

# AI in manufacturing – Myth or reality?

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Manager Industry4.0

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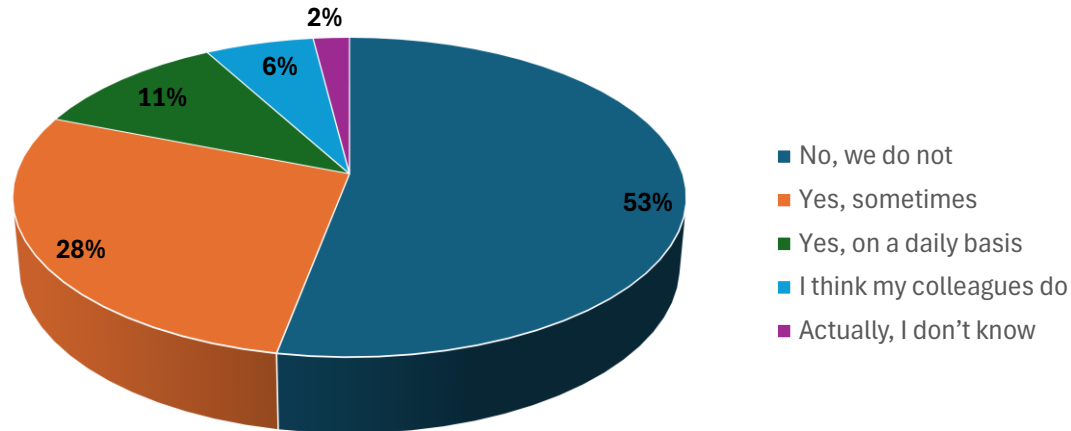
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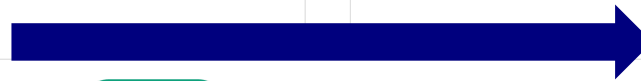
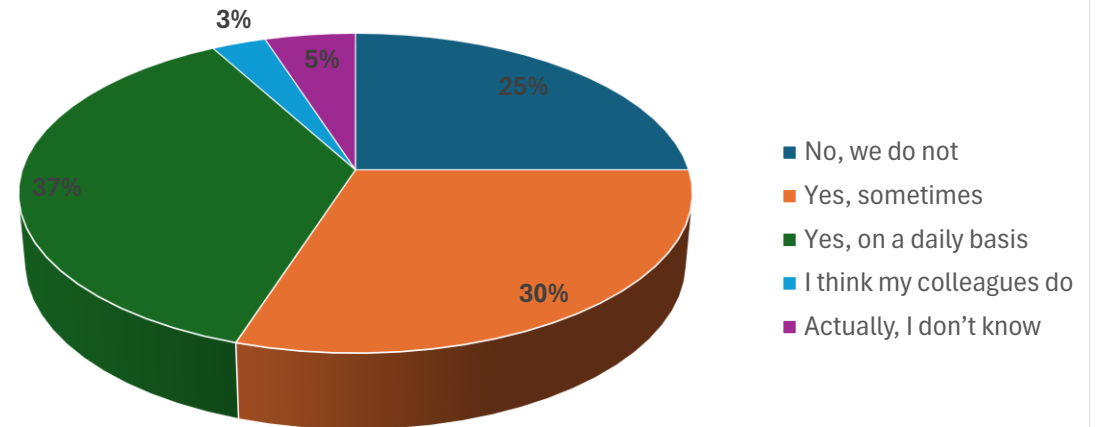
Q&A

# AI in manufacturing - State of play

Are you already using AI in production?  
(November 2023, N=65)



Are you already using AI in production?  
(May 2024, N=104)



ChatGPT

## Traditional AI

Rule-based  
Problem specific  
Limited learning capabilities  
Dedicated expertise needed  
Very accurate if trained well

Machine vision, predictive  
maintenance, demand  
forecasting, generative  
design, energy consumption  
forecasting

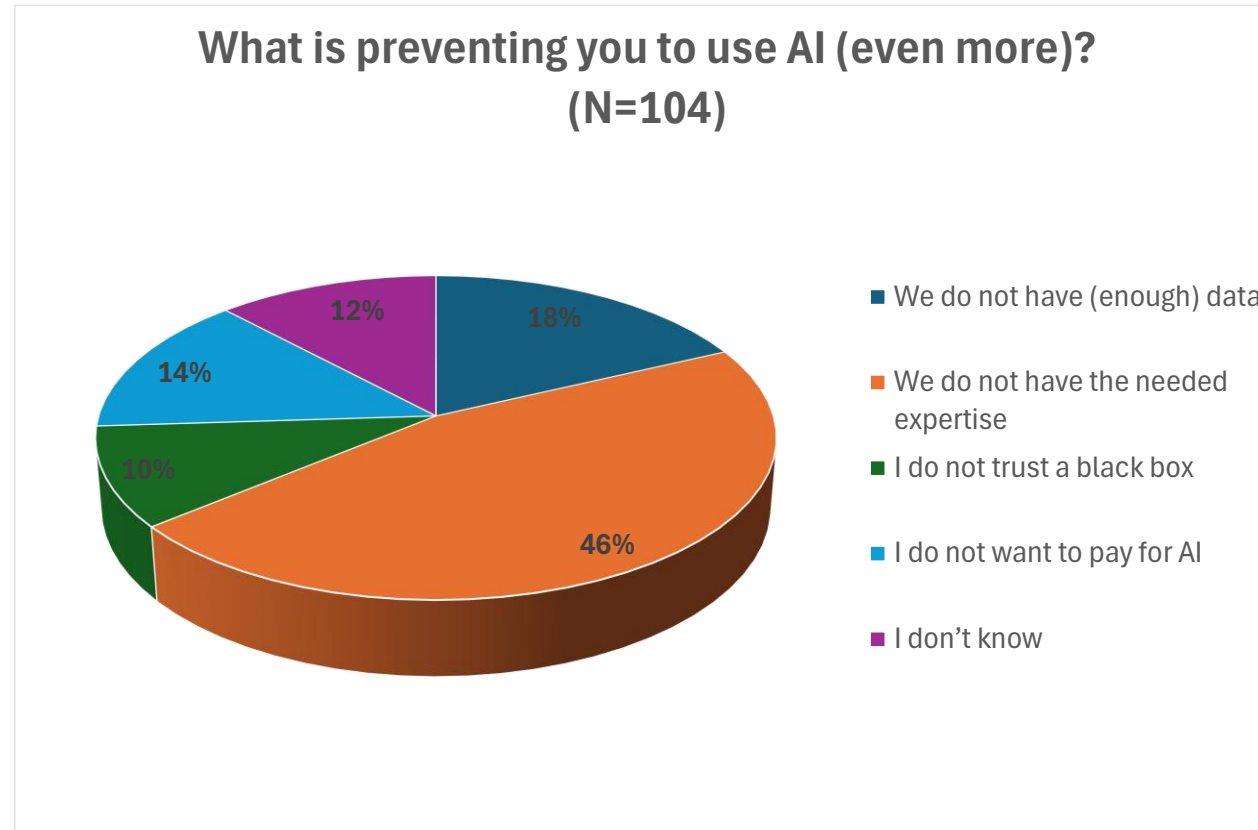


## Generative AI

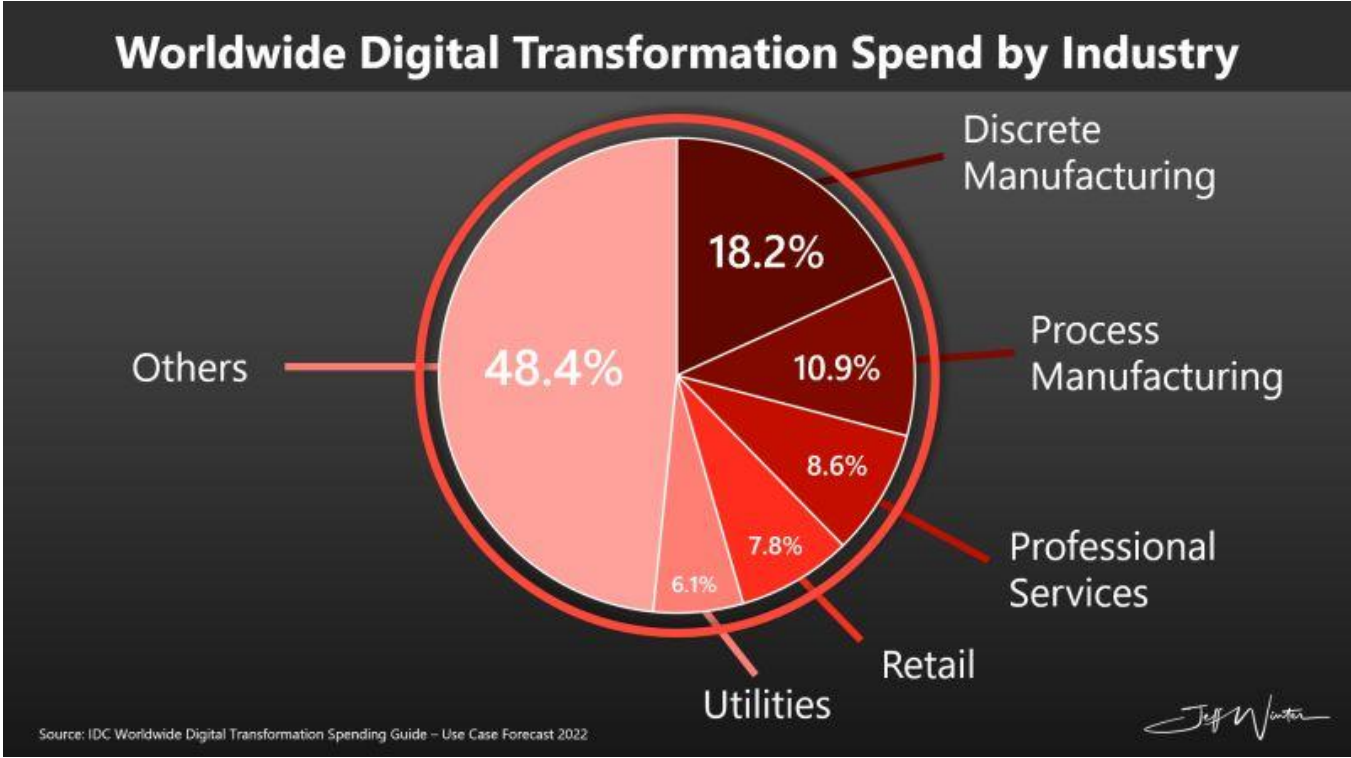
Generate new content  
Solve multiple problems  
Low-level entry  
Accuracy not guaranteed

Artificial intelligence is here to stay!  
Assume this is the worst AI you will ever use...

# AI in manufacturing - overcoming the barriers



# Lack of data?

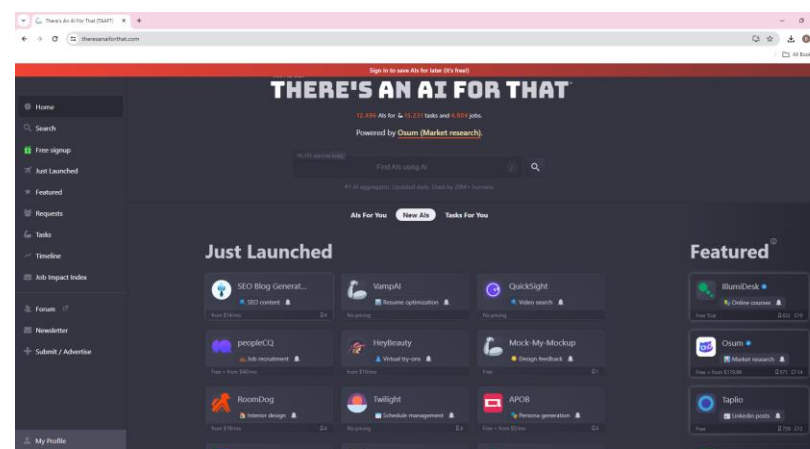


Source: Jeff Winter

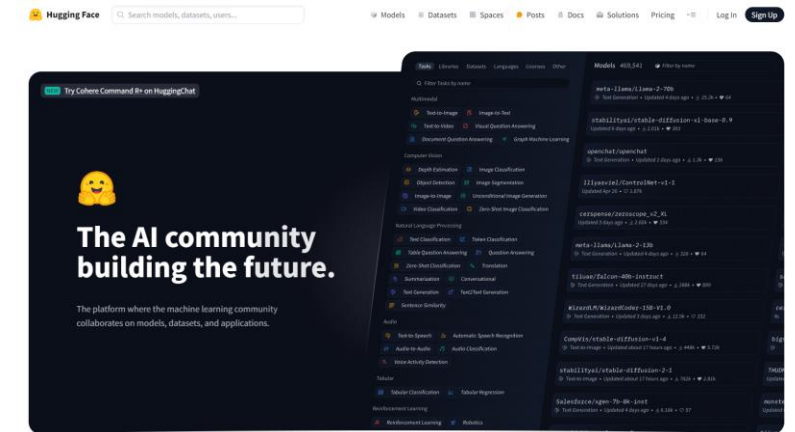


# Lack of knowledge?

- The art of prompting
- GenAI is low-level
  - User-friendly interfaces
  - Pre-trained models
  - Online community with tools, ...



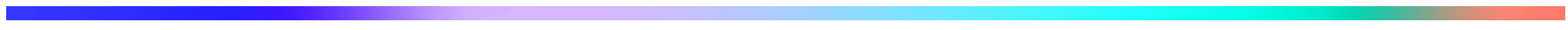
Source: [www.theresanaiforthat.com](http://www.theresanaiforthat.com)



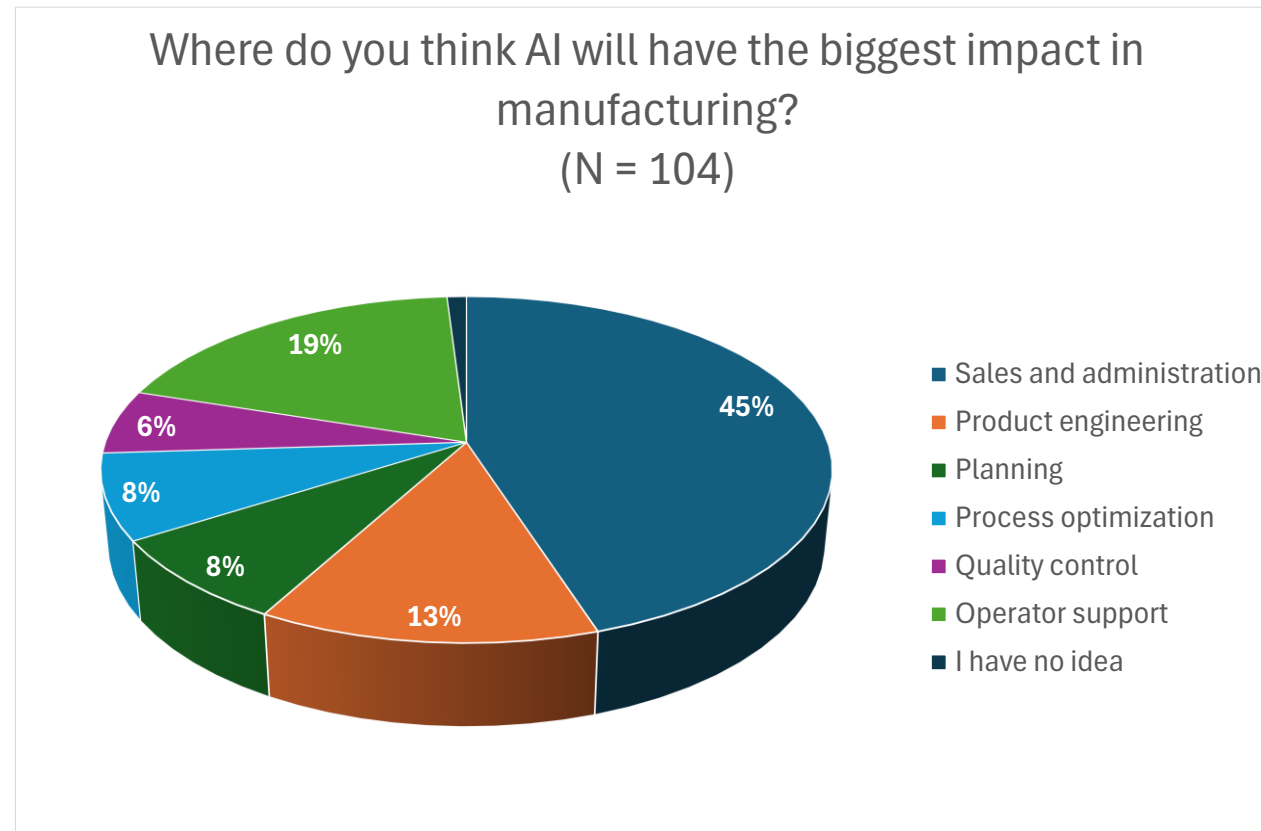
Source: <https://huggingface.co/>

But, domain knowledge will still be crucial to get the most out of GenAI

Invite AI to the table, but be the human in the loop!



# Many application domains...



# Sales and administration

## Building a configurator

Logo client

|               |  |
|---------------|--|
| Klant/Client  |  |
| Werf/Chantier |  |
| Plan n°       |  |
| Datum/Date    |  |

| Piec      | Nombre | A   | B   | C    | K1 | K2 | Opmerkingen                   |
|-----------|--------|-----|-----|------|----|----|-------------------------------|
| Standaard | 1      | --- | --- | 1504 | 20 | 20 | Dempers, deksel, traililie... |

```

Private Sub CommandButton1_Click()
    On Error Resume Next ' Foutafhandeling activeren, maar foutmeldingen onderdrukken

    Dim OutlookApp As Object
    Dim OutlookMail As Object
    Dim MailBody As String
    Dim wb As Workbook
    Dim SafeFileName As String
    Dim SavePath As String

    ' Set up the Outlook application
    Set OutlookApp = CreateObject("Outlook.Application")
    Set OutlookMail = OutlookApp.CreateItem(0)

    ' Hier stel je het bericht van de mail in
    MailBody = "Beste," & vbCrLf & vbCrLf & "Bijgevoegd is de bestellingfile." & vbCrLf & vbCrLf & "

    ' Maak een veilige bestandsnaam zonder speciale tekens en voeg een datum/tijdstempel toe
    SafeFileName = Replace(ThisWorkbook.Name, "/", "_")
    SafeFileName = Replace(SafeFileName, "\", "_")
    SafeFileName = Replace(SafeFileName, ":", "_")
    SafeFileName = Replace(SafeFileName, "*", "_")
    SafeFileName = Replace(SafeFileName, "?", "_")
    SafeFileName = Replace(SafeFileName, " ", "_")
    SafeFileName = Replace(SafeFileName, ":", "_")
    SafeFileName = Replace(SafeFileName, "<=, ", "_")
    SafeFileName = Replace(SafeFileName, ">, ", "_")
    SafeFileName = Replace(SafeFileName, "]", "_")

    ' Voeg een unieke datum/tijdstempel toe aan de bestandsnaam
    SafeFileName = SafeFileName & "_" & Format(Now(), "yyyymmdd_hhmmss") & ".xlsx"

    ' Geef het bestand een veilige opslaglocatie, bijvoorbeeld op het bureaublad
    SavePath = Environ("USERPROFILE") & "\Desktop\" & SafeFileName
    ' SavePath = Environ("USERPROFILE") & "\Documents\Bij projecten - local\JBaas\" & SafeFileName

    ' Maak een kopie van het huidige werkboek en sla het op
    ThisWorkbook.SaveCopyAs SavePath

    ' Open het opgeslagen werkboek (kopie) als een nieuw werkboek
    Set wb = Workbooks.Open(SavePath)

    ' Controleer of het bestand nog bestaat voordat het wordt toegevoegd als bijlage
    If Dir(SavePath) <> "" Then
        ' Voeg het bestand toe als bijlage
        With OutlookMail
            .To = "bart.verlinden@irris.be" ' Vervang dit door het gewenste e-mailadres
            .CC = "" ' Eventueel CC-adres
            .BCC = "" ' Eventueel BCC-adres
            .Subject = "Bestelling " & SafeFileName
            .Body = MailBody
            ' Voeg het bestand toe als bijlage
            .Attachments.Add SavePath

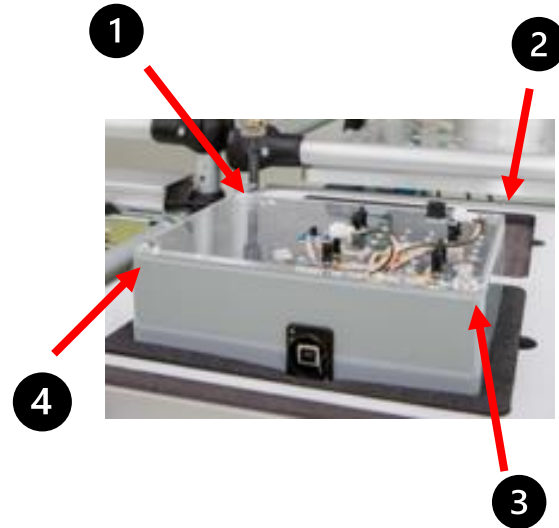
            ' Korte vertraging toevoegen voor verwerking
        End With
    End If
    
```

# GenAI for “problem-solving” in production



# Operator support

## Making digital work instructions



Can you make an instruction list from the following text. Make sure you keep the order correct (order is 1 3 2 4):  
Place the cover on the box. Take one M2 screw from box 1 and put it in hole 1 on the cover. Take the screw driver for M2 screw and screw the screw in so it sticks slightly above the cover. Next, take one M2 screw from box 1 and put it in hole 3. Do the same for hole 2 and 4. Then screw all the screws with a torque of 1Nm. Use the same order as above



Prompt

Prompt engineering



Work  
instruction



Here is an instruction list based on the provided text, arranged in the specified order:

1. Place the cover on the box.
2. Take one M2 screw from box 1 and put it in hole 1 on the cover.
3. Take the screwdriver for the M2 screw and screw the screw in so it sticks slightly above the cover.
4. Next, take one M2 screw from box 1 and put it in hole 3.
5. Do the same for hole 2 and hole 4.
6. Then screw all the screws with a torque of 1Nm, following the same order as above: holes 1, 3, 2, and 4.



Result



# Operator support

## Making digital work instructions

Can you frame this shorter but keep the necessary details?

Sure, here's a more concise version of the instructions:

1. Place the cover on the box.
2. Insert M2 screws from box 1 into holes 1, 3, 2, and 4 in that order.
3. Slightly raise the screws above the cover using a screwdriver.
4. Tighten all screws to a torque of 1Nm following the order: 1, 3, 2, and 4.



Can you translate the original instructions in french?

Here is the translation of the original instructions into French:

1. Placez le couvercle sur la boîte.
2. Prenez une vis M2 de la boîte 1 et mettez-la dans le trou 1 sur le couvercle.
3. Prenez le tournevis pour vis M2 et vissez la vis de manière à ce qu'elle dépasse légèrement du couvercle.
4. Ensuite, prenez une vis M2 de la boîte 1 et mettez-la dans le trou 3.
5. Faites de même pour les trous 2 et 4.
6. Ensuite, vissez toutes les vis avec un couple de 1Nm, en suivant le même ordre que ci-dessus : trous 1, 3, 2 et 4.



Which tool should I use to execute those instructions?



To execute the instructions provided for assembling something with screws, you'll need the following tool:

- **Screwdriver for M2 screws:** This is specifically mentioned in the instructions for tightening the screws into the cover.

Make sure the screwdriver matches the type of screw heads (e.g., flathead, Phillips) you are using, which in this case are M2 screws.



How can I be sure that I apply 1Nm on the screws?

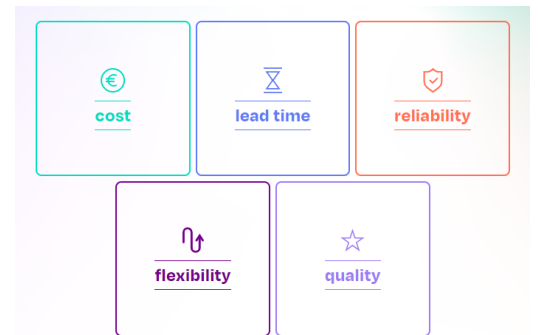


To ensure that you apply exactly 1 Newton meter (Nm) of torque on the screws, you should use a torque screwdriver. Here's how you can do it:

1. **Choose the Right Tool:** Purchase or borrow a torque screwdriver that can be set to 1 Nm. These screwdrivers typically have an adjustable setting where you can select the desired torque.
2. **Set the Torque:** Adjust the screwdriver to the 1 Nm setting. This is usually done by twisting the handle of the screwdriver until the desired torque setting aligns with a marked line or indicator.
3. **Tightening the Screws:** Insert the screwdriver into the screw and turn it until you feel the screwdriver handle click, or in some models, disengage. This click or release indicates that the preset torque has been reached.
4. **Check the Setting:** Double-check the torque setting before use, especially if the screwdriver has been used or adjusted since your last setting. This ensures accuracy in your work.

Using a torque screwdriver is the best way to apply precise torque, which is crucial for avoiding over-tightening or under-tightening, which can either damage materials or leave connections loose. ●

Start from the problem to be solved to avoid a (GEN)AI technology push!





# Challenges for manufacturing (SMEs)

## From playing to implementing

→ Using GenAI in a company specific setting/data

- Setting the rules: data security/trust
- Selecting the best use-case (assessing the ROI)
- Be aware of the cost and time effort!
- Be aware of integration and scalability

# Key takeaways

1

AI is here to stay

2

Test, test, test

3

The human in the  
lead/loop

4

We can help!



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