APP1 – Post launch analysis of detergent pouch APP2 – Detergent pouch systems

End-user partner: Translator partner:





a Partners in Performance company

Procter&Gamble







APP1 Business Case



IONTOTRANS

The challenge is the fast analysis of large datasets to assess in-market initiative success. Key Performance Indicators KPI's include product pricing, product size/number of jobs, retailer, numerical distribution, i.e., the presence of product on the shelf, product and package attributes.

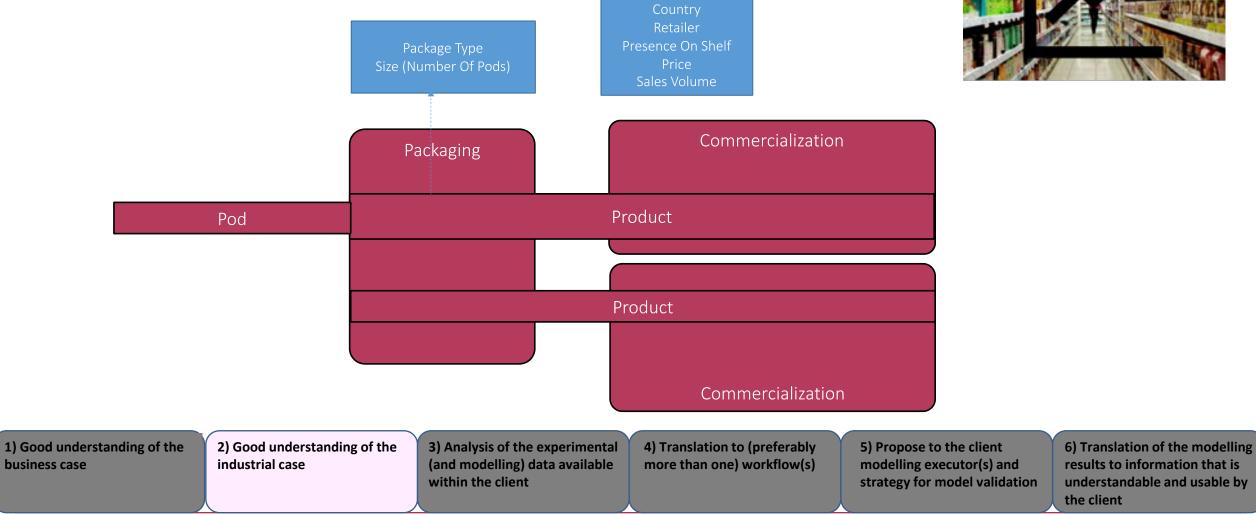
The sought benefit is to rapidly react to the change of market reality, competitive initiatives, economic drivers and distribution, to offer the best possible product line-up to consumers.

1) Good understanding of the business case

2) Good understanding of the industrial case 3) Analysis of the experimental (and modelling) data available within the client 4) Translation to (preferably more than one) workflow(s)

5) Propose to the client modelling executor(s) and strategy for model validation 6) Translation of the modelling results to information that is understandable and usable by the client

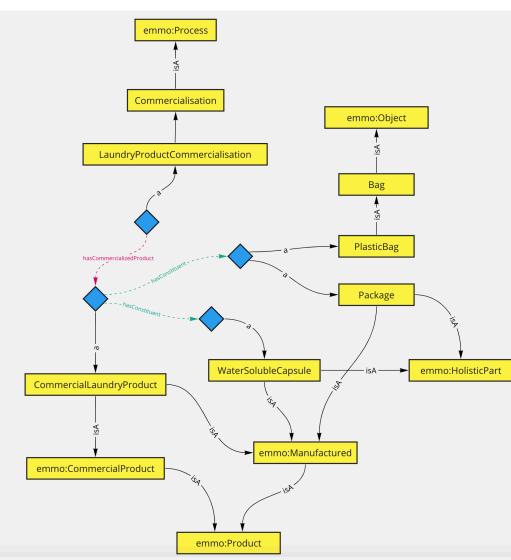
APP1 Industrial Case





APP1 EMMO Compliant Application Ontology

ommercialLaundryProdu





LONTOTRANS

Commercialization Properties

n.a. = not applicable (nonsense) n.r. = not relevant (makes sense but useless)	Property Names Property Description (semantics)		Data Description (symbolic)			
o.s. = out of scope (makes sense at could be important but not under this scope)			Data Type	Data Range	Units	
	Country Identifier	Name of the country of Commercialization	String	Enumeration of countries	n.a.	
	Retailer Identifier	Name or code of the retailer	String	Enumeration of retailers	n.a.	
Commercialization	Product Price	Price of the package as defined by the retailer.	Real Scalar	[0,Inf[Currency	
	Presence on Shelf	The % of shops handling the product according to retailer policy.	Real Scalar	[0,100]	%	
	Sales Volume	Units sold per week	Real Scalar	[0,Inf[hundreds of units per week	
	Components Performance	Product performance from multi-dimensions to evaluate product features for capsules	Integer Vector of 9 elements	[0,100]	n.a.	
WaterSolubleCapsule	Perfume Boost Technology	Specific perfume existing	Boolean	{true,false}	n.a.	
WaterSolubleCapsule hasproperty>	Perfume Type	Perfume name to apply to capsules	String	Enumeration according to PGBS nomenclature	n.a.	
	Perfume Level	Amount of perfume in a capsule.	Real Scalar	[0,1]	% w / w	
and a state of the state	Dissolution Time	Time for complete dissolution of the capsule.	Real Scalar	[0,Inf[min	
<mark>nmercialLaundryProduct</mark> h _{asProperty}	Product Size	Number of pods contained by the shelf product.	Integer Scalar	[0,Inf[n.a.	
PackagehasProperty	PackageType	Package type.	String	{box, bag}	n.a.	

APP 1 Data and Metadata Curation



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DATA SOURCE & CURATION

- In-market data are purchased by PGBS through external vendors
- The data are stored within PGBS database and regularly updated
- Data are verified by the vendor and at the time of uploading to PGBS database

1) Good understanding of the business case	2) Good understanding of the industrial case	3) Analysis of the experimental (and modelling) data available within the client	4) Translation to (preferably more than one) workflow(s)	5) Propose to the client modelling executor(s) and strategy for model validation	6) Translation of the modelling results to information that is understandable and usable by
					the client

APP 1 Models



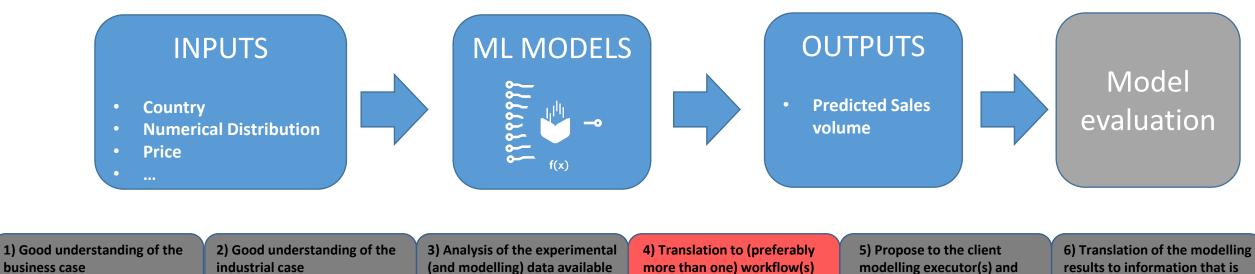
understandable and usable by

the client

IONTOTRANS

 Data are regressed with a machine learning model to predict the sales volume as a function of numerical distribution and price for 3 European countries (Germany, France and UK) and for each product in the market.

within the client



strategy for model validation

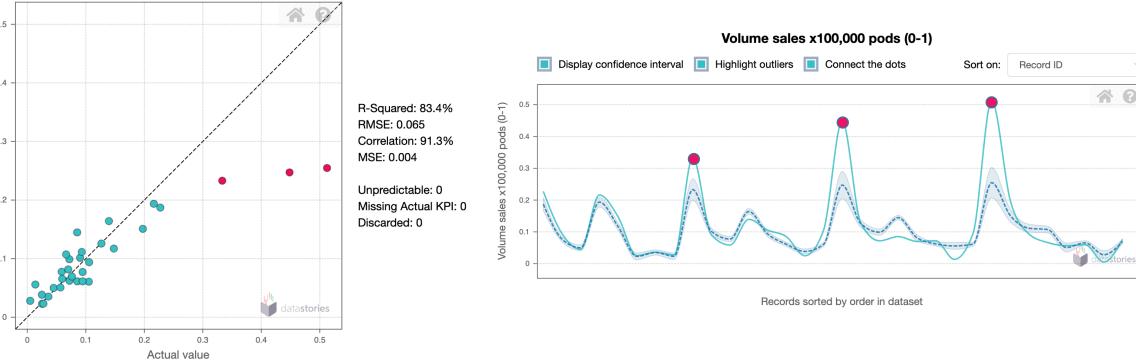
Model Validation

Volume sales x100,000 pods (0-1) 0.5 Display confidence interval 0.4 R-Squared: 83.4% Volume sales x100,000 pods (0-1) RMSE: 0.065 0.4 Correlation: 91.3% 0.3 Prediction MSE: 0.004 0.3 Unpredictable: 0 0.2 Missing Actual KPI: 0 Discarded: 0 0 0.1 atastories 0.1 0.2 0.3 0.4 0.5 0 Actual value

1) Good understanding of the 2) Good understanding of the 3) Analysis of the experimental 4) Translation to (preferably 5) Propose to the client 6) Translation of the modelling modelling executor(s) and industrial case (and modelling) data available more than one) workflow(s) results to information that is business case within the client strategy for model validation understandable and usable by the client

Second OntoTrans Open Workshop, 07.09.2023, Hybrid







APP1 Interface

APP1: Post-Launch Analysis

Good unde siness case	rstanding of the	2) Good understandin industrial case	g of the 3) Analysis of the exp (and modelling) data within the client	
Train m	odel			Ev
2021/01	/10 – 2022/05/29			0.00
Reference	period			
3			102	Price
Number of	jobs		102	0.00
ARIEL			•	GTIN
Brand				Mode
FRANCE			•	GT
Country				GT
Or define	a scenario:			GT GT
None			•	GT
Select a GT	IN			Sco
Model train	ing Model evaluation			Мо

erimental 4) Translation to (preferab available more than one) workflow(ose to the ng execut		6) Translation of the modelling results to information that is
Evaluate				
0.00			1.00	
0	.50			
Price (training range: 0.52-0.65)				
0.00			1.00	
	.50			
Numerical distribution (training range: 0.14-0.70)				
GTIN-8001841568805 from 2021-01-10 to 2022-05-29	2023-03-07 0	0:15:40	93%	
Model	Created on		Quality	
GTIN-8001841568805 from 2021-01-10 to 2022-05-29	2023-03-07 00:16:42	done	93%	
GTIN-8006540082362 from 2021-01-10 to 2022-05-29	2023-03-07 01:14:31	done	62%	
GTIN-8001841568805 from 2021-01-10 to 2022-05-29	2023-03-07 00:14:36	done	93%	
GTIN-8001841568805 from 2021-01-10 to 2022-05-29	2023-03-07 00:17:30	done	93%	
GTIN-8006540180327 from 2021-01-10 to 2022-05-29 GTIN-8001841568805 from 2021-01-10 to 2022-05-29	2023-03-07 01:37:54 2023-03-07 00:15:40	done done	65% 93%	Var Mark
Scenario Country: FRANCE Brand: ARIEL Jobs: 22-29 fro	2023-03-07 02:11:15	done	82%	
Model	Creation date	Status	Quality	E TO A NUMBER OF

Model training Model evaluation



understandable and usable by

the client

strategy for model validation

1) 6

bus

Technical Workflow

Model evaluation sequence Model training sequence **Behind firewall Behind firewall** ESS OTE API ML Evaluator Translator Wizard/CLI ESS OTE API ML Trainer Translator Wizard/CLI exploration exploration desired model exploration results model, distribution, price parameters (GTIN or Country, Brand, Jobs, Ref. period) distribution, price ML training params model, distribution, price evaluation result ML training params (sales volume) ML Mo<mark>del metadata</mark> evaluation result (sales volume) ML Model metadata evaluation result ML Model metadata, ML training params (sales volume) _____ ESS Translator Wizard/CLI OTE API ML Trainer ESS Translator Wizard/CLI OTE API ML Evaluator



ESS: Exploratory Search System

X Model Training Scenario Country: FRANCE Brand: ARIEL Jobs: 22-29 from 2021-01-10 to 2022-05-29

ALL PRODUCT MODEL TRAINING MODEL EVALUATION

18 results (19 milliseconds)

Model Training Scenario Country: FRANCE Brand: ARIEL Jobs: 22-29 from	Model Training Scenario Country: FRANCE Brand: ARIEL Jobs: 22-29 from
2021-01-10 to 2022-05-29	2021-01-10 to 2022-05-29
ModelTraining	ModelTraining
No description	No description
Model Training GTIN-8006540180327 from 2021-01-10 to 2022-05-29	From: 2021-01-10
ModelTraining	Jobs_from: 2.2E1
No description	Country: FRANCE
Training Result Scenario Country: FRANCE Brand: ARIEL Jobs: 22-29 from 2021-01-10 to 2022-05-29 TrainingResults No description	To: 2022-05-29 Jobs_to: 2.9E1 Training_type: SCENARIO Brand: ARIEL Results: GTIN-8006540182727
Training Result GTIN-8006540180327 from 2021-01-10 to 2022-05-29 TrainingResults No description	Related Entities ()



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APP2 Business Case



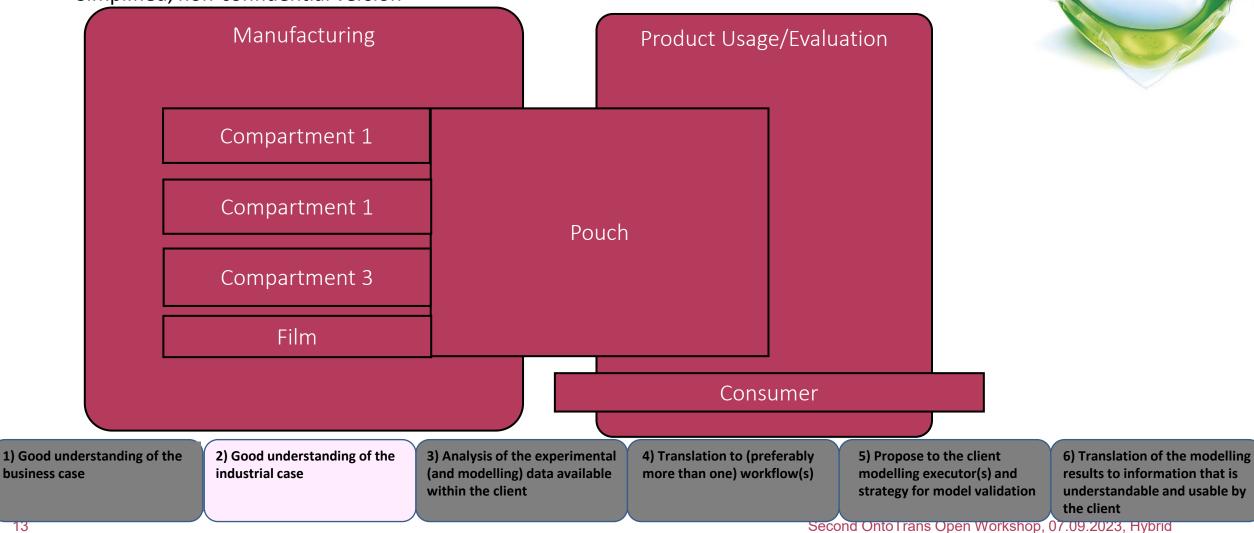
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The objective is the development of a more integrated, digital work process for the design of laundry Detergent Pouch Systems aiming at a 5X faster product development cycle

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APP2 Industrial Case

Simplified, non-confidential version



APP 2 Data and Metadata Curation

DATA SOURCE & CURATION

- Formulas composition is stored in PGBS databases along with related experimental and/or predicted properties:
 - Performance
 - Shelf stability
 - Consumer and industrial safety
 - Sustainability
 - Cost
- Based on the product performance and package, the purchase like hood across selected European countries can be modelled using consumer models developed as part of this program

1) Good understanding of the business case

14

3) Analysis of the experimental (and modelling) data available within the client 4) Translation to (preferably more than one) workflow(s)

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NTOTRANS



APP 2 Models

DETERGENT POUCH SYSTEMS: Agile response to product, market and regulatory requirements / (PGBS and DATASTORIES)

Outputs

- Performance, sustainability, cost, stability, safety of each solution
- The output of the solution is processes through
 - A model computing the character of the perfume in each formulation in comparison to that of the reference product. Product with significant character change will be discarded
 - A model computing the like hood of purchasing vs the reference. Products with low purchasing likehood will be discarded

Computed properties of each formulation:

- Performance
- Stability
- Sustainability
- Safety
- Cost

Filter solution matching success criteria

IONTOTRANS

Perfume character prediction:

- Likeability vs reference

Filter solution with not character deviation

Consumer purchase intent prediction:

- Purchasing likehood

Lead formula candidates

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Advantage Brought by OntoTrans

Ontological description of the process

- > Enhances understanding of the industrial case
- > Simplifies its extension and reapplication to other cases
- > Easier management of the modelling process
- > Optimal solution for consumer centric models
- > Application cases results: 5x acceleration of the overall work process.

RANS