

XVIth International Izmir Textile and Apparel Symposium

DIGITAL TRANSFORMATION AND ITS EFFECTS ON PRODUCTIVITY IN A CLOTHING COMPANY

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Introduction

Material

Method

Findings

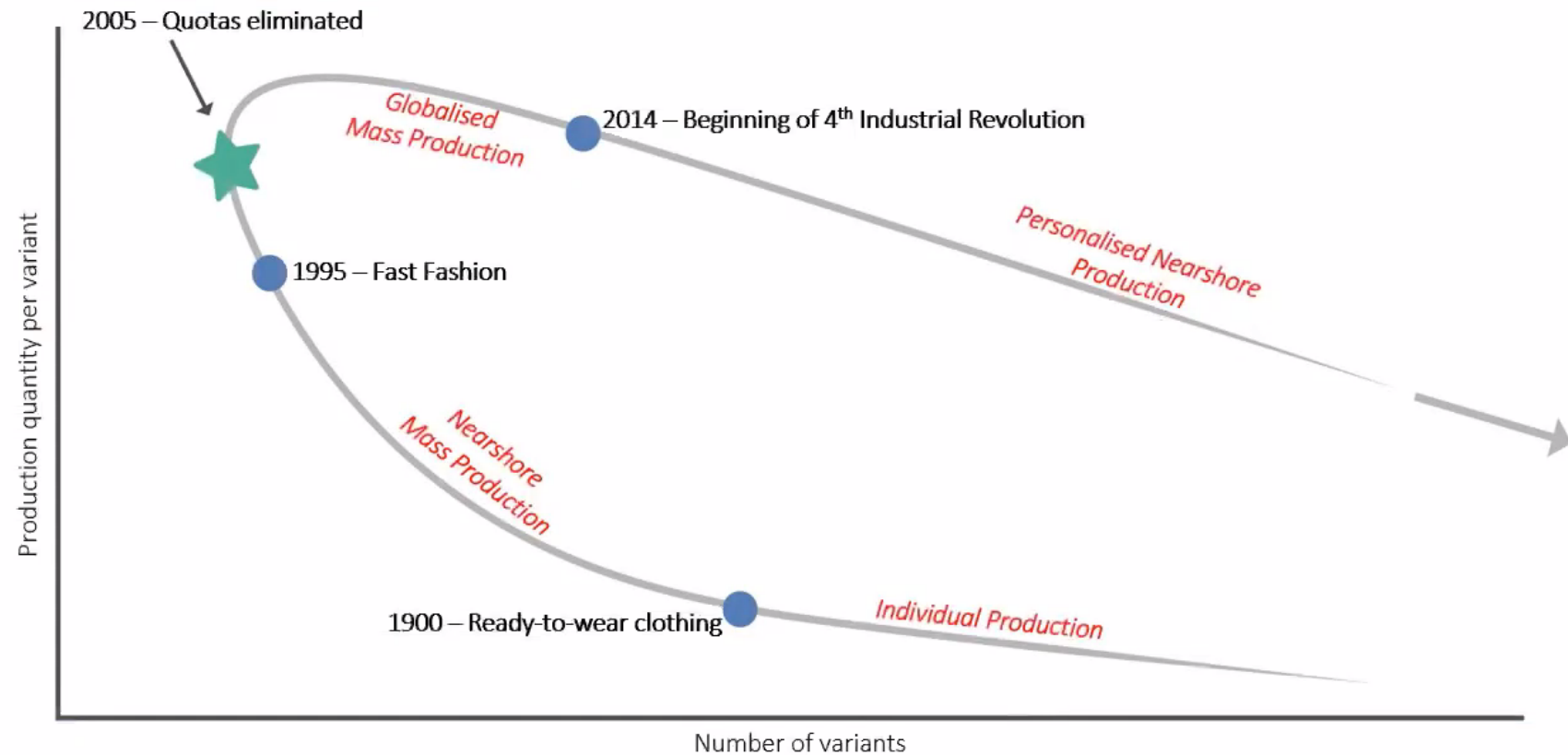
Results & Evaluations

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Operational Efficiency: Apparel “Boomerang”

Source: 



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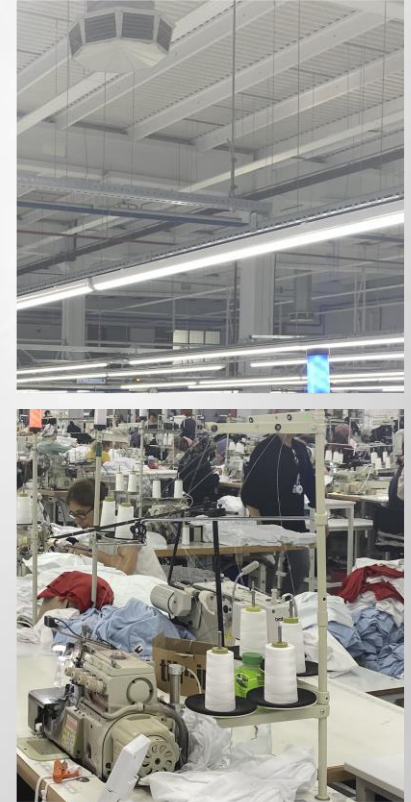
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- ✓ 60% of all personnel in a clothing company work in the production department [1].
- ✓ However, all the activities performed are highly dependent on the dexterity and performance of the operator [2].
- ✓ The fact that the data obtained from all the activities carried out in the production department is human-dependent [3].



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The objectives of this study are:

1. Effectively managing sewing lines,
2. Recording and transferring data with 100% accuracy,
3. Increasing productivity by optimizing the data...



TYH / Akhisar OSB / Sewing Production Lines

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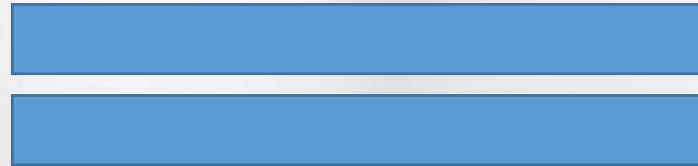
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Assembly Line 1



Assembly Line 2

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Assembly Line 14

14 Pilot Production Lines

TYH / Akhisar OSB / Sewing Production Lines

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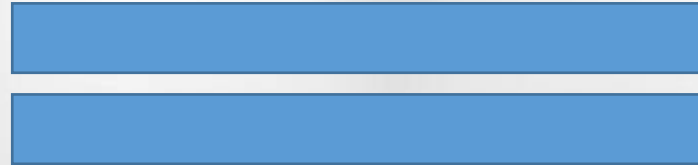
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Assembly Line 1



Assembly Line 2

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Assembly Line 14

Full Set-Up Pilot Line No:2

- 25-30 Sewing Machines
- 3 Quality Control Stations,
- 1 Packaging Station
- 40 Operators / line

TYH / Akhisar OSB / Sewing Production Lines

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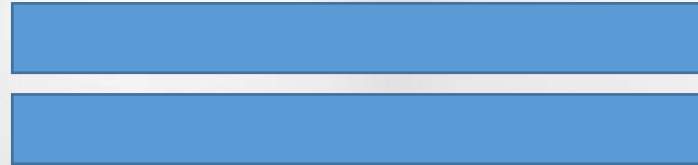
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Assembly Line 1



Assembly Line 2

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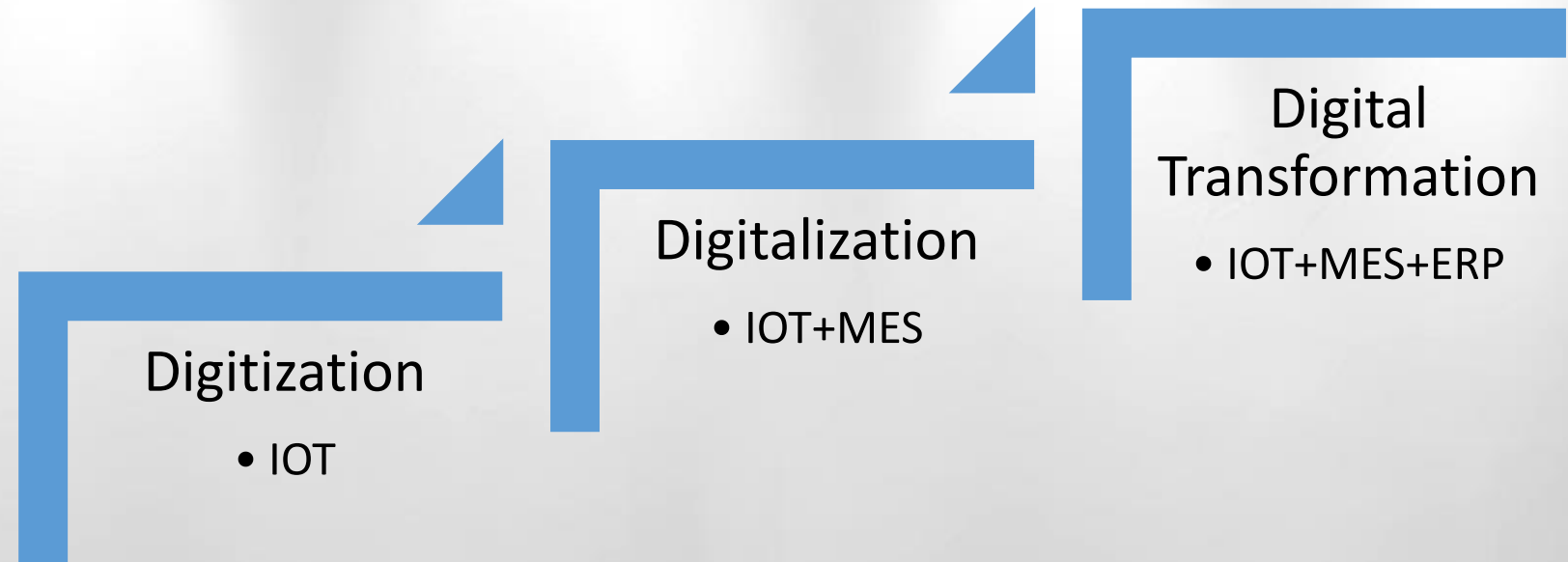
Assembly Line 14

The Other 13 Line:

- 2 Sewing Machines
- 3 Quality Control Stations,
- 1 Packaging Station
- 8 Operators / line

Figure 1. The digital transformation steps of the project

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Digitization

- IOT

 QR DOR IOT

For every type of sewing machines

 QR QP IOT

For quality control and packaging stations

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Digitization

- IOT



Figure 2. Screen samples of the DOR IoT

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Figure 3. QP IoT devices in the production field

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- IOT



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- IOT

Digitalization

- IOT+MES

**Digital
Transformation**

- IOT+MES+ERP

Figure 4. Quantum MES login page and screen sample

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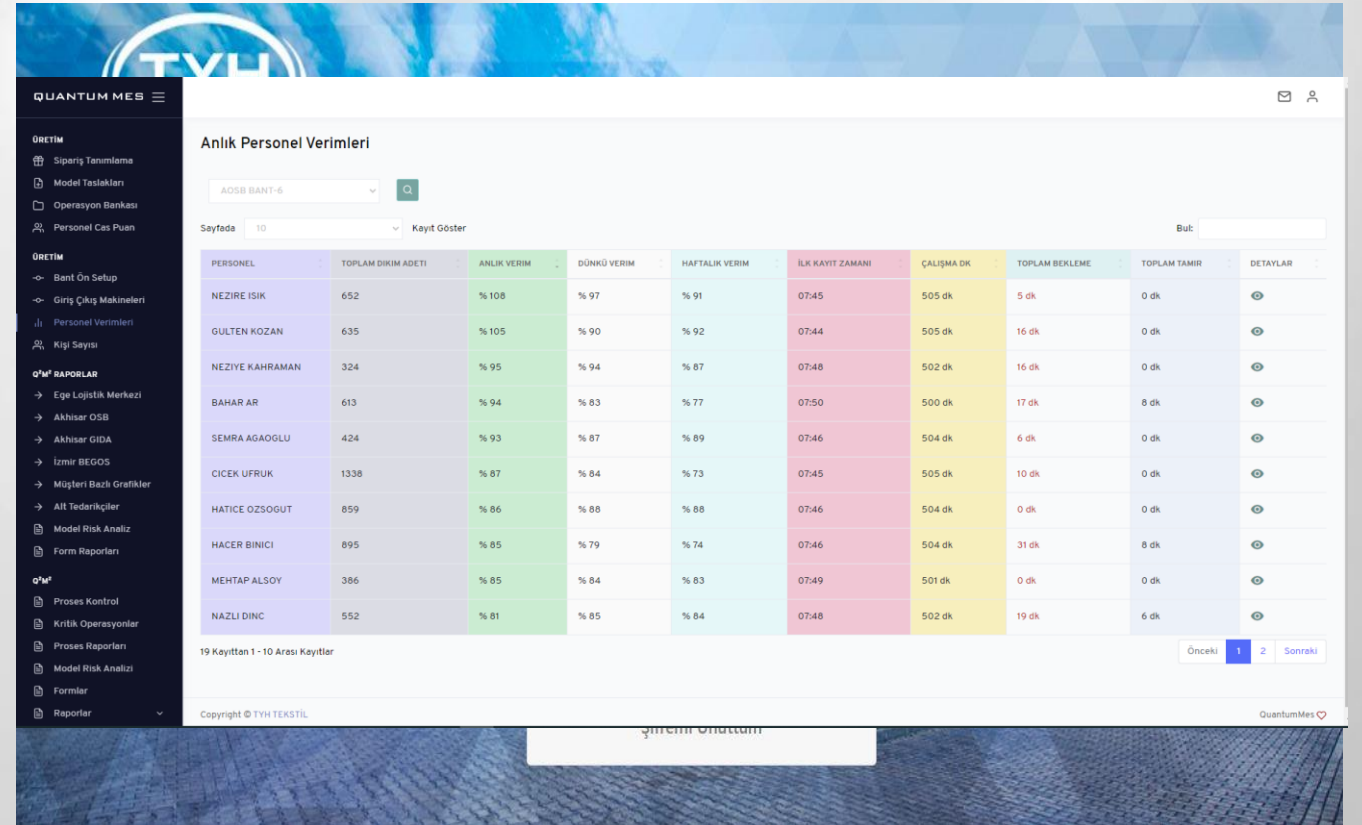
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Digitalization

- IOT+MES



The image shows the Quantum MES login page and a screen sample. The login page features the TYH logo and a navigation menu on the left. The screen sample displays a table of personnel data.

PERSONEL	TOPLAM DİKİM ADETİ	ANLIK VERİM	DÜNKÜ VERİM	HAFTALIK VERİM	İLK KAYIT ZAMANI	ÇALIŞMA Dİ	TOPLAM BEKLEME	TOPLAM TAMİR	DETAYLAR
NEZİRE İSİK	652	% 108	% 97	% 91	07:45	505 dk	5 dk	0 dk	
GULTEN KOZAN	635	% 105	% 90	% 92	07:44	505 dk	16 dk	0 dk	
NEZİYE KAHRAMAN	324	% 95	% 94	% 87	07:48	502 dk	16 dk	0 dk	
BAHAR AR	613	% 94	% 83	% 77	07:50	500 dk	17 dk	8 dk	
SEMRA AGAOĞLU	424	% 93	% 87	% 89	07:46	504 dk	6 dk	0 dk	
CİCEK UFRUK	1338	% 87	% 84	% 73	07:45	505 dk	10 dk	0 dk	
HATICE ÖZSOGUT	859	% 86	% 88	% 88	07:46	504 dk	0 dk	0 dk	
HACER BİNİCİ	895	% 85	% 79	% 74	07:46	504 dk	31 dk	8 dk	
MEHTAP ALSOY	386	% 85	% 84	% 83	07:49	501 dk	0 dk	0 dk	
NAZLI DİNC	552	% 81	% 85	% 84	07:48	502 dk	19 dk	6 dk	

19 Kayıttan 1 - 10 Arası Kayıtlar

Önceki 1 2 Sonraki

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QuantumMes

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Digitalization

- IOT+MES



Digital
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- IOT+MES+ERP



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Table 1. Data transfer test findings of the DOR IoT

	DOR IoT v6.0
Data Count Accuracy Rate*	99,64%
Data Transfer Accuracy Rate*	99,73%

**The findings regarding the results of the data transfer test performed with more than 100,000 data for 3 months*



Figure 5. Quantum MES notifications and e-mail report samples

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Akhisar OSB Tamir Oranları

TYH Quantummes <quantummes@tyh.com.tr>
To: Gamze KARA
Cc: Şafak BİROL
Per 31.08.2023 11:16

Merhaba,

Bu saate kadar olan(11:15:58) kalite tamir oranları ve dikimde oluşan operasyon hata oranları aşağıda listelenmiştir.

Akhisar OSB Tamir Oranları(Kalite) 31/08/2023				
Sıra	Bant	Toplam Kontrol	Tamir Adeti	Oran
1	AOSB BANT-13	155	0	%0
2	AOSB BANT-6	363	0	%0
3	AOSB BANT-12	79	0	%0
4	AOSB BANT-7	175	0	%0
5	AOSB BANT-9	175	0	%0
6	AOSB BANT-5	200	0	%0
7	AOSB BANT-1	26	0	%0
8	AOSB BANT-2	342	0	%0
9	AOSB BANT-8	204	3	%1.47
10	AOSB BANT-11	237	1	%0.42

Toplam Kontrol	Toplam Tamir	Oran
2038	0	%0

Akhisar OSB Dikim Operasyon Hata Oranları 31/08/2023		
Sıra	Operasyon	Oran
1	AOSB BANT-12 - S4 - Fermuar Takma-SEMRA K	%0
2	AOSB BANT-7 - S4 - Yan + Kol Altı Karyoka-GULİZAR	%0
3	AOSB BANT-12 - S4 - Cep Ust + Yan Cima-NERİMAN	%0

Bilgilerinize sunarız
TYH YASA TEAM

11:32 TELEGRAM 4G

Quantummes OSB-2.Grup-Ezgi 10 abone

AOSB BANT-5 - S4 - Dugme Dikme x 2-KIYMET - Hata Oranı - % 28 11 16:00

AOSB BANT-5 - S4 - Utu-DILEK - Hata Oranı - % 20 11 16:00

AOSB BANT-5 - S4 - Omuz Gaze-AYSE - Hata Oranı - % 20 11 16:00

AOSB BANT-6 - S4 - Yirtmac Kapama-UMMU - Hata Oranı - % 20 11 16:00

AOSB BANT-5 - S4 - Yan Catma-NAZAN - Hata Oranı - % 20 12 16:00

AOSB BANT-9 - S4 - On Beden Cep Takma-MUKADDER - Hata Oranı - % 19 11 16:00

AOSB BANT-9 - S4 - Kapson Tutturma-CANAN - Hata Oranı - % 18 12 16:00

Quantummes OSB-2.Grup-Ezgi

AOSB BANT-5 - S4 - Utu-CANSEL



DOR IOT



canias^{ERP}



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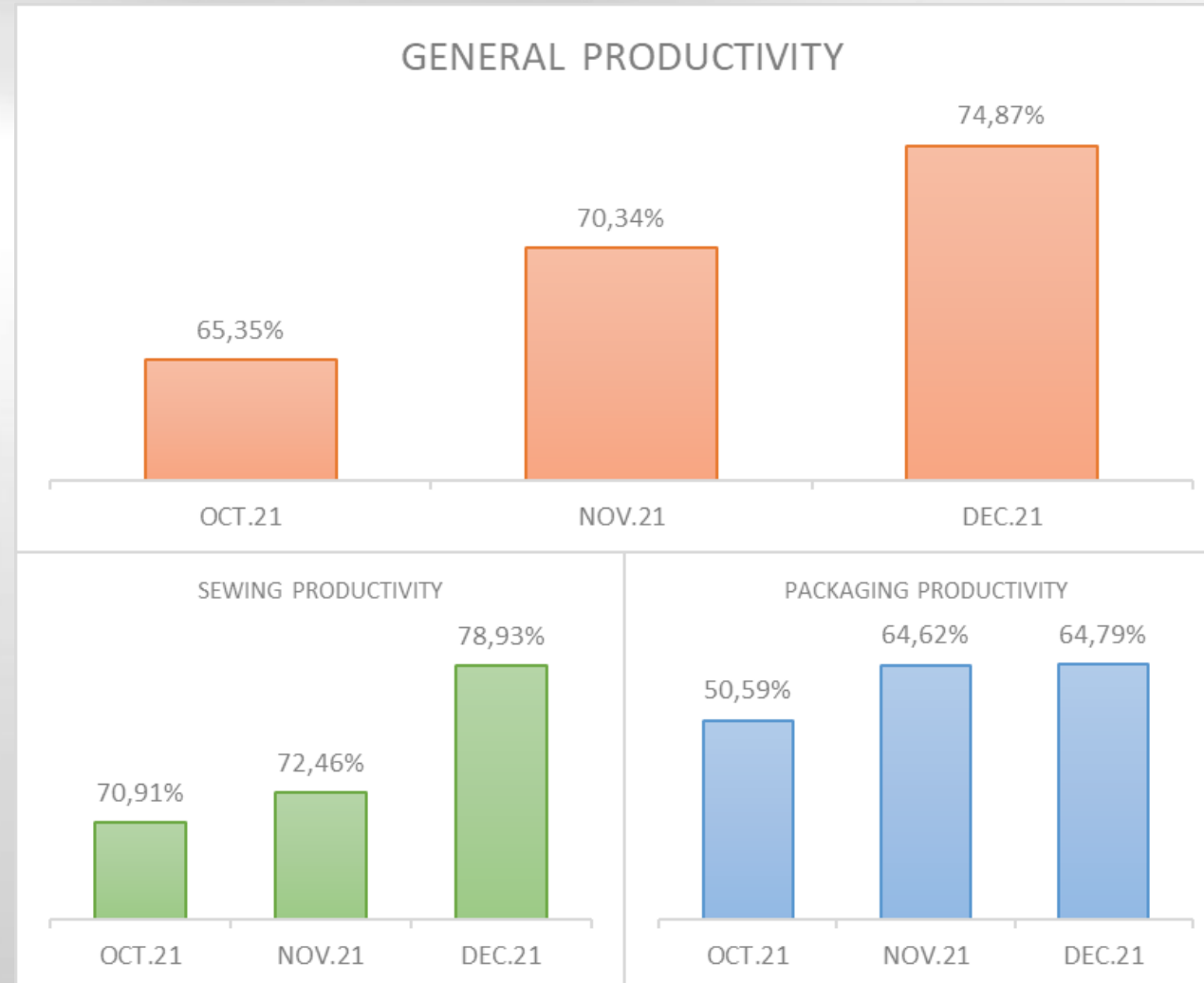


Figure 6. General productivity analysis

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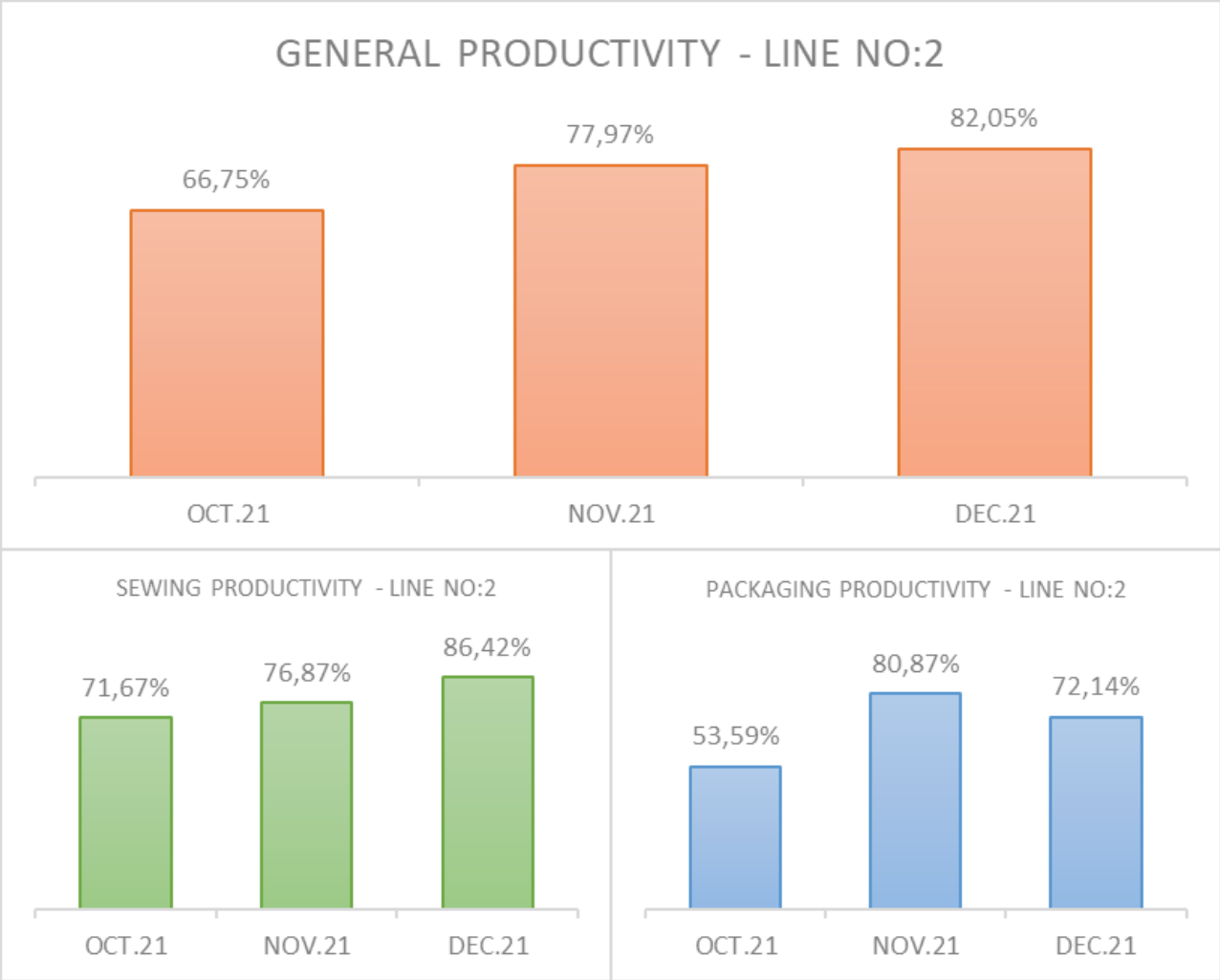


Figure 7. Line no:2 productivity analysis

QUANTUM MES

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ERP Entegration
Module



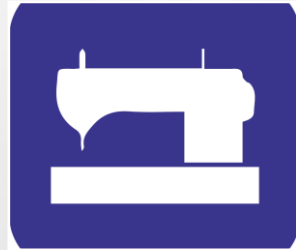
Operation Bank
Module



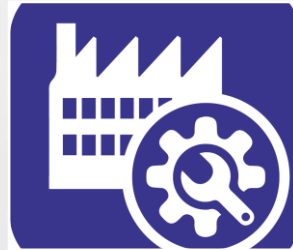
Competency
Analisis Module



Model Preparation
Module



Sewing Machines
Module



Pre Setup Module



Smart Line Balancing



Production Tracking

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- Real-time and online monitoring of all important production data,
- Accurate and detailed identification of lost times depending on stoppage type
- Checking conformity with the Sewing Line installation plan automatically,
- Allowing intermediate (buffer) stock optimization,
- Creating a digital twin of the manufacturing plant,
- There are no compatibility issues because the software (Quantum MES) and hardware (DOR IoT) are co-developed,
- The infrastructure of Quantum MES / CAS module and DOR IoT devices can be adapted to any bonus system to be applied,
- Quantum MES software has a technological infrastructure that can be integrated with all ERP systems,
- The ability to deliver more cost-effective goods via the use of patented hardware and software technology,
- Being a project designed and completed under the framework of the TÜBİTAK Industry R&D program.

S

- Artificial intelligence (machine learning) capabilities are not yet integrated in the Quantum MES platform's data analysis methodologies,
- The created technology has not yet been tested in the manufacturing facilities of other industry leaders,
- Although Quantum MES software provides an appropriate foundation for integration, other ERP systems have not yet been evaluated,
- The report screens for the Quantum Quality Management Module have not yet been finalized,
- Pre-sewing processes have not yet been implemented in the system.

W

- Breakdowns in the worldwide supply chain (chip crisis, etc.)
- The possibility that the prices of electronic materials would rise as a consequence of changing exchange rates.
- The risk of delaying digital transformation investments due to the global economic recession.
- Prolonged supply period due to electronic card duplication in Far East countries.

T

- For the first time in our firm, we are offering the opportunity to create revenue through the sale of Industry 4.0 software and hardware solutions.
- To domestic and foreign enterprises in response to the sector's rising need for digital transformation; IT services and consulting are available.
- With a digital web platform and IOT solutions, the system may be used in a variety of production fields (logistics centers, cutting, embroidery, piece printing production tracking systems).
- Having a technical infrastructure that can be tailored to various industries,

O



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THANK YOU...

Findings

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References

