

PLM of the future: what place for humans in the digital transformation of companies?

Prof. Dr Eng Frédéric SEGONDS
Arts et Métiers, LCPI, Campus de Paris

CIMdata's 2026 PLM Market & Industry Forum
AI in PLM: Expanding Capabilities Across the Product Lifecycle
The event for PLM software & service providers



Arts et Métiers Institute of Technology



Who we are

12



SITES

located all over France
dedicated to Teaching &
Research

331



PhD STUDENTS
at our Doctoral School
"Sciences des Métiers
de l'Ingénieur"

1



**BACHELOR
OF TECHNOLOGY**

6000



STUDENTS

all programs included

15



LABORATORIES
and research teams

11



ENGINEERING PROGRAMS
1 broad-based 10 specialized

1110



PERSONNEL

Teachers, Technicians &
Administrative Staff

7 MILLIONS



income

+20



RESEARCH MASTERS

15 MILLION



income generated
by industry contracts

2000



CONTINUING EDUCATION
auditors

17



**EXECUTIVE MASTER
PROGRAMS**

1780
Founded by the Duke
Of Rochefoucault-Liancourt



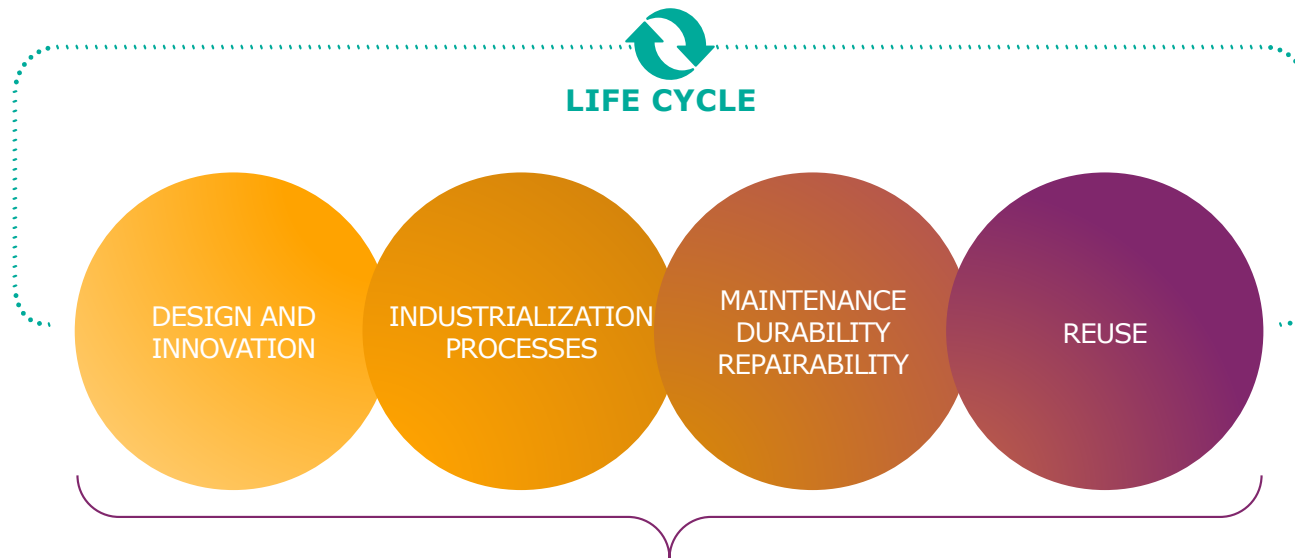
Arts & Métiers
ALUMNI

With more than 36 000
alumni registered

Arts et Métiers
Sciences et Technologies



Our specialty: research on the full product life cycle from design to reuse, through every intermediate stage



Environmental and societal impact approach

Development of groundbreaking digital tools with real world

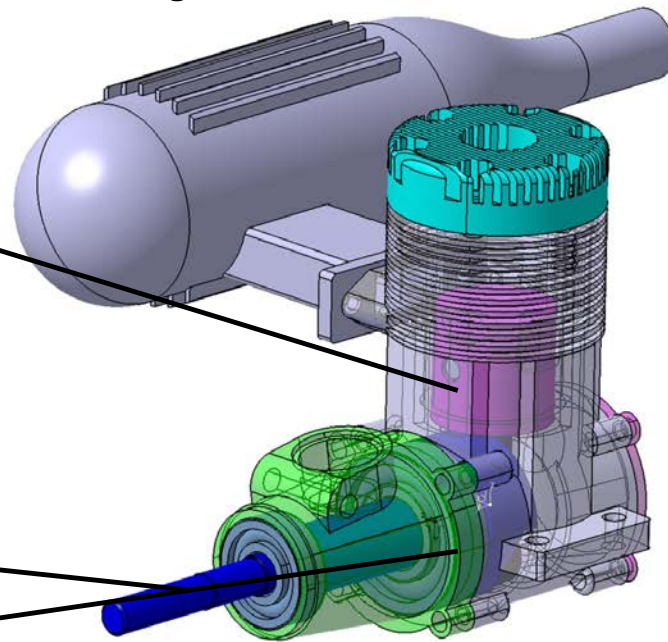
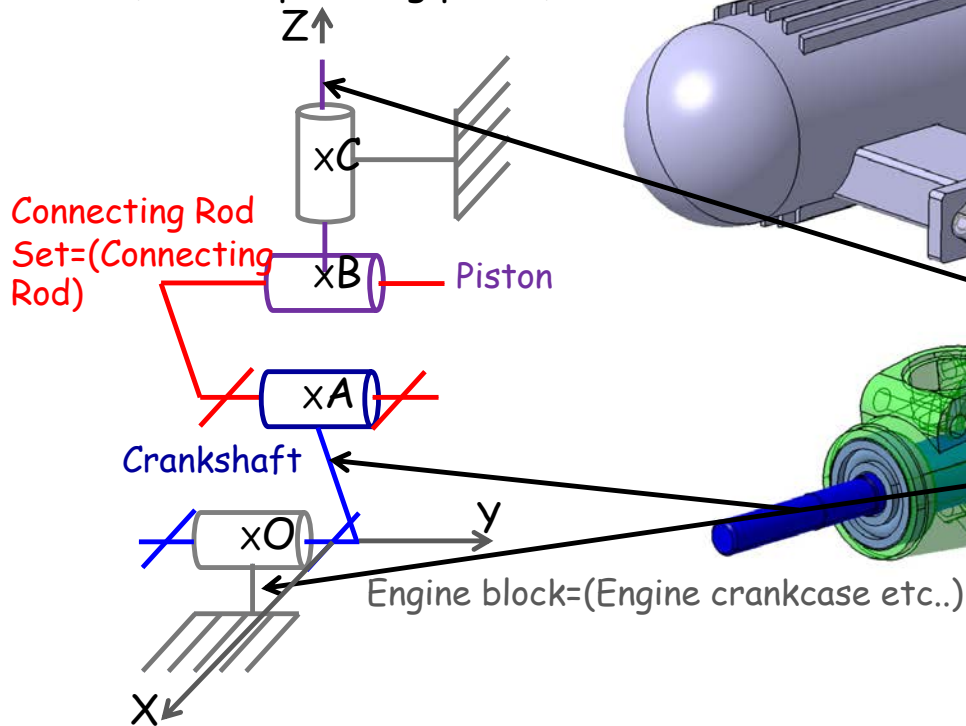
applications



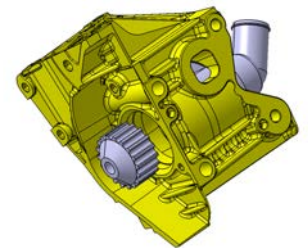
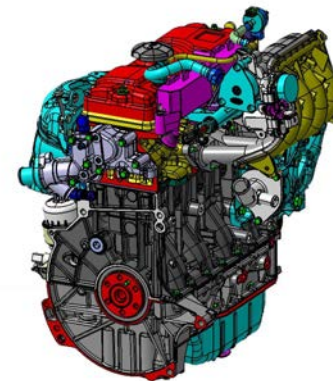
CAD related Teaching Activities (Lille)

Digital model to be made

Minimal kinematic diagram
(in the operating phase)



1st year Design: One
Engine Water Pump for
Automobile
Choice of bearings, shaft
design, cover,
implementation of
dynamic sealing





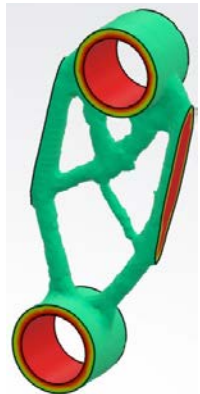
Teaching Activities (Bordeaux) The goal is to optimize the crank in order to obtain the lightest possible crank. To do this, students select the most suitable material and optimize the geometry according to three processes: Fonderie, FA, Simple and Usinage.



Plateau

Manivelle

Pédale



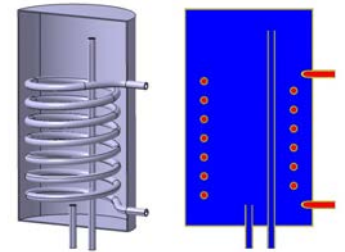
Etude des contrepois

Nom des variantes	Optimisation Manivelle A Validation de forme Fonderie	Optimisation Manivelle A Validation de forme FA	Optimisation Manivelle A Validation de forme Simple	Optimisation Manivelle A Validation de forme Usinage
<ul style="list-style-type: none"> Etude Optimisation Manivelle A Analyse d'espace d Manivelle simple Analyse d'espace d Manivelle pour FA Analyse d'espace d Manivelle pour fon 				
Options avancées				
Entrées	AI_MATERIAL_AI_AM19-356.0-T6 Permanent	AI_MATERIAL_AI_AM19-356.0-T6 Permanent	AI_MATERIAL_AI_AM19-356.0-T6 Permanent	AI_MATERIAL_AI_AM19-356.0-T6 Permanent
Type de maillage	Quadratique	Quadratique	Quadratique	Quadratique
Taille du maillage	4mm	4mm	4mm	4mm
Indicateurs de performance clés (KPI)				
Score	40.2922	55.3085	75.4546	60.2625
Masse	0.323kg	0.411kg	0.457kg	0.63kg
Volume de l'élément	1.206e-004m3	1.535e-004m3	1.705e-004m3	2.426e-004m3
Contrainte de Von Mises	9.97e+006N_m2	6.68e+006N_m2	3.881e+006N_m2	3.763e+006N_m2
Contrainte principale minimum	837003.5N_m2	328856.344N_m2	211204.328N_m2	316458.625N_m2
Contrainte principale maximum	1.041e+007N_m2	6.229e+006N_m2	3.461e+006N_m2	4.204e+006N_m2
Déplacement	0.034mm	0.027mm	0.021mm	0.015mm
Force de réaction	6.298N	6.98N	5.372N	4.9N
Energie de tension élastique	0.002J	0.002J	0.001J	9.976e-004J

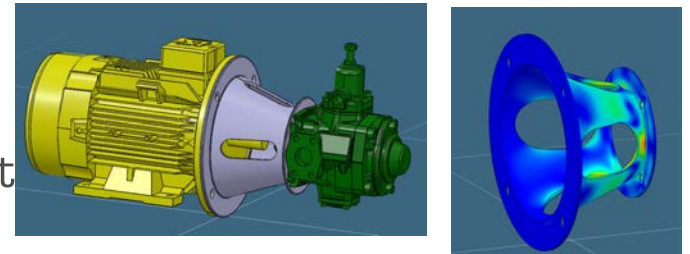


Related Teaching Activities (Lille&Paris)

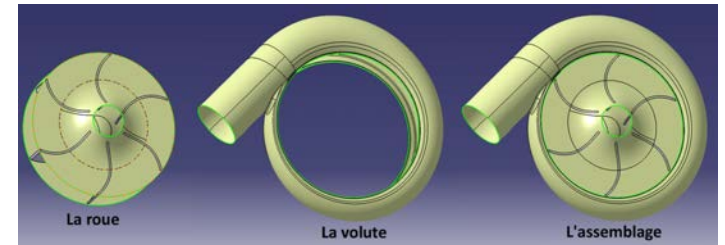
1st year project : Design of an exchanger, the thermal simulation is done c CCM+



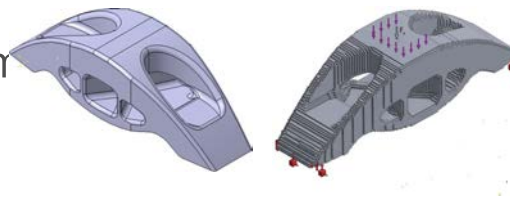
2nd year project : Design of an interface part + Finite Element



2nd year project : pump design



3rd year project : topological optim





Specialized Master's Degree "Digital Transformation Manager of Industries and Construction"



A 12-month work-study program

ACADEMIC SEQUENCE: 2 weeks per month

Approx. 400 hours of courses structured in 5 modules related to Digital Transformation, PLM, BIM etc..., Teaching by specialists in the industrial environment among our partners and by teachers from Arts et Métiers,

INDUSTRIAL SEQUENCE: 2 weeks per month+ 4 months full time

Mission in a company managed in project mode in dual supervision (academic / industrial),

Company Confidential © Arts et Métiers 2026. All rights reserved |

Mastère Spécialisé Manager de la Transformation Digitale des Industries et du Bâtiment
Titre certifiant RNCP de niveau 7
Éligible CPF, en distanciel ou sur les campus de Paris ou Aix-en-Provence

Arts et Métiers Sciences et Technologies

Classe 10^{ème} AM TALENTS MS MASTÈRE SPÉCIALISÉ

INTRODUCTION

La transformation digitale constitue aujourd'hui un enjeu majeur de compétitivité, d'innovation et d'adaptation aux nouvelles pratiques du marché pour les entreprises, en particulier dans les secteurs industriels et de la construction. Dans ce contexte, le déploiement d'outils tels que le PLM (gestion du cycle de vie des produits) et le BIM (gestion de la maquette numérique du bâtiment) représente un levier essentiel pour améliorer la performance, optimiser les processus et renforcer la position des organisations dans un environnement fortement concurrentiel. La perpétuelle réduction des temps de développement et la multiplication des versions d'un même produit entraînent la prolifération des données numériques à gérer. Il convient donc d'accompagner les entreprises dans leurs développements liés à l'ingénierie numérique. De plus, le travail collaboratif, l'interopérabilité et les normes mondiales d'échange impliquent de nouvelles méthodes de travail mais aussi de nouvelles compétences. L'ambition de ce Mastère Spécialisé est de former des experts ayant des aptitudes pour accélérer l'évolution nécessaire des pratiques industrielles pour répondre aux enjeux constamment renouvelés de l'industrie.

PUBLICS

- Salariés
- Étudiants
- Demandeurs d'emploi

PRÉREQUIS

- Diplôme d'ingénieur ou d'université (Bac + 5)
- Bac + 4 avec au minimum 3 ans d'expérience professionnelle
- Diplôme étranger équivalent
- Par dérogation L3 ou M1

PROCESSUS D'ADMISSION

Candidature en ligne à partir de janvier
Entretiens et sélections à partir de janvier
Inscription définitive jusqu'en septembre

DÉBOUCHÉS

Ce Mastère Spécialisé forme des experts capables de maîtriser des processus industriels de développement de produits et leur gestion sur l'ensemble du cycle de vie. Les profils sortant de cette formation pourront trouver des débouchés aussi bien chez les industriels manufacturiers que dans les entreprises d'ingénierie, mais aussi chez les éditeurs informatiques travaillant autour du PLM et dans les SSI et entreprises intégrant ces solutions pour les entreprises manufacturières. Les métiers visés sont : chef de projet PLM/BIM, chef de projet système de conception, responsable méthodes CAO et PLM, consultant technico-fonctionnel en déploiement PLM/BIM chez un intégrateur et/ou éditeur de solutions. 95 % de nos anciens élèves trouvent un poste en moins de 6 mois après leur diplôme.

Pour candidater en ligne, rendez-vous sur : www.artsetmetiers.fr/fr/formation/admissions





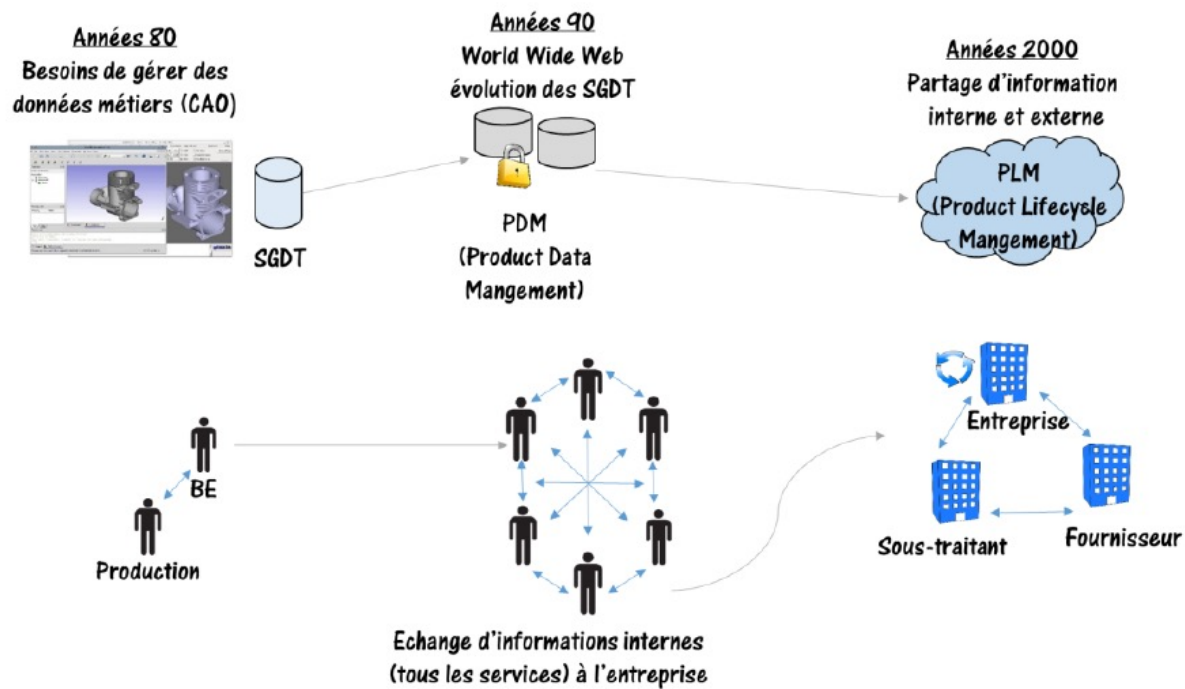
Some references



People in Digital Transformation



From the individual to the collective

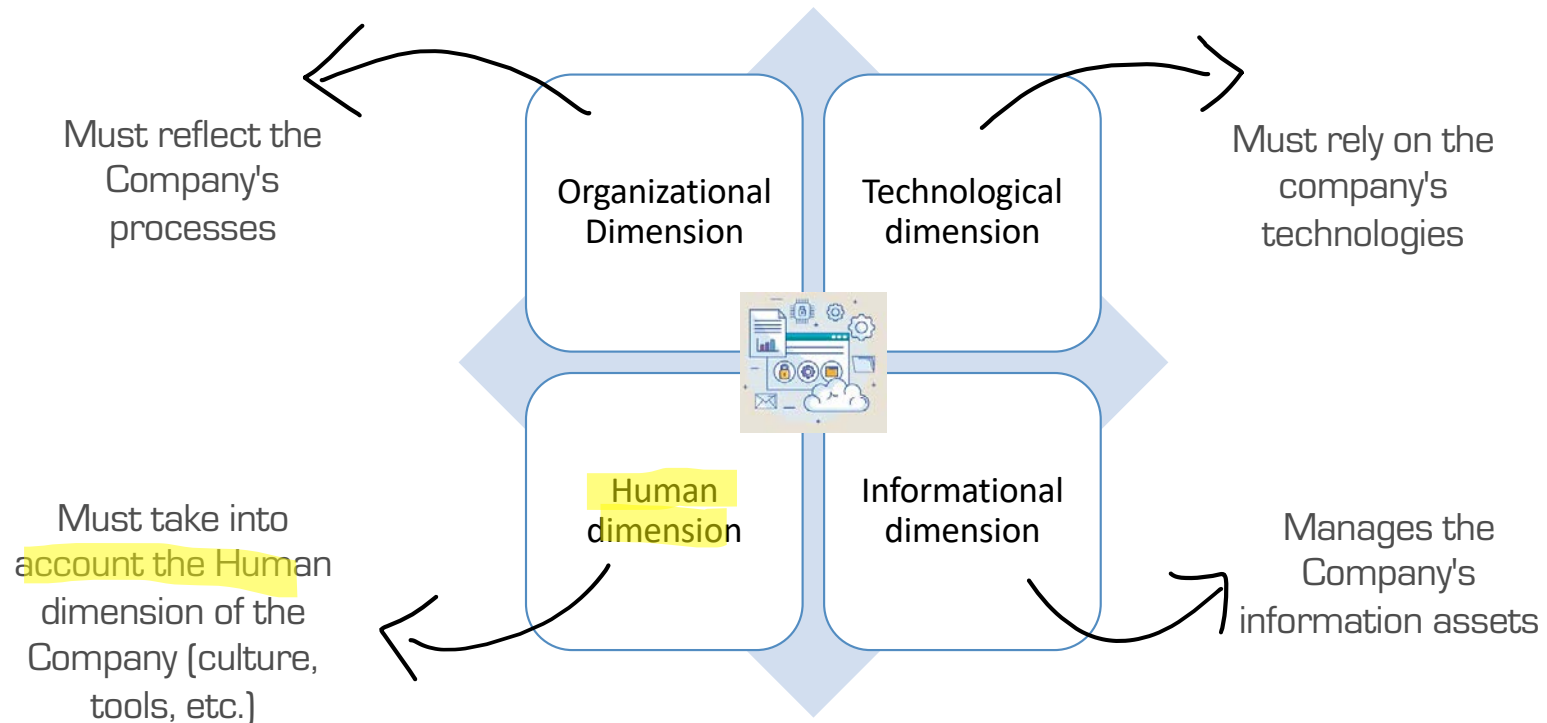


The 3 main phases of the origin of PLM
[Yildiz, 2015]

Company Confidential © Arts et Métiers 2026. All rights reserved |



PLM as a method and support tool for a company's Information System



The 4 dimensions of Enterprise PLM



The Risks of PLM Project Failure

Table 1
Risk factors identified for implementation of PLM systems.

Dimension	Factors	Description of Risk Factors for PLM systems implementation
1	Human-related risks	<ul style="list-style-type: none"> • Underestimating the need of cultural change • Lack of collaborative environment • Lack of communication • Lack of management support • Lack of user participation • Change-resistant user • Improper user understanding of technology and its use • User learning and technical skills • User may need additional hands-on training to proceed their working
	Ignored cultural changes	
	Lack of user acceptance	
2	Lack of technological skills	<ul style="list-style-type: none"> • Mismatch of process requirements of PLM • Lack of PLM technology alignment with an organization's process • Underestimating the data consolidation challenge from various other information systems such as from CAD, CAM, etc. to PLM • Poor anticipation of budget needed to deliver the full PLM implementation • Compelled executives from the software suppliers/internal management team • Mismatch between the systems' requirements & the organization's business strategy • PLM systems evaluation and selection for implementation • Lack of adequate technology infrastructure • Lack of integration among other enterprise systems such as ERP, CAD, CAM, etc. • Alterations in data format during migration • Misuse of product-related data • Unauthorized changes in the product designs/processes
3	Process-related risks	
	Lack of technology-process alignment	
4	Improper data migration	
5	Inadequate resources estimation	
6	Lack of technology-business alignment	
7	Inappropriate choice of PLM system	
8	Lack of infrastructure	
9	Lack of systems integration	
10	Mismatch in required data formats	
11	Threat to data security	
12		



Digital adoption platforms (DAPs) are software that integrates with business applications to help users master the application.



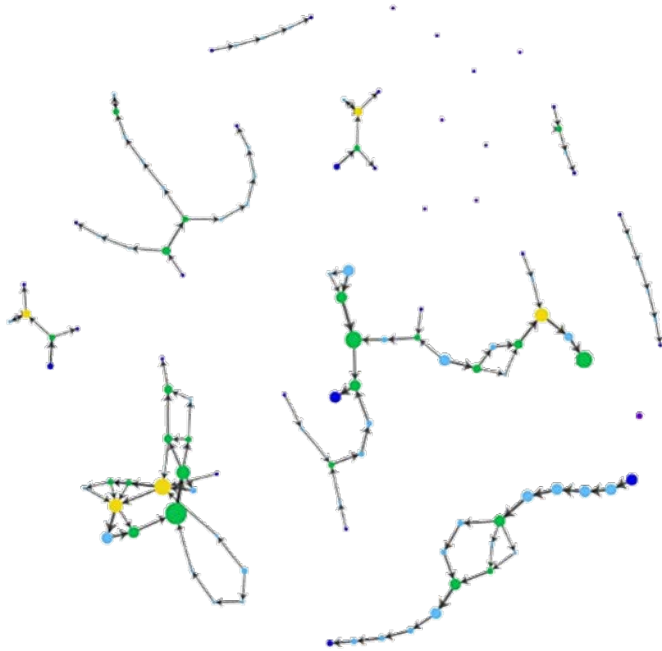
k knowmore

Tooled process graphs

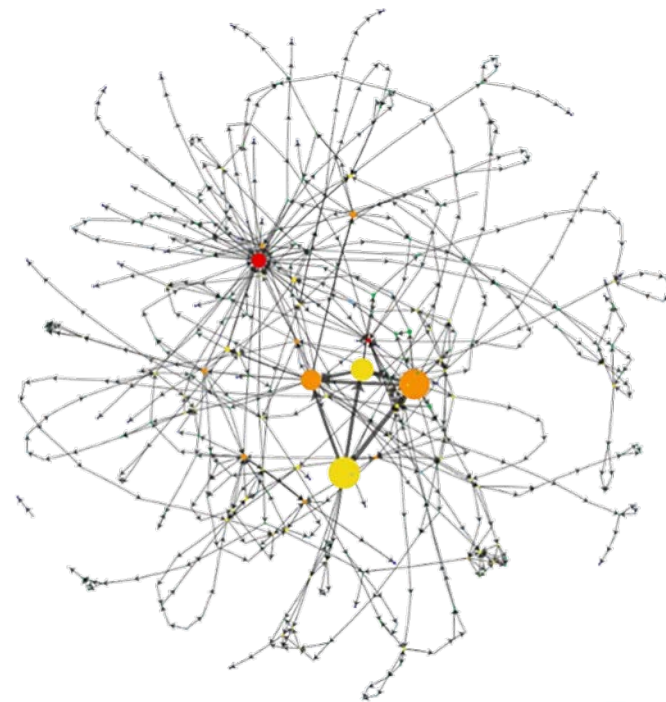


Path processes through application objects

Banking application project



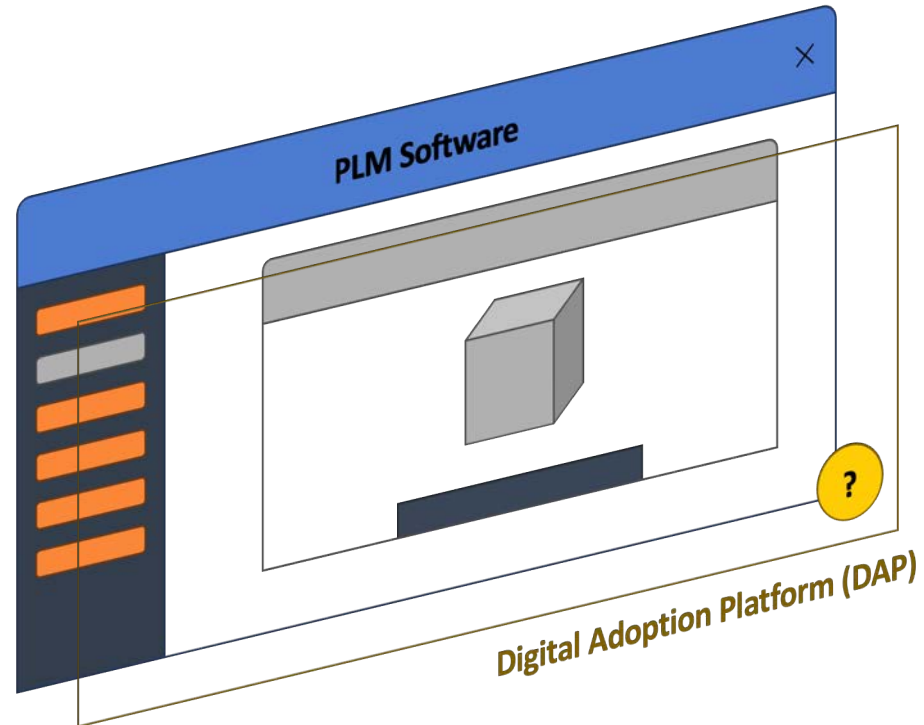
PLM Project



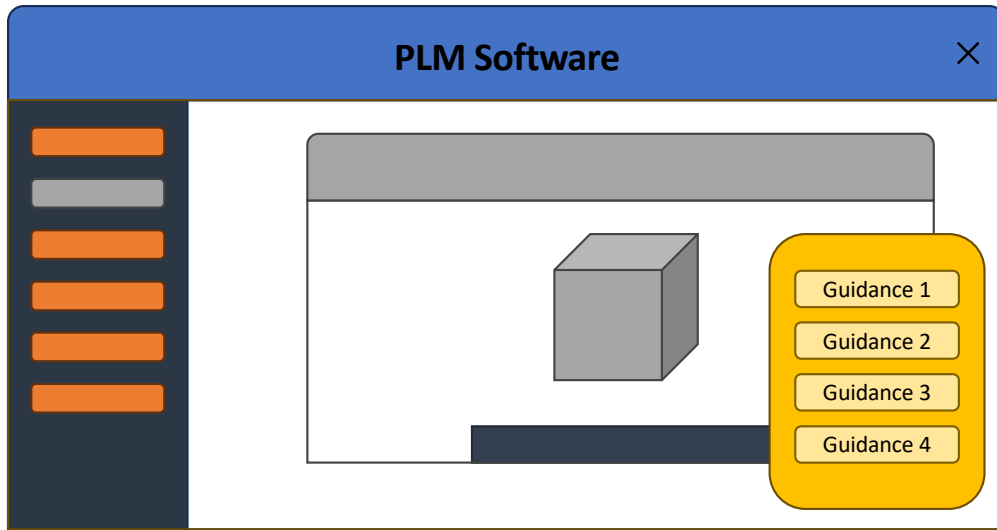
Guide users to facilitate digital transformation



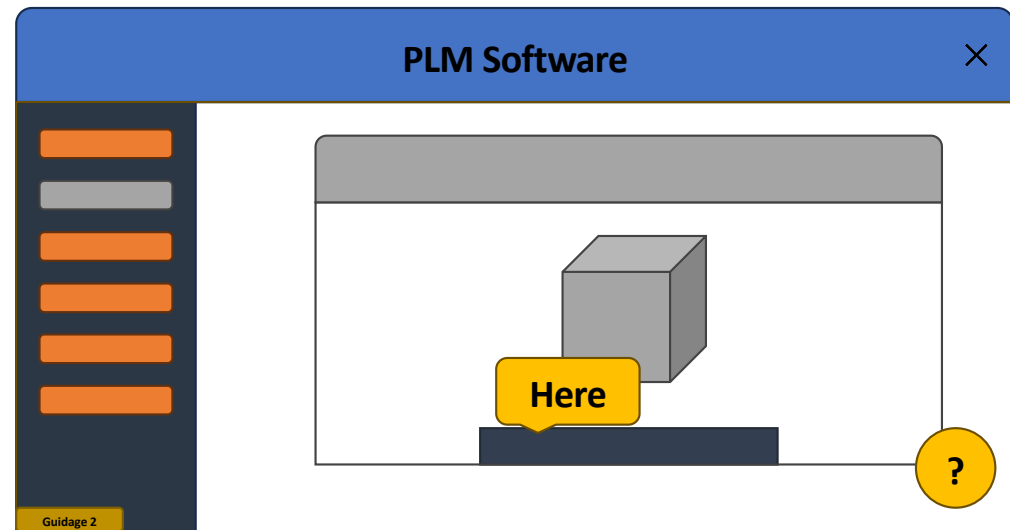
The role of Digital Adoption Platforms



Guide users to facilitate digital transformation



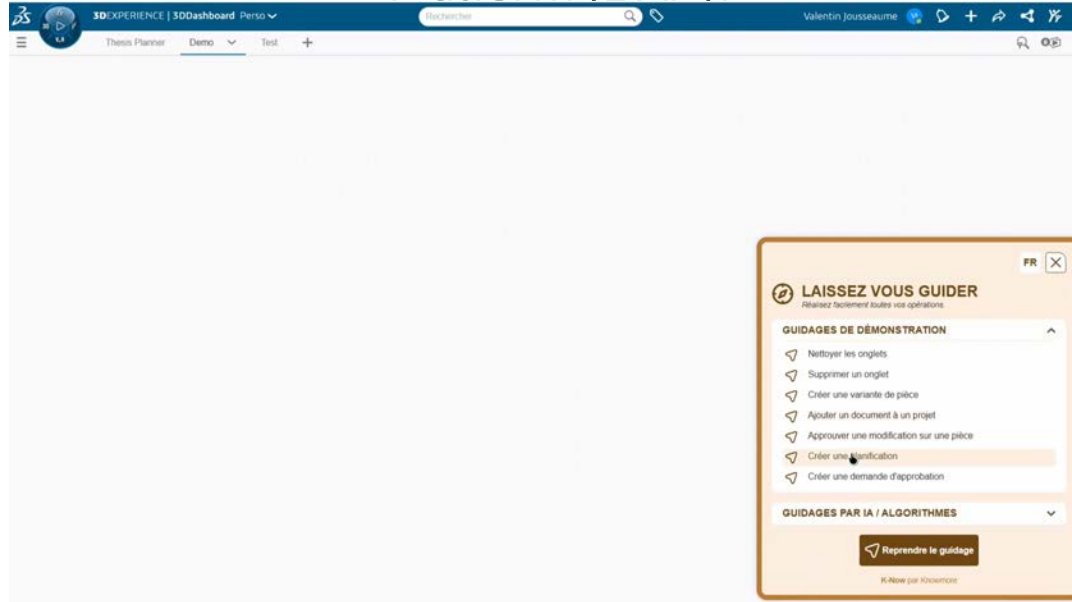
Digital Adoption Platform (DAP)



Guide users to facilitate digital transformation



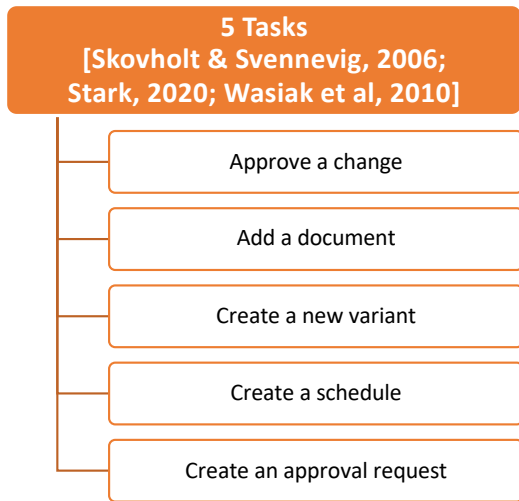
How to improve users' business practice in a Product Lifecycle Management (PLM) framework using a Digital Adoption Platform (DAP)?



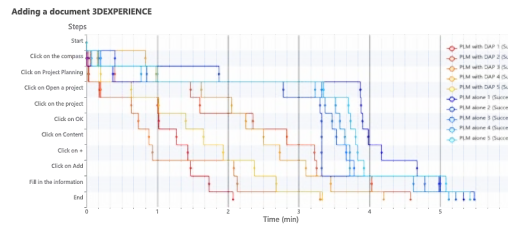
Guide users to facilitate digital transformation



Experience on the usability of the PLM tool with/without DAP



Validations

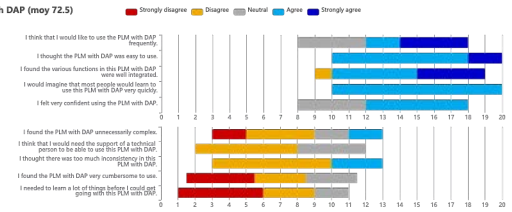


Timelines



Quality of the task performed

PLM with DAP (moy 72.5)



System Usability Scale



Semi-structured interviews

Statistics

- Kolmogorov-Smirnov test (distribution)
- Student's test (difference)
- Mann-Whitney test (rank)

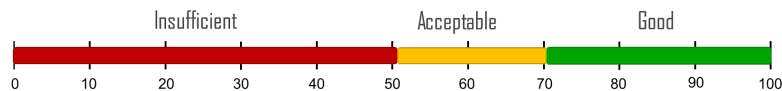
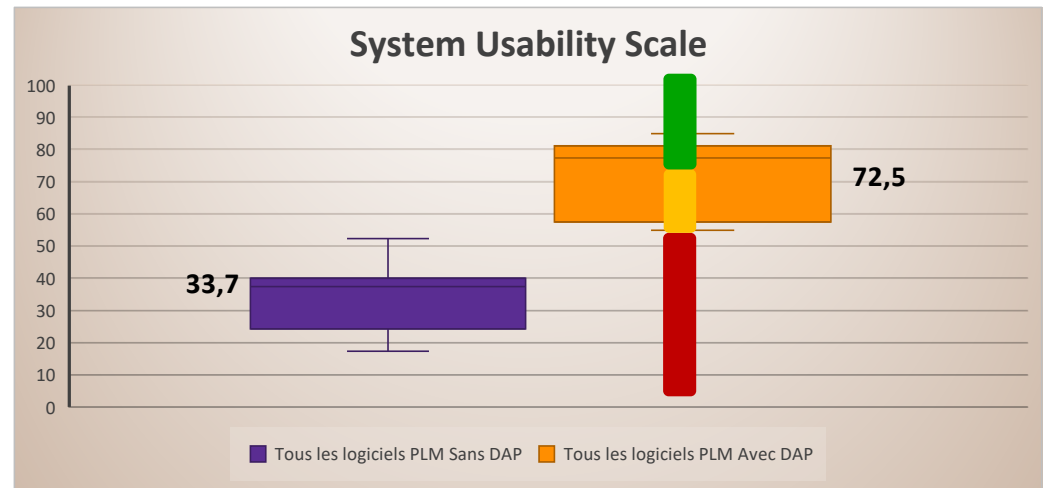


Insights on Usability



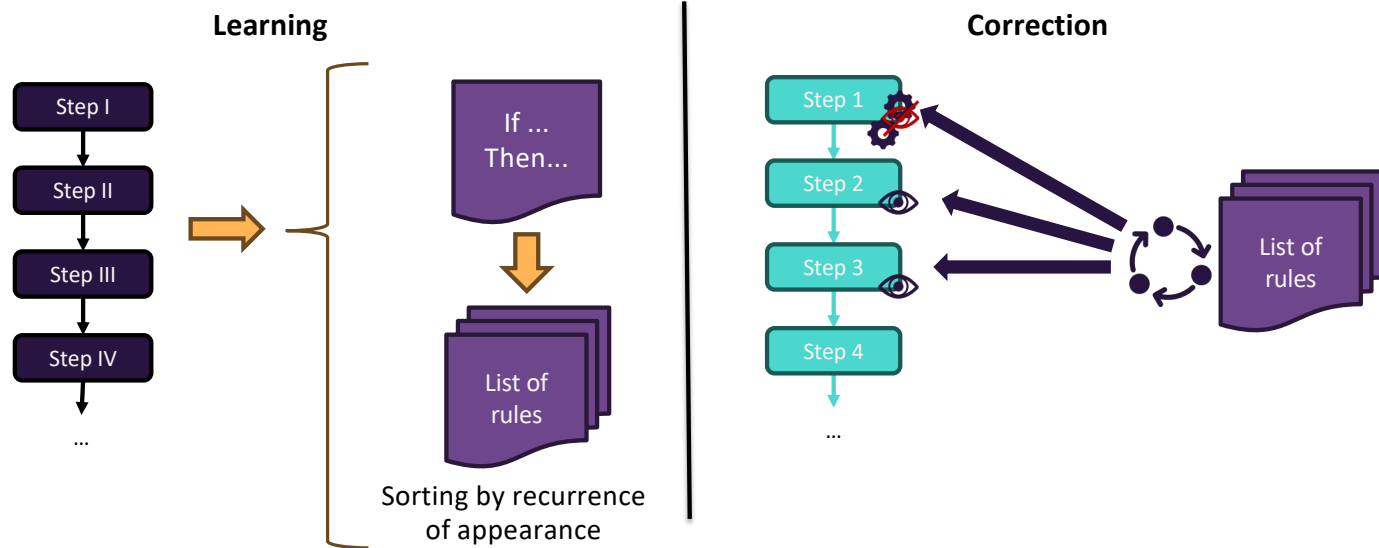
System Usability Scale [Brook, 1986]

I think I will use this service frequently
I find this service unnecessarily complex
I think this service is easy to use
I think I'll need the help of a technician to be able to use this service
I need to learn a lot before I can use this service...



DAP significantly improves the usability of PLM tools

Artificial Intelligence for DAP



Correction of the guidance offered by the DAP by artificial intelligence

Artificial Intelligence for DAP



POCDEMO 12 - K-Now v12.1.3 Administration K-Now sur ce navigateur Valentin Jousseume

Guidage corrigé par IA (Guidage) Éditer la publication →

APERÇU DES ÉTAPES

1 Cliquez sur la Boussole Voir rendu

2 Cliquez sur Collaborative Tasks Voir rendu

3 Cliquez sur + Voir rendu

4 Remplissez les informations. Voir rendu

5 Cliquez sur Créer. Voir rendu

IDENTITÉ ET ACCÈS

Identifiant : P202503241410-UBC Copier l'identifiant

Lot : Corrigé IA

Correction of the guidance offered by the DAP by artificial intelligence

Collaboration and risks assessment in Extended Enterprise

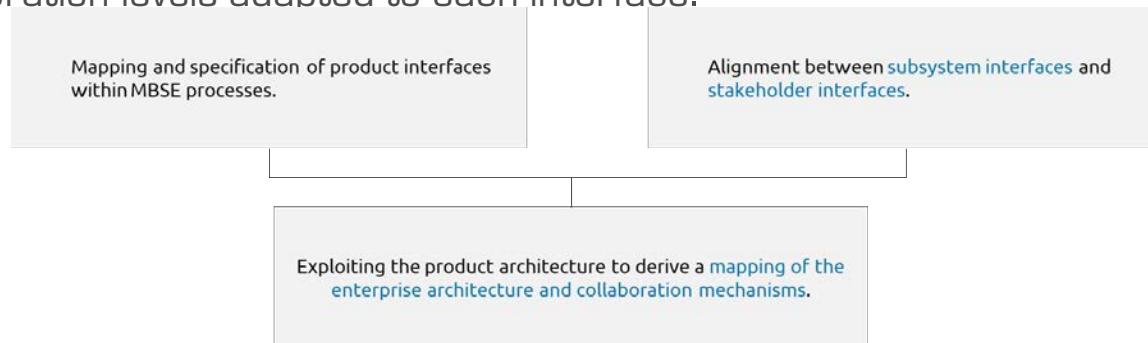


Objectives:

Tooling co-development to **mitigate information-exchange risks between stakeholders** within the extended enterprise.

Identification and mapping of interfaces between stakeholders, and prioritization of associated risks.

Proposal of collaboration levels adapted to each interface.



Collaboration and risks assessment in Extended Enterprise



Specification of the information exchanged at the interfaces between the subsystems.

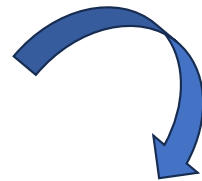
Important information

- Evaluated by system engineers from enterprises in need of information from their partners.

Evaluation Response	Corresponding numerical value
a/A	0,11
b/B	0,33
c/C	0,55
d/D	0,78
e/E	0,98

Confidential information

- Evaluated by decision-makers (program directors or equivalent) of the companies holding the information.

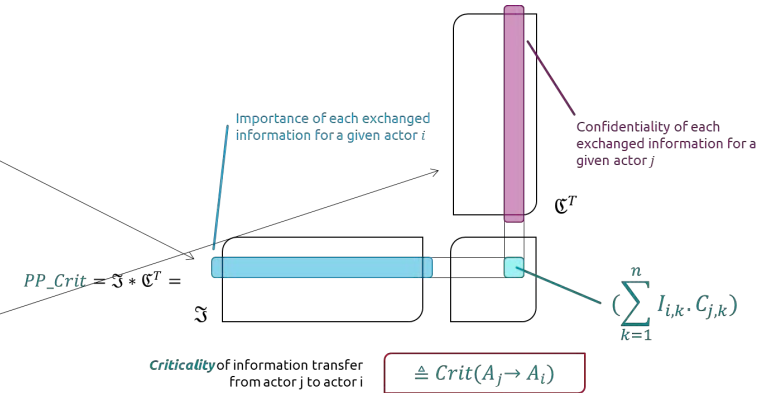


$$\mathfrak{I} = (I_{i,j}) = \begin{matrix} & \text{stakeholders} \\ \text{information} & \begin{bmatrix} 0,14 & \dots & 0,17 \\ \vdots & \ddots & \vdots \\ 0,47 & \dots & 0,58 \end{bmatrix} \end{matrix}$$

Importance of information i for stakeholder j

$$\mathfrak{C} = (C_{i,j}) = \begin{matrix} & \text{stakeholders} \\ \text{information} & \begin{bmatrix} 0,57 & \dots & 0,24 \\ \vdots & \ddots & \vdots \\ 0,47 & \dots & 0,89 \end{bmatrix} \end{matrix}$$

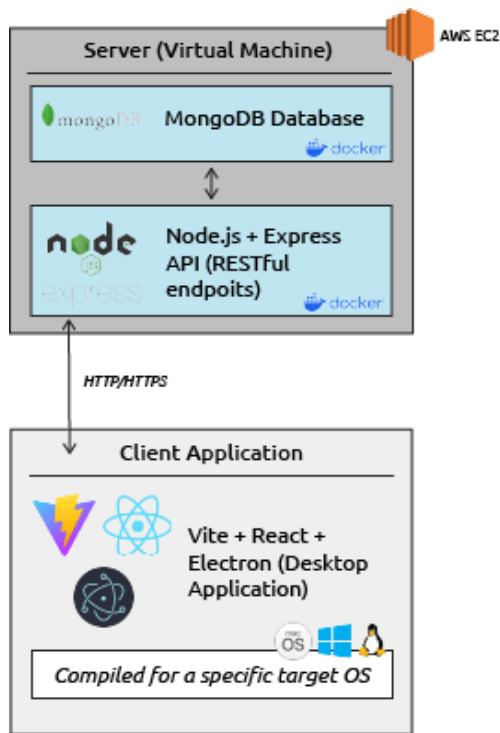
Confidentiality of information i for actor j



Collaboration and risks assessment in Extended Enterprise



Specification of the information exchanged at the interfaces between the subsystems.



The Future of PLM



Digital Adoption is a major challenge in the Digital Transformation of companies > creation of a dedicated chair, bringing together all stakeholders. A strong commitment as a vector of communication.

- **Research axis:** develop innovative research, e.g. in the field of digital engineering, PLM, BIM etc...
- **Dissemination axis:** Dissemination of the work to:
 - the national and international scientific community,
 - of our partners' industrial customers
 - Arts et Métiers students.
- **Formation Axis:** possible training of employees on themes e.g. Digital Transformation, sourcing actions



**Join the
Innovation/Research
ecosystem to promote
digital transformation!**



La certification Qualiopi a été délivrée au titre des catégories d'actions suivantes : actions de formation actions de formation par apprentissage

PLM of the future: what place for humans in the digital transformation of companies?

Prof. Dr Eng Frédéric SEGONDS
Arts et Métiers, LCPI, Campus de Paris

CIMdata's 2026 PLM Market & Industry Forum
AI in PLM: Expanding Capabilities Across the Product Lifecycle
The event for PLM software & service providers

frederic.segonds@ensam.eu

