



Stewart School of Industrial & Systems Engineering

Showcasing Optimization in Hyperconnected Networks

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Foreword



- This presentation introduces the concept of showcasing, and presents its application in guiding dealership product portfolio.
- Fast (immediate) and reliable delivery in large scale across the network as in a hyperconnected network is required to successfully implement the model in practice.
 - Able to adopt it as the sole mode across the dealer network

Through smartly integrating product showcasing and product availability, retailers can take full advantage of the fast replenishment from hyperconnected networks in the Physical Internet world and better meet customers' expectations.

Showcasing





- Each dealership displays a portfolio of vehicles in its showroom for customers to see and to help them make better purchase choices
- Once a customer decides on a vehicle he/she wants, it is shipped from another location to the dealership for pickup or directly to the customer

Which vehicles should a dealership display? How to decide?

Let us take a look at a dealer (13) for illustrative purposes Assuming its current inventory is its showcasing portfolio





	Alpha2	Beta2	Beta11	Gamma 6
Color	Red	Blue	Black	Red
Engine	1000 Twin Cylinder	1000 Twin Cylinder	Turbo	Pro 101
Platform	A2	A2	A2	A3
Passenger	2	2	2	3
Segment Industry	Recreational	Sport-1	Sport-2	Utility



Define the key categories of product features that customers want to physically touch and feel on a product in the dealership in order to differentiate correctly between products and to gain sufficient confidence that an ordered product will satisfy their needs and meet their expectations

Illustrative Feature Categories

- Product Segment
- Seating Capacity
- Platform
- Engine
- Color

Illustrative Features in a Category: Seating Capacity





Showcasing value $\Gamma = \sum_{c \in \mathcal{C}} \alpha_c w_c^s \sum_{f \in \mathcal{F}_c} d_f y_f^T + \sum_{c \in \mathcal{C} \setminus \bar{\mathcal{C}}^t} \beta_c w_c^t \sum_{f \in \mathcal{F}_c} d_f y_f^t$

w_c: Showcasing Weight of

d_{f:} Demand Share for a feature

a Feature Category

Feature Category	Weight
Segment Industry	0.455
Passenger (Seat Capacity)	0.136
Platform	0.182
Engine	0.091
Color	0.136
Sum	1





Showcasing value
$$\Gamma = \sum_{c \in \mathcal{C}} \alpha_c w_c^s \sum_{f \in \mathcal{F}_c} d_f y_f^T + \sum_{c \in \mathcal{C} \setminus \bar{\mathcal{C}^t}} \beta_c w_c^t \sum_{f \in \mathcal{F}_c} d_f y_f^t$$

- **Y**_f: showcase representation in the portfolio of feature f
 - 1 if the exact feature is showcased by a product in the dealership portfolio
 - Between 0 and 1 if a similar feature is showcased by a product in the dealership portfolio
 - 0 otherwise



Illustrative Example

Assume only engine ROTAX 1000R is showcased in products currently in the dealership portfolio

- **y**_{ROTAX1000R} = **1**
- Since seeing and touching a ROTAX 1000R is a partial surrogate for do so on a ROTAX 850

y_{ROTAX 850} = .75



Showcasing value
$$\Gamma = \sum_{c \in \mathcal{C}} \alpha_c w_c^s \sum_{f \in \mathcal{F}_c} d_f y_f^T + \sum_{c \in \mathcal{C} \setminus \bar{\mathcal{C}^t}} \beta_c w_c^t \sum_{f \in \mathcal{F}_c} d_f y_f^t$$

- For some categories such as color, customers will always want to see the exact feature
 - Thus, y_{f in category "color"} will be 1 if and only if that color is showcased

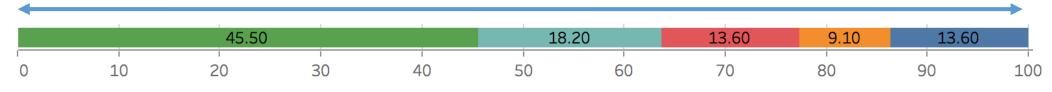
Note:

 Definitions of categories and feature scoring method in this presentation were selected to illustrate the concept; More precise definitions and methods need to be developed by the experts, and might be different from shown here

Current Showcasing Value of Example Dealer Portfolio

BRP

Max Potential Showcasing value = 100%



Showcasing value = 48.8%

	25.20		4.50 8.1	6 8.13	2.83					
1	I	I	I	I	1	I	I	1	I	
0	10	20	30	40	50	60	70	80	90	10

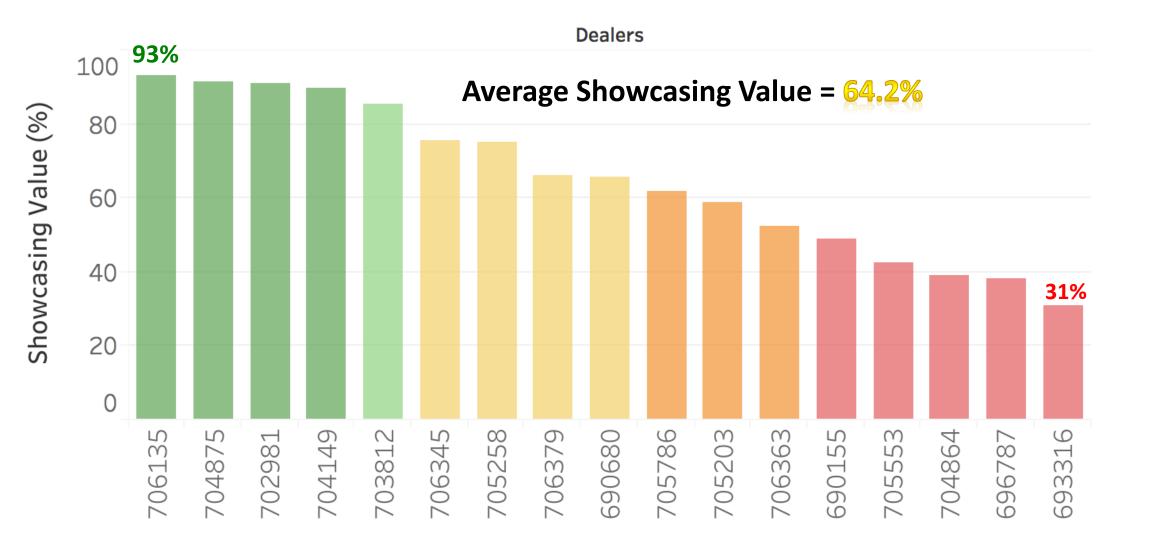
Value (%)

Color Engine Passenger Platform Segment Industry



Is it possible to get a better showcasing value with a different portfolio?

Current Showcasing Values





Optimization Model Output : Current Showcase



																																		S	SV	' Me	od	el N	lun	nbe	er																															
	1	12	23	4	5	6 7	8 '	9	10 1	11 1	2 13	3 14	4 15	516	5 17	' 18	19	20	21	22	23 2	42	526	5 27	28	29	30	31 3	23	334	1 35	36	37	38 3	39 4	04	1 42	43	44	45 4	16 47	7 48	49	50 5	51 5	253	54	55	56 57	758	59	60 6	1 62	2 63	64 6	5 66	676	8 69	70	717	2 73	74	75 7	76 77	778	798	0 81	82	83 84	Value	Cos	st (\$)
1	0	1	0	0	0 (0 0	0	0	0 0	0 0	0	0	0	0	0	0	0	0	0	0	0 1	L O	0	0	0	0	0	0 (0 1	0	0	0	0	0	0 (0 0	0	0	0	0 0	0 1	0	0	0 0) ()	0	0	0	0 0	0	0	0 0	0 (0	0 0	0	0 0	0 (0	0 (0 0	0	0 (0 0	0	0 0	0 (0	0 0	48.9%	6 80	0296
2	2 0	1	0	0	0 (0 0	0	0	0 0	0 0	0	0	0	0	0	0	0	0	0	0	0 0	0 0	0	0	0	0	0	0	2 1	0	0	0	0	0	0 (0 0	0	0	0	0 0	0 0	0	0	0 0	0 0	0	0	0	0 1	0	0	0 0	0 0	0	0 1	0	0 0	0 0	0	0 (0 0	0	0	0 0	0	0 0	0 0	0	1 0	65.9%	5 158	8893
з	3 0	0	0	0	0 (0 0	0	0	0 0	0 0	0	0	0	0	0	0	1	0	0	0	0 0	0 (0	0	0	1	0	0	0 0	0	0	0	0	0	0 (0 0	0	0	0	0 0	0 0	0	0	0 0	0 0	0	0	0	0 0	0	0	0 0	0 0	0	0 0	0	0 0	0 0	0	0 (0 0	0	0	0 0	0	0 0	0 0	0	0 0	30.8%	37	/298
4	• 0	1	0	0	0 (0 0	0	0	0 0	0 0	0	0	0	0	0	0	0	0	0	0	0 0	0 0	0	0	0	0	0	0	0 0	0	0	0	0	0	0 0	0 0	0	0	0	0 0	0 0	0	0	0 0	0 0	0	0	0	0 0	1	0	0 0	0 0	0	0 0	0	1 0	0 0	0	0 (0 0	0	0	0 0	0	0 0	0 0	0	0 0	38.3%	51	397
5	5 0	0	0	0	0 0	0 0	0	0	0 1	1 0	1	0	0	0	1	1	0	0	0	0	0 0	0 0	0	0	0	4	2	0	0 1	1	3	1	1	2	2	2 0	0	0	0	0 0	0 1	1	0	0 0	0 0	0	0	1	0 0	2	0	3 5	5 2	1	22	4	6 4	0	0	0 (0 0	0	0	0 0	1	3 3	8 0	2	1 0	91.0%	135	58033
	0	0	0	0	0 0	0 0	0	0	0 0	0 0	0	0	0	0	0	0	1	2	1	0	0 0	0 0	0	0	0	0	0	0	0 0	0	2	0	0	2	2 (0 0	0	0	0	0 0	0 0	0	1	0 0	0 0	2	1	2	0 0	0	1	1 1	L O	1	0 0	0	0 0	0 0	0	0 (0 0	0	0	1 0	3	2 2	2 2	0	0 0	85.4%	535	5470
Je 7	, 0	0	0	0	0 0	0 0	2	0	0 0	0 0	0	0	0	0	1	0	1	1	0	0	0 1	LO	0	0	0	1	0	1	1 0	0	1	0	0	2	1 (0 0	0	1	0	0 2	2 2	0	0	0 0	0 0	0	0	1	0 1	0	0	2 1	0	1	0 0	0	1 0	0 0	1	0 (0 0	0	0	0 0	0	2 3	8 0	1	0 0	89.5%	638	8868
ž s	0	0	0	0	0 0	0 0	0	0	0 0	0 0	0	0	0	0	0	0	0	0	0	0	0 0	0 0	0	0	0	1	0	0	2 3	0	0	0	0	0	0 0	0 0	0	0	0	0 0	0 0	0	0	0 0	0 0	0	0	0	0 0	0	0	0 0	0	0	0 0	0	0 0	0 0	0	0 (0 0	0	0	0 0	0	0 1	L O	1	0 0	38.9%	209	9692
Number	1	1	0	0	0 0	0 0	0	1	1 (0 0	0	1	0	0	0	0	0	0	0	0	0 1	L 0	0	0	0	0	0	0	1 1	0	0	0	0	0	0 (0 0	0	1	0	1 1	1 0	0	0	0 0	0 0	1	0	0	0 0	0	0	1 0	0	0	0 1	0	0 0	0 0	0	0 (0 0	0	1	0 0	0	1 1	L O	0	1 0	91.3%	349	9082
b 1	0	1	0	0	0 0	0 0	0	0	0 0	0 0	0	0	0	1	0	0	0	0	0	0	0 0	0 0	0	0	0	0	0	0	0 0	0	0	0	0	0	0 (0 0	0	0	0	0 0	0 0	0	1	1 (0 0	0	0	0	0 0	0	1	0 1	0	0	0 0	0	0 0	0 0	0	0 (0 0	0	0	1 0	1	0 0	0 0	0	0 0	58.7%	5 127	7992
	1 0	0	0	0	0 0	0 0	0	0	0 0	0 0	0	0	0	0	1	0	0	0	0	0	0 0	0 0	0	0	0	0	0	0	1 1	0	0	0	0	0	0 (0 0	0	0	0	0 0	0 0	0	1	0 0	0 0	0	0	0	1 0	0	0	0 0	0	1	0 0	0	0 0	0 0	0	0 (0 0	0	0	0 0	0	0 0	0 0	0	0 0	75.1%	6 110	0494
ם ₁	2 0	0	0	0	0 0	0 0	0	0	0 0	0 0	0	0	0	0	0	0	0	0	0	0	0 0	0 0	0	0	0	0	0	0	0 0	0	0	0	0	0	0 (0 0	0	0	0	0 0	0 0	0	0	0 0	0 0	0	0	0	0 0	0	0	0 0	0 0	0	0 0	0	0 0	0 0	0	0 (0 0	0	0	0 0	1	0 1	L O	0	0 0	42.5%	33	3198
1	3 0	0	0	0	0 0	0 0	0	0	0 0	0 0	0	0	0	0	0	0	0	0	0	0	0 0	0 0	0	0	0	0	0	0	1 1	0	1	0	1	0	0 (0 0	0	0	0	0 0	0 0	0	0	0 0	0 0	0	0	0	0 0	0	0	0 0	0 0	1	0 0	0	0 0	0 0	0	0 0	0 0	0	0	0 0	0	0 0	0 0	0	0 0	61.8%	123	3495
1.	4 0	0	0	0	0 0	0 0	1	0	0 0	0 0	0	0	0	0	0	0	1	0	1	0	1 (0 0	0	0	0	0	0	0	1 2	0	1	0	0	1	1 (0 0	0	0	0	0 1	1 1	0	0	0 1	LO	1	1	0	0 0	0	0	2 0) 1	1	1 0	0	0 0) 1	0	0 (0 0	0	0	0 0	0	2 3	3 0	0	0 0	93.2%	506	6674
1	5 0	0	0	0	0 0	0 0	0	0	0 0	0 1	0	0	0	0	0	0	1	0	0	0	0 1	L 1	0	0	0	0	0	0	0 0	0	0	0	0	2	0 (0 0	0	0	0	0 0	0 0	0	0	0 0	0 0	0	1	0	0 0	0	0	1 0	0	0	0 0	0	1 0	0 0	0	0 (0 0	0	0	0 0	0	0 2	2 0	0	0 0	75.7%	5 20E	8189
1	6 0	0	0	0	0 0	0 0	0	0	0 0	0 0	0	0	0	0	0	0	0	0	0	0	0 0	0 0	0	0	0	0	0	0	0 1	0	0	0	0	1	0 (0 0	0	0	0	1 (0 0	0	0	0 0	0 0	0	0	0	0 0	0	0	0 0	0 0	0	0 0	0	0 0	0 0	0	0 (0 0	0	0	0 0	0	0 1	LO	0	0 0	52.6%	6 86	5696
1	7 0	0	0	0	0 0	0 0	0	0	0 0	0 0	0	0	0	0	0	0	0	0	0	0	0 0) 0	0	0	0	4	1	1	1 2	0	0	0	0	0	1	2 0	0	0	0	0 0	0 0	0	0	0 0	0 0	0	0	0	0 0	0	0	0 0	1	0	0 0	0	0 0	0 0	0	0 0	0 0	0	0	0 0	0	3 (66.2%		

- Shows the SSV models initially showcased for each dealer in Oklahoma
- Current showcasing value and budget also shown for each dealer

- Product not showcased for this dealership
- 1 One unit of the product showcased for this dealership
- 2 Two units of the product showcased for this dealership
- 3 Three units of the product showcased for this dealership
- 4 Four units of the product showcased for this dealership
- 5 Five or more units of the product showcased for this dealership

Several dealers have multiple copies of the same product, which adds nothing to the showcasing value

Showcasing Value Optimization

- Goal is to maximize showcasing value for a dealer through deciding which products to showcase given physical and budgetary constraints
- Higher showcasing value means lower chance of a customer not purchasing the product because desired features were not showcased

Showcasing Portfolio Value Optimization Model



max	$\Gamma = \sum_{c \in \mathcal{C}} \alpha_c w_c^s \sum_{f \in \mathcal{F}_c} d_f y_f^T + \sum_{c \in \mathcal{C} \setminus \bar{\mathcal{C}}^t} \beta_c w_c^t \sum_{f \in \mathcal{F}_c} d_f y_f^T$	J_f^t	(1)
s.t.	$y_f^s \ge \delta^i_{fp} x_p^i,$	$\forall c \in \mathcal{C}, f \in \mathcal{F}_c, p \in \mathcal{P}, i \in \{s, t\}$	(2)
	$y_f^s \leq \sum_{i \in \{s,t\}} \sum_{p \in \mathcal{P}} \delta^i_{fp} x_p^i,$	$\forall c \in \mathcal{C}, f \in \mathcal{F}_c, i \in \{s, t\}$	(3)
	$v_{fp}^i \le 1 - (y_f^s - \delta_{fp}^i x_p^i),$	$\forall c \in \mathcal{C}, f \in \mathcal{F}_c, p \in \mathcal{P}, i \in \{s, t\}$	(4)
	$\sum_{i \in \{s,t\}} \sum_{p \in \mathcal{P}} v_{fp}^i \le 1,$	$\forall c \in \mathcal{C}, f \in \mathcal{F}_c$	(5)
	$y_f^m \ge \mu \delta^m_{f,f'} x_{f'}^m,$	$\forall c \in \mathcal{C}, f, f' \in \mathcal{F}_c$	(6)
	$y_f^m \le \mu \sum_{f' \in \mathcal{F}_c} \delta_{f,f'}^m x_{f'}^m,$	$\forall c \in \mathcal{C}, f \in \mathcal{F}_c$	(7)
	$u_{f,f'}^m \le 1 - (y_f^m - \mu \delta_{f,f'}^m x_{f'}^m),$	$\forall c \in \mathcal{C}, f, f^{'} \in \mathcal{F}_{c}$	(8)
	$\sum_{f'\in\mathcal{F}_c} u_{f,f'}^m \le 1,$	$\forall c \in \mathcal{C}$	(9)
	$y_f^t \ge \delta_{fp}^t x_p^t,$	$\forall c \in \mathcal{C}, f \in \mathcal{F}_c, p \in \mathcal{P}$	(10)
	$y_f^t \leq \sum_{p \in \mathcal{P}} \delta_{fp}^t x_p^t,$	$\forall c \in \mathcal{C}, f \in \mathcal{F}_c$	(11)
	$u_{fp}^t \le 1 - (y_f^t - \delta_{fp}^t x_p^t),$	$\forall c \in \mathcal{C}, f \in \mathcal{F}_c, p \in \mathcal{P}$	(12)

Showcasing Portfolio Value Optimization Model



$\forall c \in \mathcal{C}, f \in \mathcal{F}_c, i \in \{s, m\}$	(13)
	(14)
	(11) (15)
$v \in \mathbf{C}, j \in \mathbf{C}, v \in [0, m]$	
	(16)
	(17)
	(18)
$\forall c \in \mathcal{C}, f \in \mathcal{F}_c, i \in \{s, t\}$	(19)
$\forall c \in \mathcal{C}, f \in \mathcal{F}_c, i \in \{t, T\}$	(20)
$\forall c \in \mathcal{C}, f \in \mathcal{F}_c$	(21)
$\forall p \in \mathcal{P}, i \in \{s, t\}$	(22)
$\forall c \in \mathcal{C}, f \in \mathcal{F}_c$	(23)
$\forall c \in \mathcal{C}, f \in \mathcal{F}_c, i \in \{s, m, t, T\}.$	(24)
	$\begin{aligned} \forall c \in \mathcal{C}, f \in \mathcal{F}_c, i \in \{t, T\} \\ \forall c \in \mathcal{C}, f \in \mathcal{F}_c \\ \forall p \in \mathcal{P}, i \in \{s, t\} \\ \forall c \in \mathcal{C}, f \in \mathcal{F}_c \end{aligned}$

Optimized Portfolio of the Same Dealer Maximizing Showcasing Value



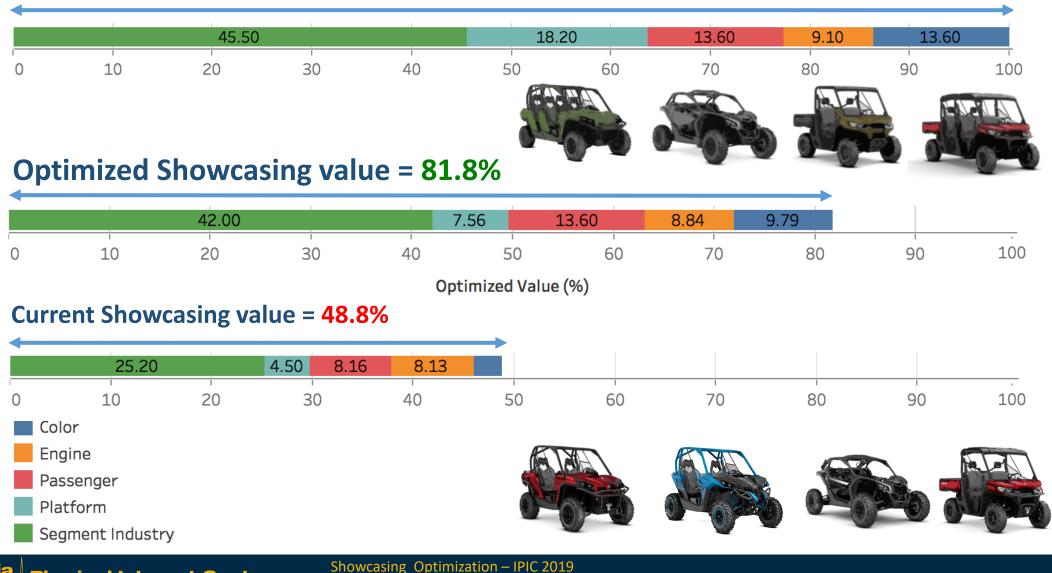


	Alpha 12	Beta 10	Gamma 9	Gamma 20
Color	Green	Grey	Brown	Red
Engine	1000 -Twin Cylinder	Turbo	Pro 8	Pro 100
Seating	4	2	3	6
Platform	Alpha 6	D38	B5	B15
Segment	Muti	Sport-1	Utility	Utility Multi
Showcasing Value		81.	8%	

Optimized Showcasing Value

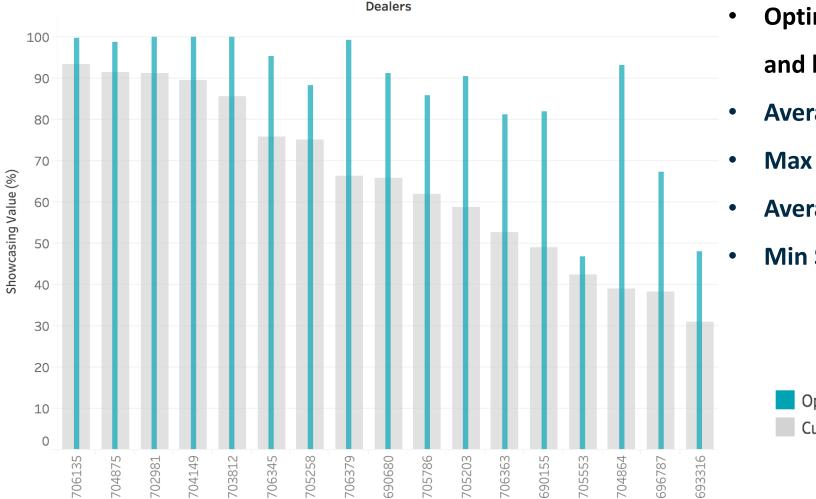
Max Potential Showcasing value = 100%





Fgia Physical Internet Center ech Supply Chain & Logistics Institute Park, Montreuil, Dayarian, Derhami, Yim

Showcasing Value Optimization



- Optimized with the same portfolio size and budget for each dealer
- Average Showcasing Value = 86.2%
- Max Showcasing Value Increase: 140%
- Average Showcasing Value Increase: 40.7%

• Min Showcasing Value Increase: 7%

Optimized Value Current Value

Max Achievable Showcasing Value with no portfolio size constraint= 100%

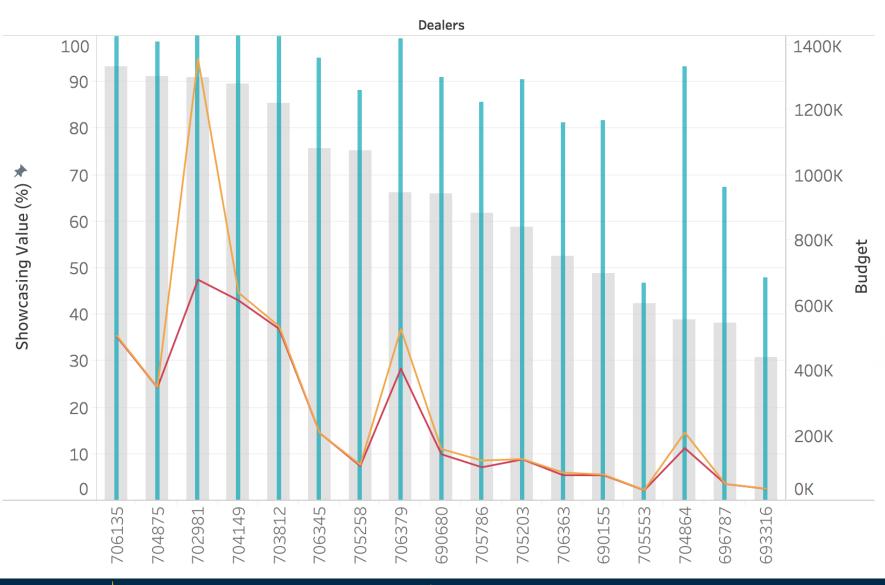
Physical Internet Center

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Showcasing Value Optimization

Physical Internet Center

Supply Chain & Logistics Institute





- For some dealers, the new budget decreased
- The total budget for all dealers decreased by 18%



Showcasing Value Optimization: Optimized Dealer Portfolios

																																		S	s٧	Mc	de	el N	lun	nb	er																																
	1	2	3	4 :	56	7	8	9 1	0 11	12	13	14	15	16	17	18	19	20	21	22	23	24 2	25 2	62'	7 28	29	30	31	32 3	3 34	35	36	37	38 3	19 40	0 41	42	43	44	45 4	6 47	748	49	50 5	51 5	52 5	3 54	4 55	56	575	8 59	60	61 6	62 63	3 64	65 6	667	68 (69 7	071	72	73	74 7	5 76	5 77	78	79	80 8	81 82	2 83	84	Value (%	6) Cost (\$
	1 0	0	0	0 (0 0	0	0	0 0) ()	1	0	0	0	0	0	0	0	0	0	0	0	0	0 () (0 (0	0	0	1	0 0	0	0	0	0	0 0	0 (0	0	0	0 (0 0	0 (0	1	0	0 (0 0	0	0	0 () ()	0	1	0 0	0	0 0) ()	0	0 0) ()	0	0	0	0 0	0	0	0	0 0	0 0	<u> </u>	0	81.8	78396
	2 0	0	1	0 (0 0	0	0	0 0	0 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (0 0	0	1	0	1	0	0 0	0	0	0	0	0 0) 0	0	0	0	0 (0 0	0	0	0	0	0 (0 0	1	0	0 (0 (0	0	0 0	0	0 1	0	0	0 0	0 (0	0	0	0 1	0	0	0	0 0	0 0	0 1	0	91.1	14279
	3 0	0	0	0 0	0 0	0	0	0 0	0 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 1	1 0	0	0	0	0	0	0 0	0	0	0	0	0 0) 0	0	0	0	0 (0 0	0	0	0	0	0 (0 0	0	0	0 (0 (0	0	1 0	0	0 0	0 (0	0 0	0 (0	0	0	0 0	0	0	0	0 0	0 0	0 0	0	47.9	36798
	4 0	0	0	0 0	0 0	0	0	0 0	0 0	0	0	0	0	0	0	0	0	1	0	0	0	0	0 (0 0	0	1	0	0	0	0 0	0	0	0	0	0 0) ()	0	0	0	0 (0 0	0	0	0	0	0 (0 0	0	0	0 (0 (0	0	0 0	0	1 0	0 (0	0 0	0 (0	0	0	0 0	0	0	0	0 0	0 0	0 0	0	67.3	51397
	5 0	0	0	1 (0 0	1	1	0 1	1 0	0	1	1	0	1	0	1	1	0	1	1	1	1	1 1	1 1	0	0	1	0	0	1 1	0	1	0	1	0 1	1	0	0	0	0 (0 0	0	1	0	1	0 (0 0	0	1	0 (0 (0	0	0 0	0	1 1	0	0	0 0	0 (0	0	1	0 0	1	1	0	1 1	1 1	1 0	1	100.0	67896
	6 0	0	0	1 (0 1	0	1	0 1	1 0	0	1	0	1	0	0	1	1	0	1	0	1	0	0 1	1 1	1	0	0	1	0	0 0	0	0	1	0	1 1	0	0	0	0	0 (0 0	0	1	0	1	0 (0 1	0	0	0 (0 (0	0	0 1	0	0 1	0	0	0 0	0 (1	0	0	0 0	1	1	1	0 0	0 1	1 0	1	99.9	52777
Number	70	0	0	1 (0 0	1	1	0 1	1 0	0	1	1	0	1	0	1	1	0	1	1	1	1	0 1	1 1	0	0	1	1	0	0 1	0	1	0	1	0 1	0	0	0	0	0	0 0	0	1	0	1	0 (0 0	0	1	0 (0 (0	0	0 0	0	1 1	0	0	0 0	0 (0	0	1	0 0	1	1	0	1 (0 1	1 0	1	100.0	61526
ΙĔ		0	0	0 0	0 0	0	0	1 0	0 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0	0 0	1	0	0	1	0	0 0	0	0	0	0	0 0	5 0	0	0	0	0	0 0	0	0	0	0	0 (0 0	0	1	0 (0 (0	0	0 0	0	1 1	0	0	0 0	0 (0	0	0	0 1	0	0	0	0 (0 1	1 0	0	93.2	16159
2		0	0	0 0	0	0	0	0 0	0	0	1	0	1	0	0	0	1	0	1	0	0	0	0 1		0	1	0	1	0	0 0	0	1	0	0	0 1	0	0	0	0	0	0 0	0	1	0	1	0 (0 1	0	0	0 (0	0	0	0 1	0	0 1	0	0	0 0	0	0	0	1	0 0	0	1	0	0 0	0 0	0 1	1	93.2 98.6	
2		0	0	0 0	, o	ő	0	1 0	, , , ,	0	-	0	0	0	0	0	0	1	0	0	0	0	0 0	. °	0	0	0	0	1	0 0 0	0	-	0	0	0 0		Ő	0	0	0	00		0	0	-	0 0		0	0	0 0	, . 	0	0	0 0	0	1 1	0	0	0 0	, . 	0	0	1	1 0	0	-	0			0 0	1		34758
Dealer	10	0	0	0 0		0	0	1 0			0	0	0	0	0	1	0	1	0	0	0	0	00			0	0	0	1	0 0	0	0	0	0	00		0	0	0	0 0	00		0	0	0	0	0 0		0	0 0		0	0	00	0	0 1	0	0	00		0	0	0	1 0	0	0	0	0 0		0 0		90.5	12699
e e	11 0	0	U	0 (5 0	0	0	1 (J U	0	0	0	0	0	0	1	0	0	0	0	0	0	0 (J U		0	0	0	1	00	0	0	0	0	00	0	0	0	0	0 0	00		0	0	0	0 0	00	1	0	0 0		0	0	00	U	0 1	U	0	0 0		0	U	0	1 0	0	0	0	0 0	00	· ·	Ĭ	88.1	10659
	12 0	0	0	0 (0 0	0	0	0 0) ()	0	0	0	0	0	0	0	0	0	0	0	0	0	0 1	0	0 0	0	0	0	0 (0 0	0	0	0	0	0 0	10	0	0	0	0 (0 0	0 0	0	0	0	0 (0 0	0	0	0 () ()	0	0	0 1	0	0 (0 (0	0 0) ()	0	0	0	0 0	0	0	0	0 0	0 0	0 0	0	46.7	32298
	13 0	0	0	0 (0 0	0	0	0 0	0 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (0 0	0 0	0	0	0	1 (0 0	0	0	0	0	0 0) 0	0	0	0	0 (0 1	0	0	0	0	0 (0 0	0	0	0 (0 (0	0	0 0	0	0 0	0 (1	0 0	0 0	0	0	0	0 1	0	0	0	0 0	0 0	J 1	0	85.7	10289
	14 0	0	0	0 (0 0	1	1	1 0	0 0	0	1	0	1	0	0	1	1	0	1	0	1	0	0 1	1 1	1	0	0	1	0	0 0	0	0	1	1	0 1	. 0	0	0	0	0 (0 0	0	1	0	1	0 (0 1	0	0	0 () 1	0	0	0 0	0	0 0	0 (1	1 0	0 (0	0	0	0 0	0	1	0	1 0	0 1	1 0	1	99.7	50357
	15 0	0	0	0 1	0	0	0	0 0	0 0	0	0	0	0	0	0	0	0	0	1	0	1	0	0 () (1	0	0	0	1	0 0	0	0	0	0	0 0) 0	0	0	0	0 (0 0	0	0	0	0	0 (0 0	1	0	0	0	0	0	0 0	0	0 1	0	0	0 0	0 (0	0	0	0 1	0	0	0	0 0	0 0	0 1	1	95.2	20818
	16 0	0	0	0 0	0 0	0	0	0 0	0 (1	0	0	0	0	0	0	0	0	0	0	0	0	0 () (0	0	0	0	1	0 0	0	0	0	0	0 0) ()	0	1	0	0 (0 0	0	0	0	0	0 (0 0	0	0	0 (0 (0	0	0 0	0	0 0) 1	0	0 0	0 (0	0	0	0 0	0	0	0	0 0	0 0	0 0	0	81.2	78496
	17 0	0	0	0 0	0 1	0	1	0 0	0 0	0	1	0	1	0	0	0	1	0	1	0	1	0	0 1	1 0	0	1	0	1	0	0 0	0	1	0	0	0 1	0	0	0	0	0	1 0	0	1	0	1	0 (0 0	0	0	0 () 1	0	0	0 0	0	0 0	0 (1	0 0	0 (0	0	1	0 0	0	1	0	0 0	0 0	0 1	1	99.2	40557
	17																					-														_	_	_	_	_						-			-																			_				33.2	4055

Product not showcased for this dealership

1 One unit of the product showcased for this dealership

- Shows the models the showcase for optimal showcasing value within the current budget of each dealer
- The optimization model takes only showcasing value in to account

so only one unit of the same model is selected to be showcased, making it easier to stay within the budget

Future Work



- Field work with experts and testing with consumers
 - Feature category definition
 - Feature weighing and representation
- Field work with dealers
 - Showcasing portfolio optimization
- Integrating Virtual, Parts and Product Showcasing
- Modeling Dealer Portfolio and Inventory Optimization
 - Merging the Showcasing and Product Availability concepts



Questions, comments and ideas are most welcome!