label

Logistics
optimization

Frictionless returns

Reusable
packaging tracking

Anti counterfeiting

Weight information

REPLACEMENT OF SPOOL LABELS



Sustainability / PPWR

Less different materials on a package (glue. Label) which reduce recycability and less waste (release liner)



Appearance

Directly on the package printed content looks nicer and cleaner than an attached label



Lower material costs

The material of a label costs much more than the ink of printing an QR-code directly on a package

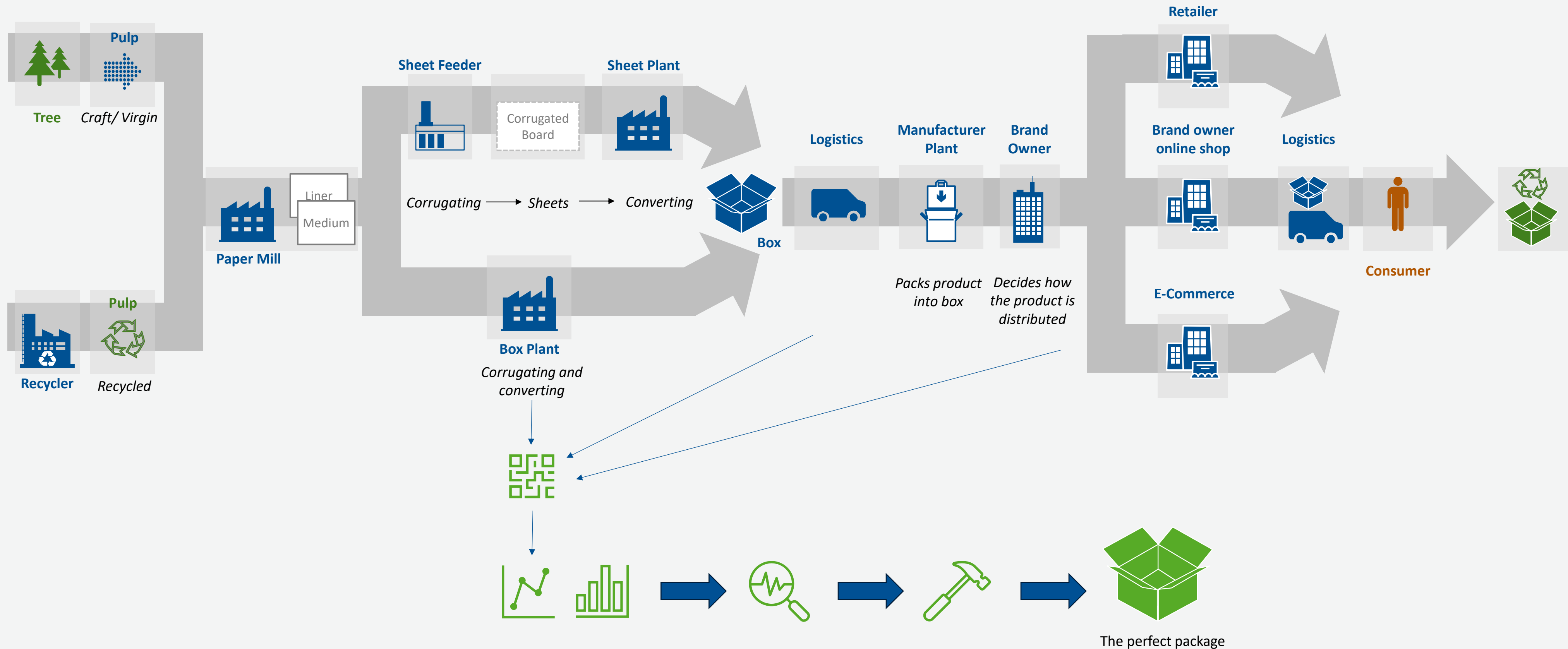


Lower process costs

No additional step needed to add the label to the package



PACKAGING OPTIMIZATION



PACKAGING OPTIMIZATION



Reduction of overfitting

Reduces packaging material



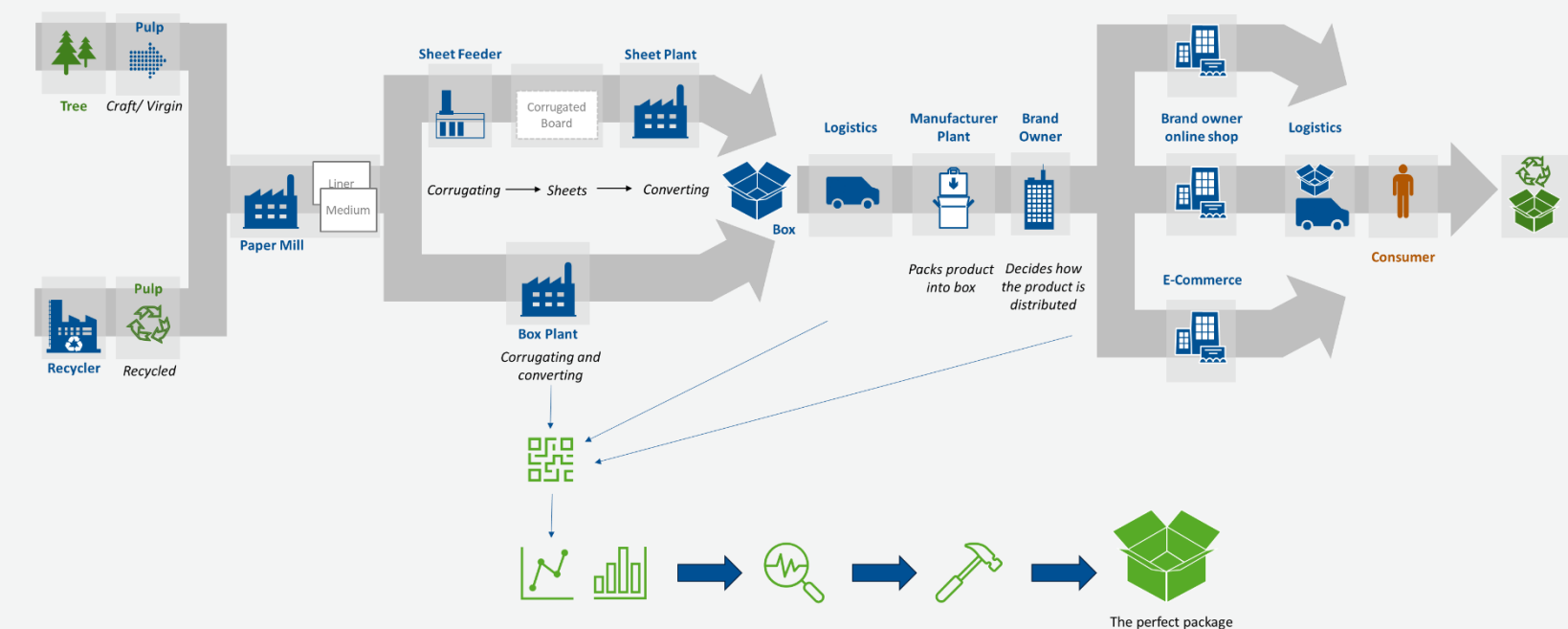
Improve packaging quality

Less reclamations because of broken or weak packages



Reduce packaging costs

If the packaging is produced tailored to the real requirements, it will reduce the costs per package, because less material is needed and production will be more efficient

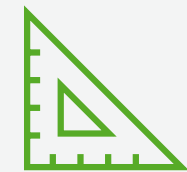


LOGISTICS OPTIMIZATION

The more data the logistics have about the packages and the content, the better it can handle them



Strength of the package



Dimensions

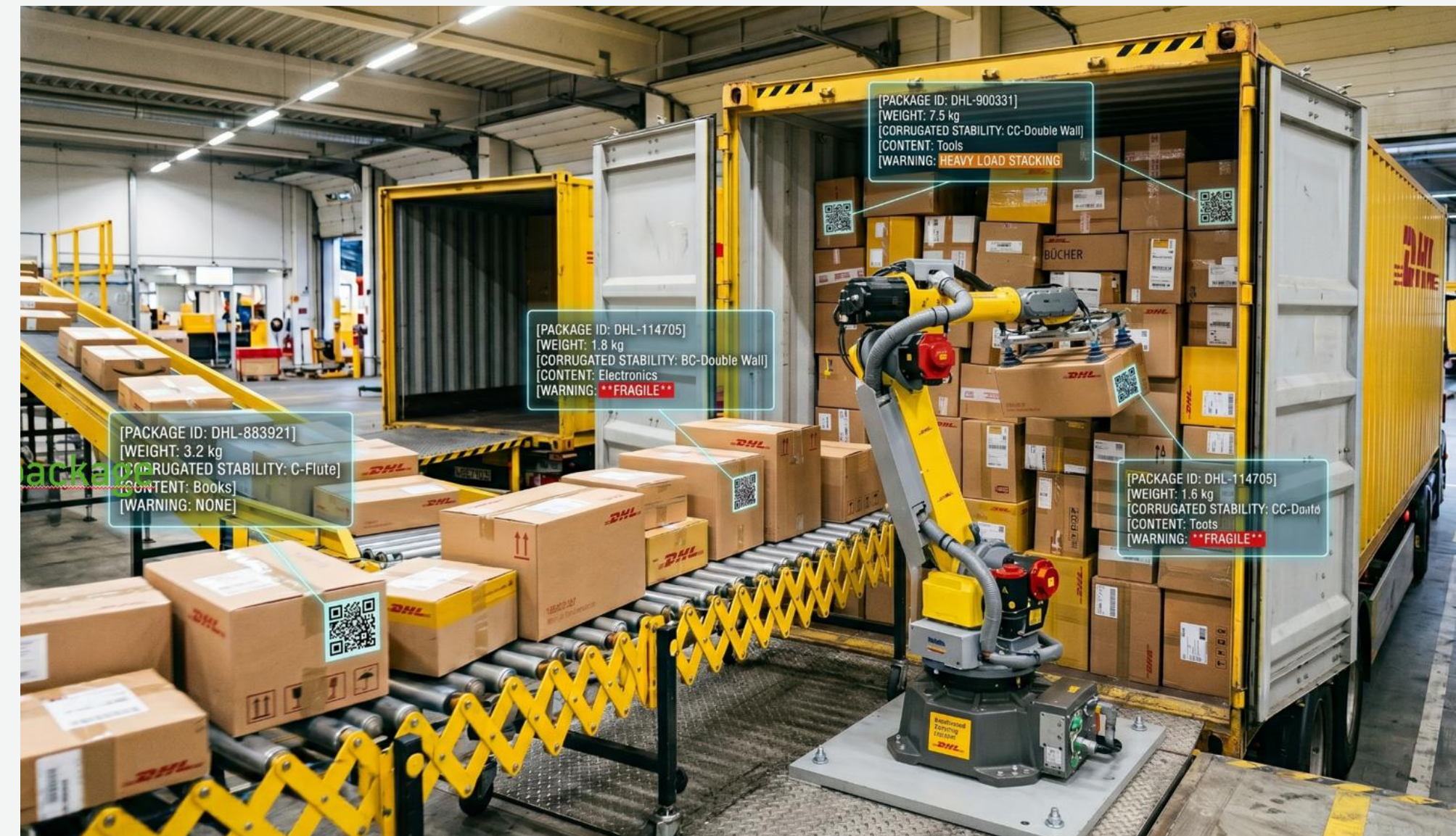


Weight

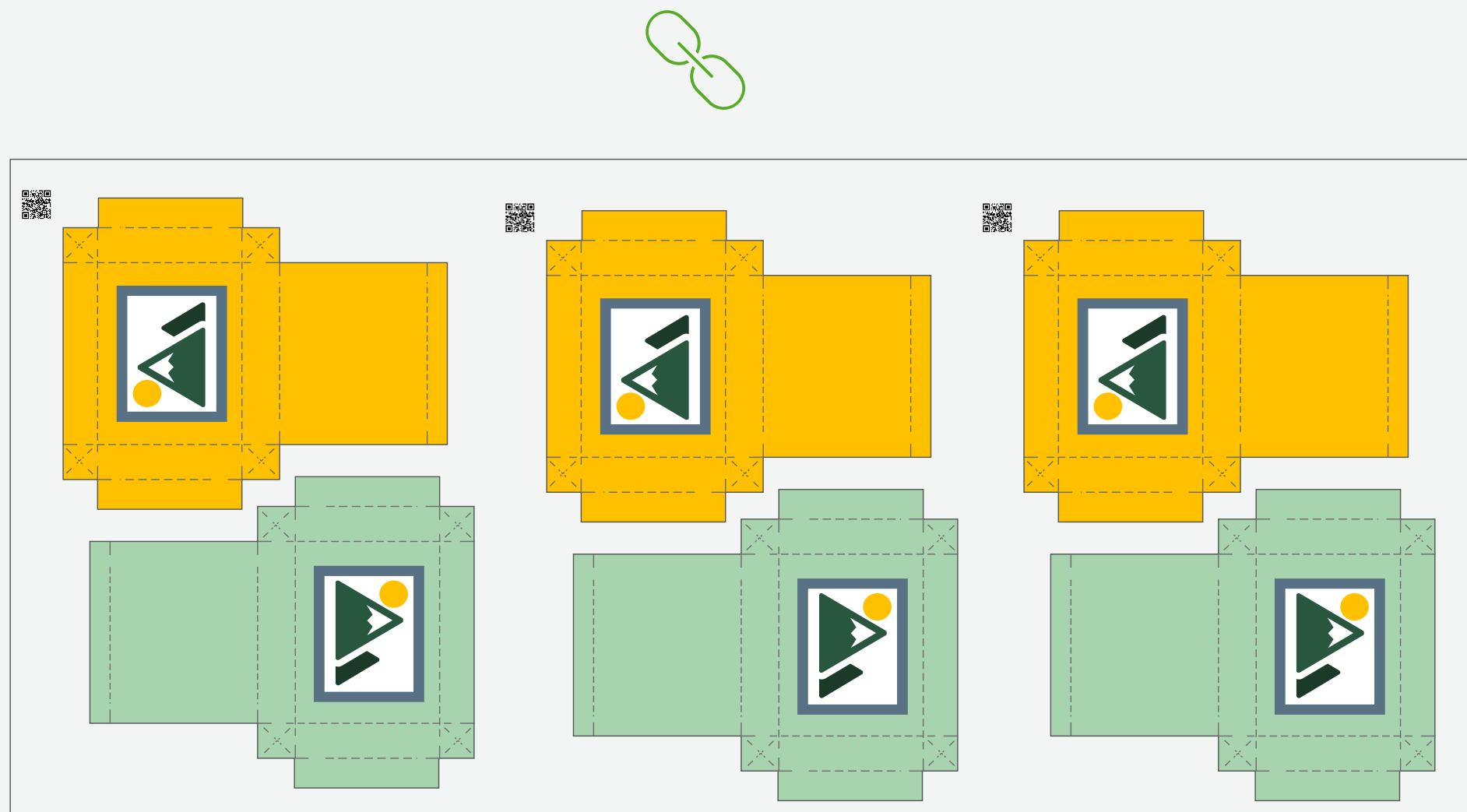


Content specifications

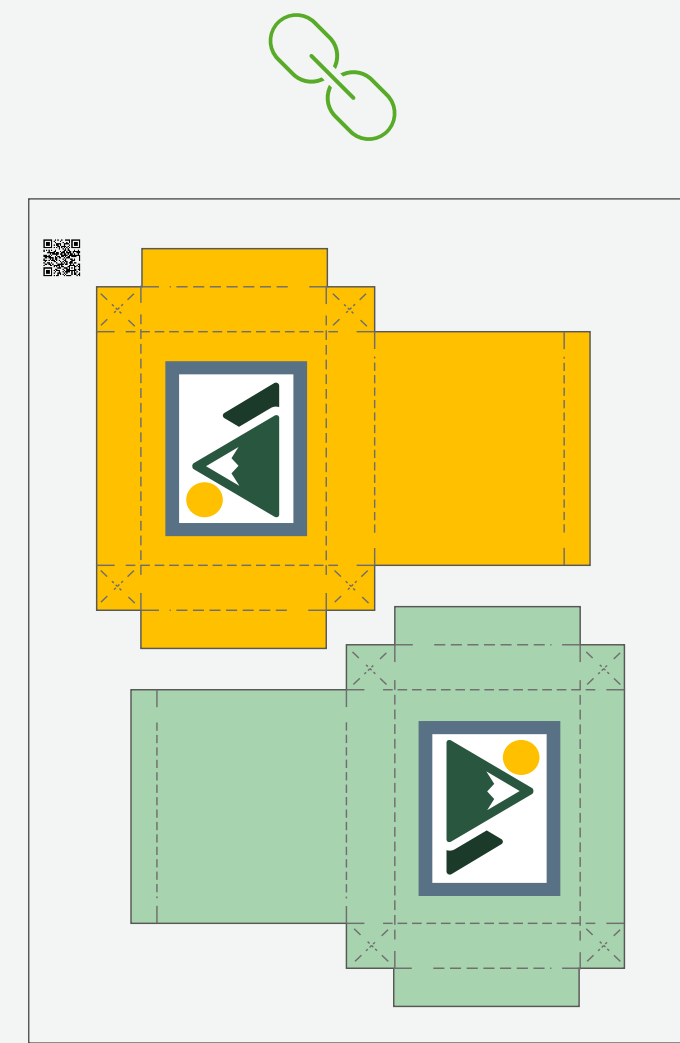
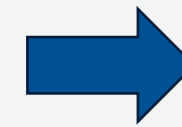
These data could help to automate the logistics process and to provide better delivery quality
(less broken packages)



LOSS OF TRACEABILITY

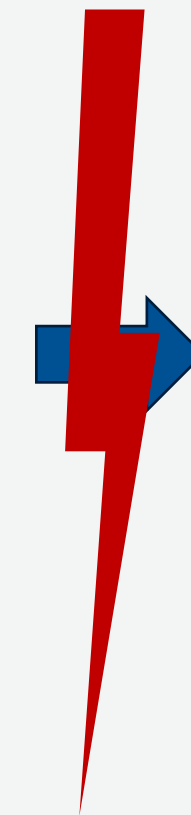


Printing of QR-codes and layout on the paper



Codes are scanned and processed at the corrugator

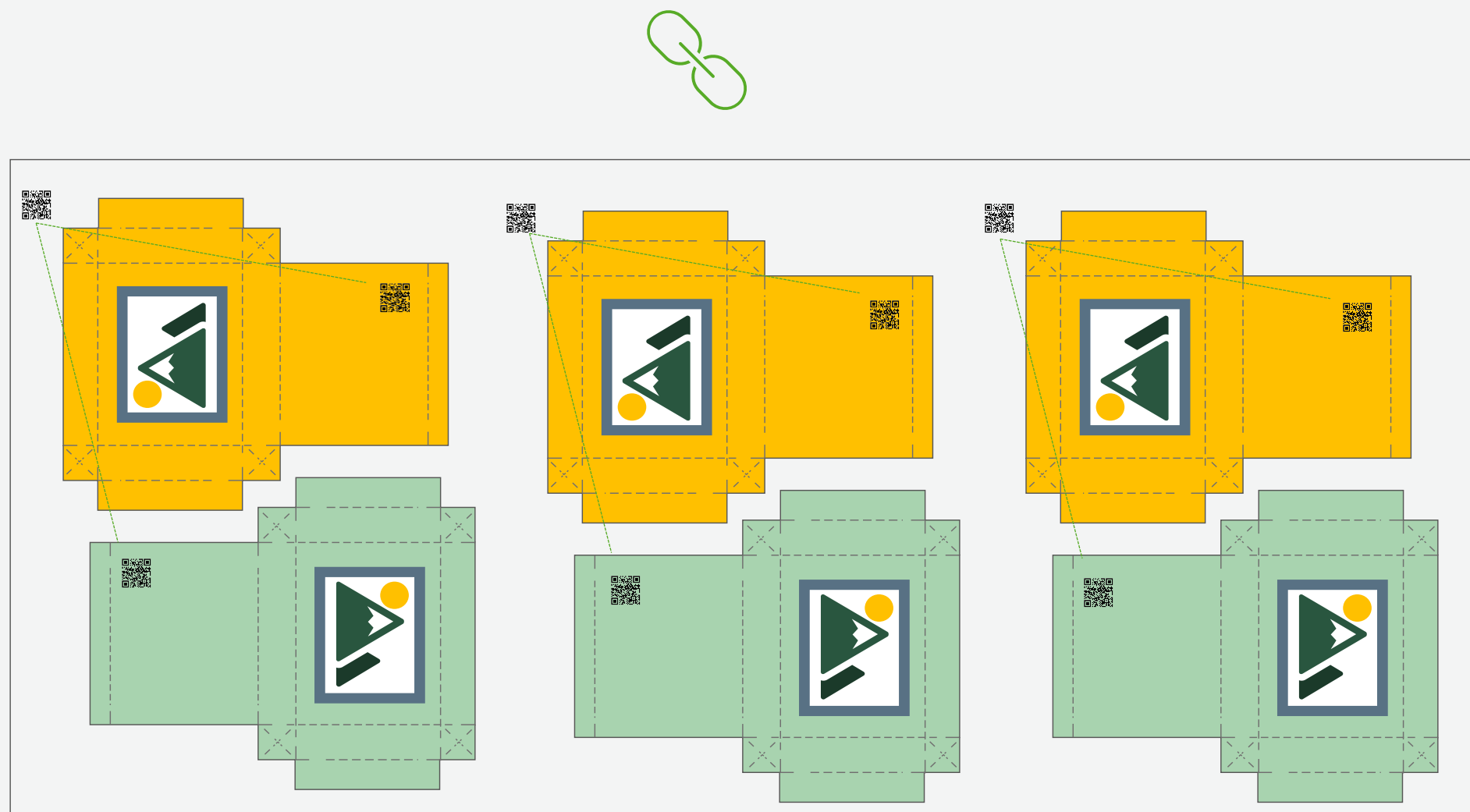
103.000.000



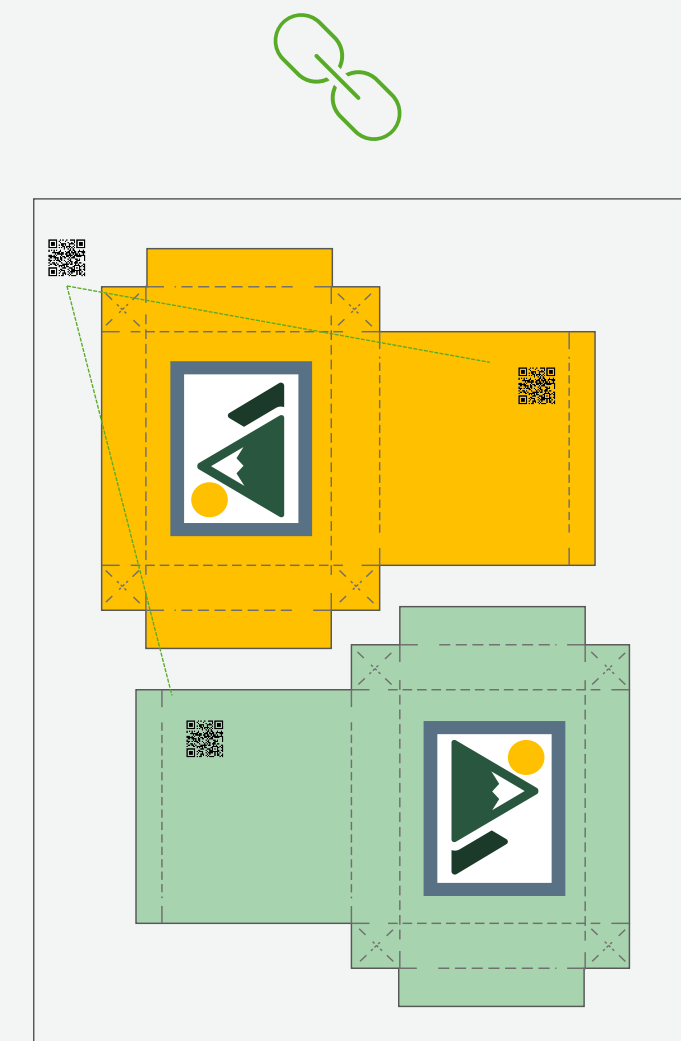
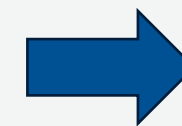
Codes are removed during the converting process, resulting in a complete loss of traceability.

0

LOSS OF TRACEABILITY



Printing of QR-codes and layout on the paper. Link sheet-codes with package codes



Codes are scanned and processed at the corrugator



Sheet QR-codes are removed during the converting process. The single packages can still be tracked, because they are digitally linked to the origin sheet QR-code

No serialization needed

Digital Product
Passport (DPP)

Content
digitalization

GS1 Digital Link
(use at PoS)

Multi-language
content

PPWR content

Serialization helps

Content warnings
(fragile, this side
up, ...)

Packaging
optimization

Packaging material
optimization

Packaging strength
information

Product tracking
and optimization

CO2 footprint
tracking

Consumer
engagement

Easy reordering

Supply chain
transparency

Layout A/B testing

Dynamic content

Recall
management

Layout
optimization

Interactive content
(e.g. manuals)

Multi-media
content

Product specific AI
chatbot

Serialization needed

Replacement of
spool labels

Personalization

Learn more about
your customer

Automated
Warehouse
Routing

Digital shipping
label

Logistics
optimization

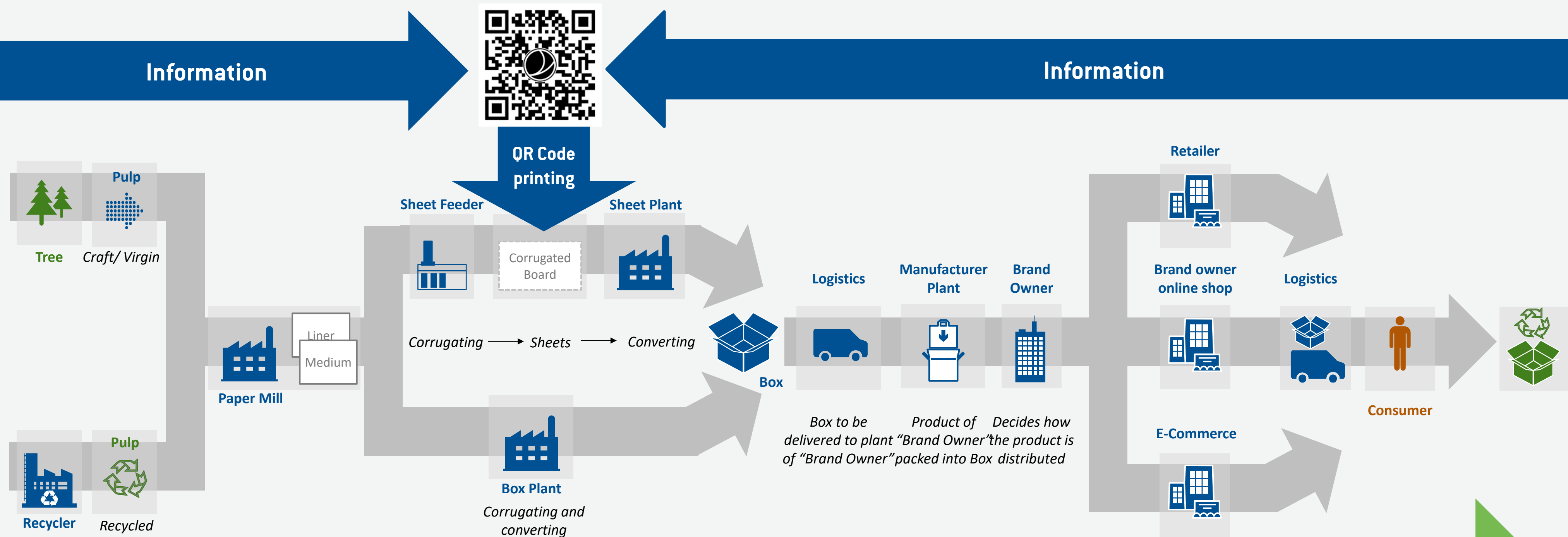
Frictionless returns

Reusable
packaging tracking

Anti counterfeiting

Weight information

CONNECT THE WHOLE PACKAGING VALUE CHAIN VIA ONE QR-CODE



LET'S CONNECT





**BHS CORRUGATED
—THINK BEYOND.**

