Report 1

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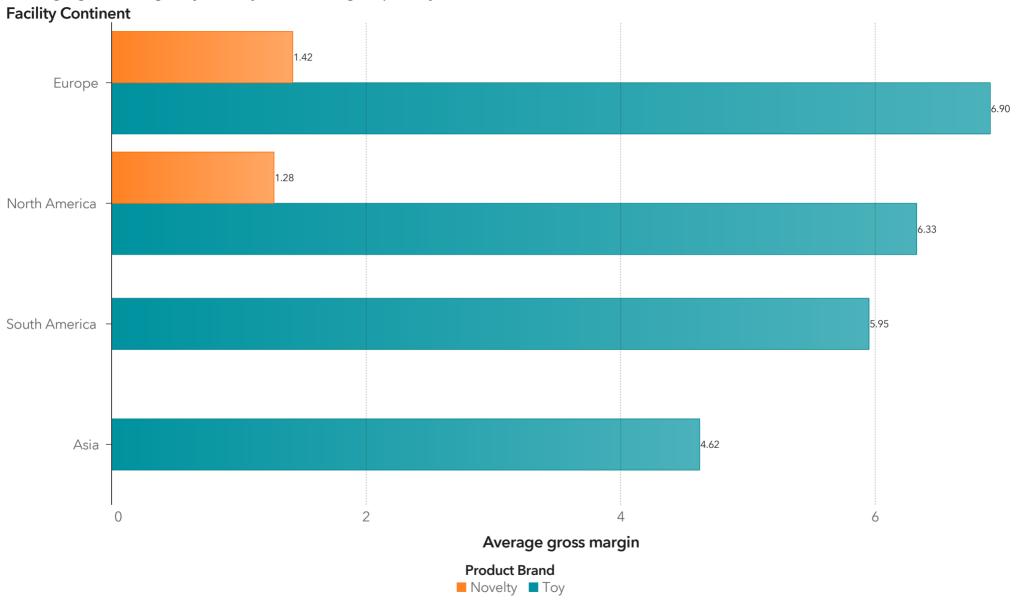
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Average gross margin by Facility Continent grouped by Product Brand

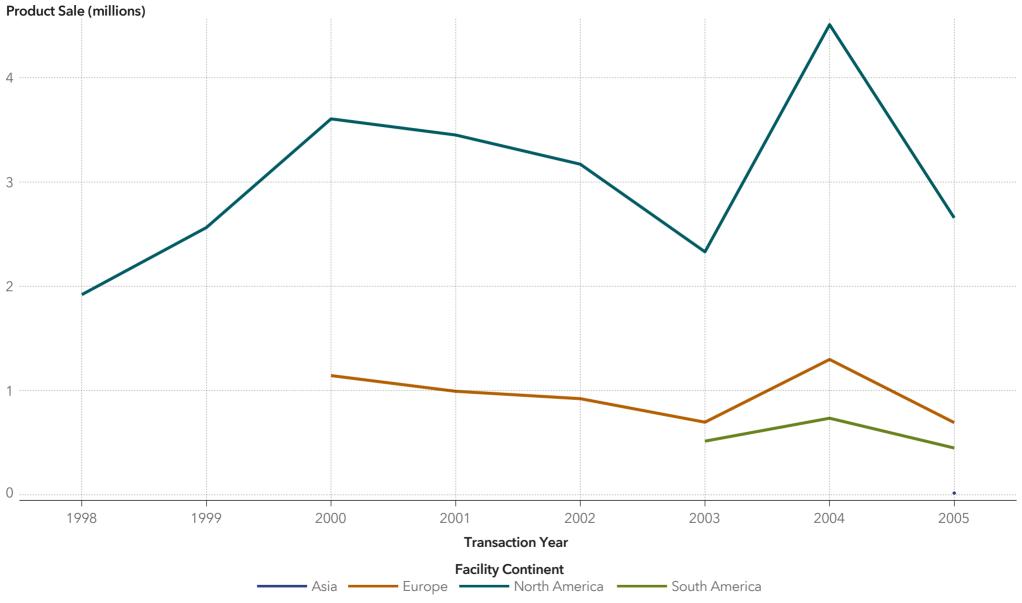


Facility Continent	▲ Facility Country map locations ▲	Product Sale	Average gross margin
Asia	China	16645	4.62
	Denmark	234614	3.54
	France	296303	3.23
	Germany	689530	3.22
Europo	Italy	445738	3.50
Europe	Norway	409697	3.95
	Spain	1560412	3.58
	Sweden	607665	3.71
	United Kingdom	1501642	3.50
	Canada	969520	3.28
North America	Mexico	406205	3.29
	United States	22832243	2.94
	Argentina	57805	6.19
	Brazil	455194	5.95
South America	Chile	282672	6.14
	Colombia	200706	5.35
	Peru	376081	6.35
	Venezuela	325704	5.73

Average gross margin by Facility Country locations Facility Country map locations Peru Argentina Chile Brazil Venezuela Colombia China Norway Sweden Spain Denmark Italy United Kingdom Mexico Canada France Germany **United States** 2 Average gross margin **Facility Continent**

■ Asia ■ Europe ■ North America ■ South America

Product Sale by Transaction Year grouped by Facility Continent

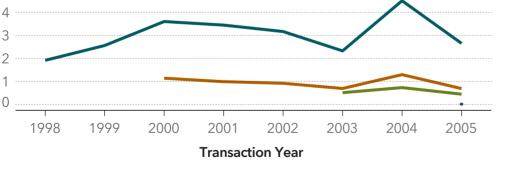


Germany

Facility Country map locations	Facility Continent •	Product Sale	
Argentina	South America	57805	
Brazil	South America	455194	
Canada	North America	969520	
Chile	South America	282672	
China	Asia	16645	
Colombia	South America	200706	
Denmark	Europe	234614	
France	Europe	296303	
Germany	Europe	689530	
Italy	Europe	445738	



Product Sale (millions)





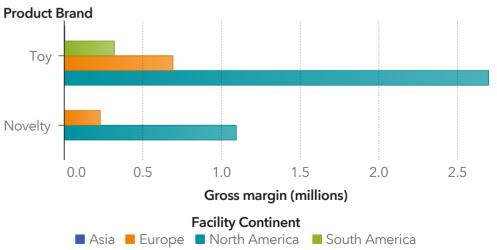
Average gross margin by Facility Country map locations grouped by Facility Continent



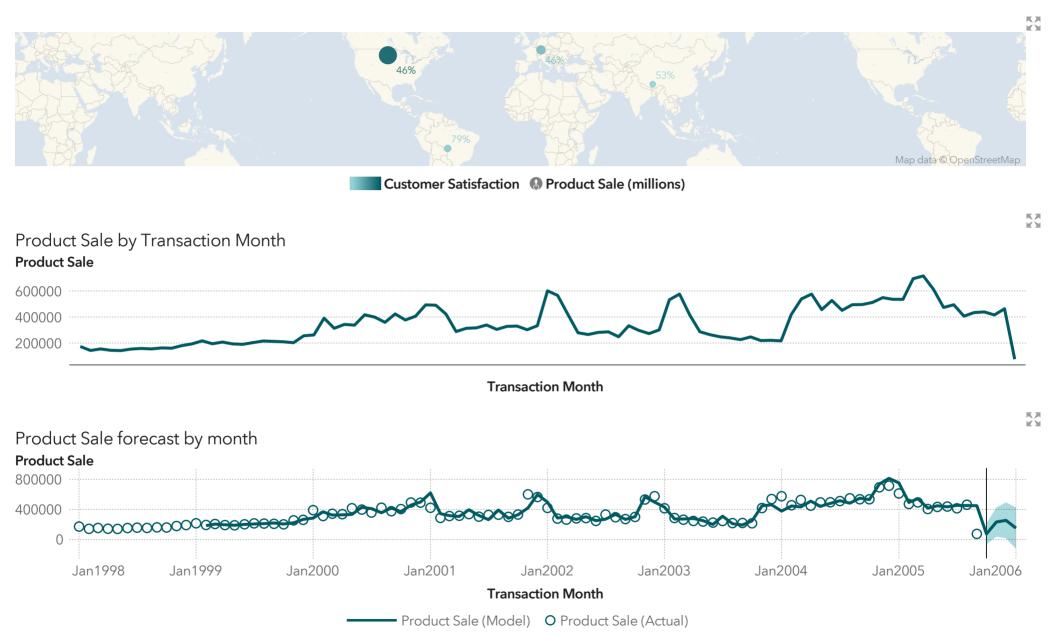


2

Gross margin by Product Brand grouped by Facility Continent



Task 3



95% forecast confidence.

Task 4



This entire report consists of 4 tasks in total. All the tasks in this report/case study deal with different aspects of the data insights from Insight Toy demo data set which is also an inbuilt set of SAS viya. A breif description of the contained tasks is as follows.

Task 1 It consists of three subtasks.

- 1.1 In this task we have created a calculated field by using built in option of SAS create calculated field from add new data object option in tool bar on the left and then used the two columns namely Product sales and product cost of sales and subtracted them using the x-y function of SAS to get the gross margin on products.
- 1.2 Here I have created a product hierarchy using SAS feature 'Hierarchy' and used given values Brand line, make and product to get the desired heirarchy.
- 1.3 In this task I have created a Geo hierarchy for continent, country, region and city by changing the classification of each first to geo and then put in the values of corresponding latitudes and longitudes with the help of given relevant data in the dataset.

In the end I have created a drillable visualization to get the average gross margin at each level of geography.

Task 2 This task is aimed to create a visualization to get the gross margin and it has got three sub taks.

- 2.1 From data obects I selected cross tab type and put in the values of continents, country etc.
- 2.2 I used the bar chart option form the objects to get the data of different countries in descending order of avg. gross margin with Peru having highest and US having the lowest avg. gross margin.
- 2.3 To do this task I used line chart with foru colored lones depicting for different continents and the X axis has got value of year of sales.

Task 3 In this task I have created an interactive report to compare the product sales and customer satisfaction across different facility geographies using bulit in map and also forecasted four months sales using the predictive analyctics feature of SAS which is forecast.

- 3.1 Here the size of dots represent the product sales bigger the size higher is the product sale.
- 3.2 Below in the second visualisation varyingblue shade reperesent the cusotmer satisfaction across different facility geographies.
- 3.3 It contains a forecast of product sales in the next four months done using forecast feature from data objects and introducing the given values of product sales as the data to help the forecast.

Task-4 Identifying the correlation between facility attribuutes like distance, age etc and the customer satisfaction based on those factors.

Appendix

A1.1 Average custo	omer Satisfaction by Facility Country map locations grouped by Facility Continent
Filters:	Facility Continent = 'Europe'
A1.2 Correlation of	Selected Measures
Filters:	Facility Continent = 'Europe'
A1.3 Frequency of (Customer Distance
Filters:	Facility Continent = 'Europe'
A1.4 Avg customer	Distance by Transaction Year
Filters:	Facility Continent = 'Europe'

Facility Continent

Europe

Asia

Europe

North America

South America

North America

Bar - Facility Geographic hierarchy 1 Supplement 1

X

Average gross margin ▼ Product Brand

6.90 Toy

6.33 Toy

5.95 Toy

4.62 Toy

1.42 Novelty

1.28 Novelty

Bar - Facility Country Supplement 1

Facility Country map locations	Average gross margin ▼	Facility Continent
Peru	6.35	South America
Argentina	6.19	South America
Chile	6.14	South America
Brazil	5.95	South America
Venezuela	5.73	South America
Colombia	5.35	South America
China	4.62	Asia
Norway	3.95	Europe
Sweden	3.71	Europe
Spain	3.58	Europe
Denmark	3.54	Europe
Italy	3.50	Europe
United Kingdom	3.50	Europe
Mexico	3.29	North America
Canada	3.28	North America
France	3.23	Europe
Germany	3.22	Europe
United States	2.94	North America

Line - Transaction Year 1 Supplement 1

Fransaction Year ▲		Product Sale	Facility Continent	XX XX
1998		1919776	North America	
1999		2563739	North America	
2000		1143414	Europe	
2000		3606000	North America	
2001		992804	Europe	
2001		3451002	North America	
2002		922036	Europe	
2002		3171014	North America	
2003		696474	Europe	
2003		2330522	North America	
2003		514524	South America	
2004		1298342	Europe	
2004		4509764	North America	
2004		734550	South America	
2005		16645	Asia	
2005		692530 Europe		
2005		2656152 North America		
2005		449088	South America	

Bar - Facility Country map locations 1 Supplement 1

Facility Country map locations	Average gross margin ▼	Facility Continent	XX
Peru	6.35	South America	
Argentina	6.19	South America	
Chile	6.14	South America	
Brazil	5.95	South America	
Venezuela	5.73	South America	
Colombia	5.35	South America	
China	4.62	Asia	
Norway	3.95	Europe	
Sweden	3.71	Europe	
Spain	3.58	Europe	
Denmark	3.54	Europe	
Italy	3.50	Europe	
United Kingdom	3.50	Europe	
Mexico	3.29	North America	
Canada	3.28	North America	
France	3.23	Europe	
Germany	3.22	Europe	
United States	2.94	North America	

Line - Transaction Year 2 Supplement 1

Transaction Year	Product Sale	Facility Continent	XX AK
1998	1919776	1919776 North America	
1999	2563739	North America	
2000	1143414	Europe	
2000	3606000	North America	
2001	992804	Europe	
2001	3451002	North America	
2002	922036	Europe	
2002	3171014	North America	
2003	696474	Europe	
2003	2330522	North America	
2003	514524 South America		
2004	1298342 Europe		
2004	4509764	North America	
2004	734550	South America	
2005	16645 Asia		
2005	692530 Europe		
2005	2656152 North America		
2005	449088	South America	

Product Brand

Novelty

Novelty

Toy

Toy

Toy

Bar - Product Brand 2 Supplement 1

XX

Gross margin ▼ Facility Continent

2,698,502.12 North America

1,094,379.21 North America

318,929.10 South America

691,796.78 Europe

229,680.03 Europe 2,449.23 Asia

Geo coordinate - Facility Geographic hierarchy 1 Supplement 1

Facility Continent

Asia

Europe

South America

North America

_	_		_		_	
		1	6	54	-5	

Product Sale

1698161

5745601

24207969

Customer Satisfaction

27,982%

4.208.428%

12.102.395%

59,576,475%

Average customer Satisfaction

53%

79% 46%

46%

Tomotopology , 10,000 Facility 10,000 Facility 10,000 Applie 10,000 A	Line - Transaction Month 1 Supplement 1	
42.19% 15.29% 16.19% 15.20% 16.19% 15.20% 16.29% 15.20% 16.29% 15.20% 16.29% 15.20% 16.29% 15.20% 16.20%	Transaction Month	
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Feb2005473155Mar2005494082Apr2005406271May2005434048Jun2005438933Jul2005415907Aug2005463306		
Mar2005494082Apr2005406271May2005434048Jun2005438933Jul2005415907Aug2005463306		
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Jun2005 438933 Jul2005 415907 Aug2005 463306		
Jul2005 415907 Aug2005 463306		
Aug2005 463306		
		75801

Transaction Month Jan1998	Product Sale (Model)	Product Sale (Actual) 173197	Lower Confidence Interval	Upper Confidence Interval
Feb1998		142799		
Mar1998 Apr1998		154668 144096		
May1998		142060		
Jun1998		153747		
Jul1998 Aug1998		158293 154668		
Sep1998		162443		
Oct1998		160225		
Nov1998		180236		
Dec1998 Jan1999		193342 216736		
Feb1999	186338	194364	•	
Mar1999	206233	207487		
Apr1999	196915	193120		
May1999	191085	190215		
Jun1999 Jul1999	201902 207732	203187 215502	•	
Aug1999	211877	212933		
Sep1999	220708	209614		
Oct1999	207396	202763		
Nov1999	222775	255735		
Dec1999 Jan2000	268840 285477	262083 391275	•	
Feb2000	368902	312985		
Mar2000	326109	343091		
Apr2000	328724	337435		
May2000	334529	416953		
Jun2000 Jul2000	429925 411070	398755 358997	•	
Aug2000	356428	423597		
Sep2000	420278	377039		
Oct2000	370188	405606		
Nov2000	458578	492892		
Dec2000 Jan2001	499240 619981	490789 422659		
Feb2001	344370	288179		
Mar2001	318286	313142		
Apr2001	307485	316492		
May2001	396011	338734		
Jun2001 Jul2001	320536 264849	304608 327917	•	
Aug2001	392517	330329		
Sep2001	283771	302036		
Oct2001	330603	333031		
Nov2001	420317	600960		
Dec2001 Jan2002	598856 497590	565720 420964	•	
Feb2002	286484	278850		
Mar2002	303812	265437		
Apr2002	268788	281731		
May2002	303973	285935		
Jun2002 Jul2002	251808 271401	248091 332929	•	
Aug2002	335340	296845		
Sep2002	268552	272637		
Oct2002	303632	300948		
Nov2002	568877	532612		
Dec2002 Jan2003	497372 431315	576070 416039	•	
Feb2003	273925	286775	•	
Mar2003	273363	264058		
Apr2003	280351	247784		
May2003	251988	239240		
Jun2003	201396 311068	226231 247021		
Jul2003 Aug2003	210937	247021		
Sep2003	194761	220716		
Oct2003	249027	216626		
Nov2003	448290	419220		
Dec2003	462678	538842 576088		
Jan2004 Feb2004	378811 446824	576088 456570	•	
Vlar2004	433852	527201		
Apr2004	510927	451035		
May2004	442491	494180		
Jun2004	481171	495807		
Jul2004 Aug2004	516597 483904	511956 548665		
Sep2004	550412	535873		
Oct2004	531783	535572		
Nov2004	738166	694198		
Dec2004	813820	715511		
Jan2005 Feb2005	752757 493395	612913 473155	•	
-eb2005 Mar2005	543786	494082		
Apr2005	417916	406271		
May2005	449415	434048		
Jun2005	435675	438933		
Jul2005 Aug2005	455082 452616	415907 463306		
Aug2005 Sep2005	452616	75801	•	
Oct2005	75499		-62014	213012
Nov2005	234125		39653	428598
Dec2005	255438		17259	493617

Forecasting - Transaction Month 1 Supplement 2

Dependent Variable

Algorithm

Product Sale ARIMA: Product Sale ~ D = (1,12) NOINT

The forecasting object uses statistical trends in your data to predict future values. It automatically tests multiple forecasting models against the specified data items and then selects the best model for each one.

The selected model for Product Sale is ARIMA: Product Sale ~ D = (1,12) NOINT, displayed with a 95% confidence interval. A 95% confidence interval is the predicted data range that will contain future values of Product Sale with 95% confidence.

Historical values of Product Sale are displayed as markers only, without a line. The chart displays predicted values (hindcast) as part of the forecast line. Some forecasting models include delayed effects, in which case the hindcast will not begin at the start of the MONTH axis.

Facility Country map locations Average customer Satisfaction ▼ Facility Continent 344 United Kingdom 50% Europe 470/ F.... Spain Norway

Bar - Facility Country map locations 2 Supplement 1

Italy Sweden

Denmark

Germany France

47%	Europe
45%	Europe
44%	Europe

44% Europe

43% Europe 43% Europe

42% Europe

MK

X Axis	Y Axis	Correlation

Customer Distance

Correlation - Customer Satisfaction 1 Supplement 1

Customer Satisfaction

Frequen	Customer Distance (upper)	Customer Distance (lower)
1	0.1	0.0
5	0.4	0.2
1,0	0.5	0.4
8	0.6	0.5
6	0.7	0.6
1,0	0.8	0.7
2,1	1.1	1.0
1,3.	1.2	1.1
1,9	1.3	1.2
2,0	1.4	1.3
2,5	1.6	1.4
2,2.	1.8	1.7
2,4	1.9	1.8
2,2	2.0	1.9
2,6	2.2	2.0
3,0	2.3	2.2
2,3	2.5	2.4
3,1.	2.6	2.5
3,5	2.8	2.6
2,8	2.9	2.8
3,7	3.0	2.9
3,2	3.1	3.0
3,3	3.4	3.1
3,5	3.5	3.4
4,6	3.6	3.5
4,3.	3.7	3.6
2,7	3.8	3.7
3,7,	4.0 4.1	3.8 4.0
3,8	4.2	4.1
4,0.	4.3	4.2
3,8	4.4	4.3
3,6	4.6	4.4
3,6	4.7	4.6
3,7	4.8	4.7 4.8
3,1	5.0	4.9
4,5	5.2	5.0
3,9	5.3	5.2
3,7	5.4	5.3
3,2	5.5	5.4
3,4. 4,2	5.6 5.8	5.5 5.6
3,8	5.9	5.8
3,8	6.0	5.9
5,2	6.1	6.0
4,1	6.2	6.1
4,1	6.4	6.2
4,3	6.5	6.4
4,4	6.6	6.5 6.6
5,3	6.8	6.7
4,5	7.0	6.8
5,0	7.1	7.0
4,5.	7.2	7.1
4,4	7.3	7.2
4,7 5,0	7.4	7.3 7.4
5,0	7.7	7.4
4,9	7.8	7.7
4,6	7.9	7.8
4,0	8.0	7.9
3,1	8.2	8.0
3,7 ⁽	8.3 8.4	8.2 8.3
3,2	8.5	8.4
3,9	8.6	8.5
3,9	8.8	8.6
3,6	8.9	8.8
3,1	9.0	8.9
1,1	9.1 9.2	9.0 9.1
1,1.	9.4	9.1
1,0	9.5	9.4
1,7	9.6	9.5
1,0	9.7	9.6
1,4	9.8	9.7
1,6.	10.0	9.8

Bar - Transaction Year 1 Supplement 1

Transaction Year	A
2002	

Avg customer Distance