Digital Twin Definition: A digital duoin is a virtual representation

of a real world asset.

Crealed using seal time data from IOT and sensors Key functions: 1) deal dime monitoring: continous monitoring, helps in detecting failures - optimize production 2) predictive maintainence -> predict failures by using seal time
data and help schedule maintainence to prenent any
down time 3) Simulation: digital point can help simulate different
manufacturing scenarios without having to physically
alterate 4) Remole assistance: experts can use digital trains to analyze and vikualise and for trouble enooling and offer remole training Offer remole training implone the peodict keeping the customer reviews and real time data in check.

Virtual Factory	op Lating 9
Definition: A virtual factory is a compulu generale	destrivitual
simulated of a real world manufacturing fac	lety
includes machines work flows and duman	(N)
interactions in a digital environment	Chance the
Key features in government wandered : principalinger and	ir dave (1 9
marganhord activides &- maring this	203ksh
1) Simulation and modelling: Allows manufactures to v	isualise
and dig analyse procuses digitally in Order to find	both news
and ophinise workflows without progress providing	9
	i rama
2) propos opinitation.	citaturais (f. g
2) Training in proportion of the prophice uning machinery of	and
2) Training: operators can practice using machinery of upskilling without sisking equipment	- Land
3) virtual Commissioning: Simulates the integration of	now of the
machinery into the production live witho	ut so
machinery into the production live witho	Sept. 1
	~~~
4) predictive analysis: virtual factories can analyse time data and anticipate potential issues.	29. AM
All the act and and the shirt shirt las	2 Janua
5) rollaboration: stake holders can interact with vir	lual
5) collaboration: Stake holders can interact with vir models to make data-driven decisions collab	poratively.
	U

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-9	
3	Virtual Factory Software (11500 Contability of the order of the
3	
4	· Anylogic -> versatile simulation used in industrial curas
1	· Anylogic -> versatile simulation used in industries such as manufacturing, healthcare etc.  It supports multiple modelling methods.
3	It supports multiple modelling methods
<b>13</b>	and promotorious animalous some
- <b>3</b> _	· Axena -> A discrete - event somulation tool
3	commonly used in manufacturing and supply chain
3	analusia
<b>∂</b> −	· Flensim -> A 3D simulation software in visualizing manufacturing and logistic processes.
3	manufacturing and logistic processes.
<b>9</b>	Exampled pending to pullby a minimises of feets or man as
•	cimitations top virtual factory software
	· automization: virtual Factory models must be dighty
<b>29</b>	Customised to factory reflect real factory conditions.
<b>D</b>	
1	· Cost: Developing and implementing virtual factories can
	de expensive: 30 mil 23 growg was marker and kinder
3	Tomaratia Couldwood with proceeding with the
3	· Roal time data: Accurate simulations require real time
3	data collection
3	
	* Data Analytics Integrationy: most softwares can model
-	process: a joint door
)	Consider Actions of the Constant of the Consta
3	A few chave advanced analytics
-3	enistance to make to the player may be account to
B	"Artificial Neural Networks"
-	The state of the s

Total productive maintainence (TPM)
Definition -> TPM is a maintainence strategy that
maximises the effeciency and the effectiveness of
the machinery by involving all employees in proachine
and prenentatine maintainence
Joer an ilo Luwipo trasus - Dorazho A = Durina:
Key-Benefitz: 2 brue perious almon us becas ideamino)
O division of the construction of the construc
· increased reliability -> Reduces equipment breakdowns  twough preventative maintainence
tuougn prenentative maintainene
그는 그는 그는 걸리가 되었으면 결정 회사를 가는 가장이 되었다. 나는 사람들이 나는 사람들이 되었다는 것이 사람들이 되었다는 것이다. 그는 사람들이 되었다. 그는 사람들이 다른 사람들이 되었다.
· Enhanced platuet quality -> minimises defects -> more
exorded pronsistintingualthy all client
improved efficiency - ophinises machine performance ->
· improved efficiency -> optimises machine performance ->
· Cultural transformation -> TPM forture a sense of aconcertion
ownship among employees.
promotis continous improvement
· Deal Line dala: Accessage should reman veguine vegit have
challinges:
· tign initial Effort -> requires significant commitment,
training ete.
C> resource intensine
Aldrida has transfer would us A
· Revistance ets change -> Employees may be against to
adopting new processes./practices.

4	opplications - used in industries automatines
5	· electionics
5	Our pood loberarage withing
9	no no rod alles remains must replarma ceuticals
3	Lagrania MN and hannowha wing
1	Indeestanding Industry 4.0 in MSHE's
<b>3</b>	micro, small, medium
3	evides meldarg how plied and a menterprises.
3	
5	Technology Adoption: MSME might face challenges in
, 3	adopling indurary 4.0 dechnologies are
3	to financial problems with hard annual
9	workers + automotion -> augment their stills
•	Enhanced connectivity: will shelp MSNE establish interconnectivity
•	doeween machines and processes -> miles and is
•	Arrament spisallows real-time data collection
•	- Shore toxis inexase efficien
•	pala- Driven Decisions: MINI's can analyse due data
	Collected and identify areas for improving,
	cost cutting productive maintainence and
<b>1</b>	might custominisatisfaction were moment
<u> </u>	leading to better decision making helping
3	dombara the fiture.
•	
	Customization and fresibility: advanced technologies
3	will deep MSME's to respond quickly to changing
	stilled away market demands
<b>3</b>	Confenibility.
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.0	

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Industry & David amornia. saldoubori pri bain & mailanigga
e inditals
Definition: builds on industry 4.0
emphasing on turn human collaboration
with advanced technologies
duman centered manufacturing
workers Collaborate with machines to
enhance creativity and problem solving
bay feathers problem such injustant maitgaba unimantes?
Land to the property of the pr
- Human centered manufacturing : iomand at
workers + automation -> augment their stills
divite many etai while the ment of all the entering he mante
· lollaboratine Robotics (Cobots) -> illians reserved
Collaboration Robert Livour alongside Jumans
-> share tasks, inescase efficiency
and out existence was strong : maind accuracy 1300 -
And the state of t
· Out in a office and discosting - The shall
· customization and personalisation ->
human creativity + technology -> highly
mighed mixiam manifold political of publical Cuesto mixed
products
a gradaina Milli - a grada the argue of a gradate in a gr
· sustainability -> ainus to promoteriore
wish of white he sustainable manufacturing +
Social Seponsiblu y
Social responsibility.