LoDI and Logility Logistics Case Competition

OVERVIEW

Client: **Ford Motor** Company is the second-largest U.S.-based automobile manufacturer. The company sells automobiles and commercial vehicles under the Ford brand, and luxury cars under Lincoln brand. Although it remains an American car brand, many parts are not exclusively manufactured in the country. Ford outsources a large majority of its vehicle components from high-quality component manufacturers from all over the globe. Then, they piece together the components for final assembly and roll out in Ford's factories. Ford's supply chain has around 1,200 Tier 1 production suppliers who provide vehicle parts composed of nearly 1,000 different materials. Ford outsources their car parts from low-labor-cost countries. This gives Ford the opportunity to identify and reduce costs to protect against changeable economic conditions.

Business Situation: The COVID-19 crisis created uncertainty in every market, including the automotive sector. The COVID-19 pandemic forced the automotive industry to look for alternate suppliers and prioritize import substitution with their production activities and supply chain. Total lockdown and the temporary shutdown of industries, leading to border closures that restricted the movement of transportation and logistics services. However, according to the current situation, the world is getting back on track. A significant increase in the sales of passenger cars has been recorded recently, which leads to a rise in demand for the car parts market, especially safety system components.

To keep production costs and pricing low, Ford sources main safety system parts from all over the globe, including North/South America, Asia, and Europe. **Autoliv Inc.** is the worldwide leader in automotive safety systems such as airbags, seatbelts, and steering wheels for all major automotive manufacturers worldwide. Autoliv has more than 64 facilities in 27 countries and is considered Ford's primary supplier of **airbags and seatbelts**. The client is looking to estimate the total costs and traveling time of providing annual demand for airbags and seatbelts outsourcing from Autoliv facilities focusing on **China, Romania, and Mexico** suppliers. The components would be stored in the client's central warehouse and distributed to Ford automobile manufacturers over the US. The client should study the impact of different outsourcing options on total costs and traveling time and the best choice for the central warehouse among **Livonia, MI**, and **Laurel, MD**, locations as the main distribution center.

ELIGIBILITY

A. Teams of at most three (3) individuals may participate; individual entries are permitted.

B. Interested teams should contact Claire.Arnold @louisville.edu via email to register their intent to participate by **February 10, 2023.**

REGIONAL CONFERENCES

Teams participating in the regional conferences will submit their portfolio and scientific poster online for review. There will not be any in-person presentations at the regional conferences. The judges will provide written assessment, feedback, and scores to each team via email.

A. Teams in all regions should submit the documentation portfolio and scientific poster components of the team's entry via the internet by 11:59 p.m. ET on **February 17, 2023**.

B. The top two teams from each region will be identified as winner and runner-up based on the quality of the solution, novelty and visual presentation.

C. A maximum of eight top teams across all regions will be invited to participate at the state conference. Notification on whether your team is selected to the State Round will be made on **February 24, 2023** via email.

PROCEDURES

PRE-CONFERENCE

A. Teams create an account on www.starboardcorp.com (button in the upper right corner).

B. Go to account management and enter the promotion code:

Academic_uofl

C. Log off and back on again to update credentials – check to see "Academic" is now in the upper right corner

D. Participants identify an optimal solution and collect or compile data from various sources. Participants create their documentation and scientific poster according to the regulations.

E. Submission information will be provided on the LoDI website under Competition Updates.

STATE CONFERENCE

ATTIRE

Competition attire is required for this event.

A maximum of eight top teams will be selected and notified by FEBRUARY 24th to advance to the final round for an on-site presentation with a poster display of their solution at the state conference on April 10-12.

The presentation is limited to ten (10) minutes, broken down as follows:

1. One (1) minute to set-up
2. Six (6) minutes to present
3. Three (3) minutes to respond to Q &A.

B. The contestants report at the time and place stated in the conference materials and will be assigned a presentation time.

C. Participants report at the assigned time and place with their scientific poster.

D. Participants are allowed ten (10) minutes to present their scientific poster and respond to questions.

E. Judges will evaluate entries based on the

Documentation Portfolio, scientific poster, and presentation. The 1st and 2nd place winner and an innovation award will be selected and announced.

CASE STUDY

PROJECT DELIVERABLES

All teams need to describe their recommendations for how Ford company should move forward to outsource and deliver the safety system's components to the car manufacturers and assembly facilities in their presentation. Your presentation should address the client's consequences for selecting each source by discussing on pros and cons. This recommendation will include:

1. Outsourcing recommendations.
2. Distribution location recommendations.
3. Transportation modes from ports to distribution center recommendations.
4. Overall proposed network, including anticipated costs and service time from the suppliers to customers.

PROJECT INPUTS

Demand Data (DemanData.xls): Your team are provided with annual demand data with shipments to each customer. Demand has been flat so this will serve as a proxy for future demand also. Download the data file at DemandData-LogilityCompetition.

Supplier Data: The information of the three alternatives suppliers is represented in Table 1. The sale prices have been converted to $/lb for the ease of calculation of freight/cargo transportation cost.

Distribution Center Data: Ford has two distribution center options, one in Livonia, MI, and the other in Laurel, MD. The client must decide which location best handles all their shipments to manufacturers and assembly facilities. A minimum of 50,000 square feet of space is needed for the warehouse.

Table 1: Sale Prices and Transportation Information

Suppliers	Airbags	Seatbelts	Traveling Time/Day	Shipping Distance (Mile)	Container Cost to Entry Port	Port of Entry
Shanghai, China	$10.75/lb	$3.50/lb	19	6,010	$1.10/lb	Long Beach
Brasov, Romania	$12.20/lb	$3.20/lb	20	6,350	$1.27/lb	Port of Norfolk
Querétaro, Mexico	$11.10/lb	$3.50/lb	2	1,031	$0.85/lb	El Paso

PROJECT TASKS

1. Create a blank model and import demand data.
2. Establish the suppliers based on the information given in Table 1.
3. Identify performance metrics you think is important for this problem.
4. Build scenarios to address the following:
   a. Select the best combination of suppliers to optimize the performance metrics you have identified. The suppliers can provide either one product or both products together.
   b. Design a distribution plan from selected suppliers to the warehouses and customers.
   c. Decide on which warehouse between Livonia, MI and Laurel, MD would be the best choice considering the service time and costs factors.
   d. Calculate the average service time from the selected warehouse to the customers.
   e. Bonus point for analyzing the impact of different transportation modes on service time and costs.
   f. Increase the warehouse space to 100,000 square feet and compare the total costs to the previous scenario.
5. We encourage you to discover the available tools at the navigator to collect, visualize, and analyze the obtained results.

NETWORK DESIGN TOOL

You will be using Starboard Navigator to build, optimize and quantify your networks. You can access this tool by sign up for a free version at www.starboardcorp.com.
You can find a series of simple help videos inside the application by going to the Tactician's Corner (orange tab in the upper left) and opening the "How To" section—these are all very short and very quick. Training will be provided at the beginning of the project. For technical questions about using the tool, use chat link in application or email support@starboardcorp.com.

REGULATIONS AND REQUIREMENTS

Students will work to develop their 21st century leadership skills in the process of preparing for and participating in this competitive event. The development and application of those skills must be evident in their submission, demonstration, and /or communication pertaining to the entry.

PRE-CONFERENCE

A. Participants must create an account with Starboard:

1. Create an account at www.starboardcorp.com
2. Go to account management and enter the promotion code: academic_uofl
3. Log off and back on

B. View training videos by clicking on the training icon 

C. Documentation Portfolio:

1. The documentation portfolio must be saved as a multi-page PDF document with the pages presented in the following order:
   a. Title page with the event title, the conference city and state, the year, and the team name; one (1) page
   b. Table of contents; pages as needed
   c. Introduction
   d. Purpose- an explanation of the importance of the issue including problems and possible solutions (if applicable); one (1) page
   e. Methods - the methods used to obtain your data; one (1) page
   f. Results; pages as needed:
   g. Analysis of data collected and/or intermediate results displayed on Starboard.
   h. Support materials such as graphs and any pertinent

data collected

i. Conclusions - synthesis of the data collected; pages as needed

j. Next Steps - next steps to further analyze the data, collect more data, or minimize the impactof the issue; one (1) page

k. Bibliography/references – A list of references and credible resources in a professional citation-style of your choice. Failure to use a professional citation style will result in a rules violation of 20%. Some examples of professional citation styles include MLA, APA, Chicago, and IEEE; a minimum of three (3) different types of resources must be used. Work must be original or cited.

2. Scientific Poster:

a. Participants must use the scientific poster template. An editable, downloadable document is available on the LoDI website under Competitions/Forms: www.uofllogistics.org

b. Participants shall incorporate visuals (graphs, maps, charts or tables) on the scientific poster.

c. Copyright:

Citation of all ideas, fonts, and images from sources other than the designer, and/or that are copyrighted (most fonts and images found on the web are copyrighted material unless purchased or offered as free domain). Clip art must be documented; failure to do so results in disqualification.

CONFERENCE

A. Participants must have the following computerhardware:

1. One (1) laptop
2. Extra charged laptop battery or extra chargedlaptop as backup
3. One (1) computer mouse, optional

EVALUATION

A. The documentation portfolio

B. The scientific poster

C. The presentation

Refer to the official rating form for more information

Please see the attached grading rubric.

STEM INTEGRATION

This event has connections with the STEM (Science, Technology, Engineering, and Mathematics) educational standards.

LEADERSHIP AND 21st CENTURY SKILLS DEVELOPMENT

This event provides an opportunity for students to build and develop 21st century leadership skills including but not limited to:

- Communication
- Collaboration/Social Skills
- Initiative
- Problem Solving/Risk Taking
- Critical Thinking
- Perseverance/Grit
- Creativity
- Relationship Building/Teamwork
- Dependability/Integrity
- Flexibility/Adaptability

CAREERS RELATED TO THIS EVENT

This competition has connections to one (1) or more of the careers below:

- Data scientist
- Data analyst
- Industrial engineer
- Inventory manager
- Transportation manager
- Operations manager
- Global operations specialist / manager
- Supply chain analyst
- Supply chain manager
- Operations research analyst
- Quality engineer

LoDI AND Logility LOGISTICS CASE COMPETITION

2023 OFFICIAL RATING FORM

HIGH SCHOOL

Judges: Using minimal (1-4 points), adequate (5-8 points), or exemplary (9-10 points) performance levels as a guideline in the rating form, record the scores earned for the event criteria in the column spaces to the right. The X1 or X2 notation in the criteria column is a multiplier factor for determining the points earned. (Example: an "adequate" score of 7 for an X1 criterion = 7 points; an "adequate" score of 7 for an X2 criterion = 14 points.) A score of zero (0) is acceptable if the minimal performance for any criterion is not met.

Go/No Go Specifications

- Before judging the entry, ensure that the items below are present; indicate presence with a check mark in the box.

  If an item is missing, leave the box next to the item blank and place a check mark in the box labeled ENTRY NOT EVALUATED. If a check mark is placed in the ENTRY NOT EVALUATED box, the entry is not to be judged.

☐ Documentation portfolio was submitted pre-conference and scored

☐ Scientific poster is present

☐ ENTRY NOT EVALUATED

DOCUMENTATION PORTFOLIO (70 points)

CRITERIA	Minimal performance	Adequate performance	Exemplary performance	Record scores in the column spaces below.
	1-4 points	5-8 points	9-10 points	
Portfolio (X1)	Portfolio is unorganized and/or missing three (3) or more components.	Portfolio has most components and it is somewhat organized.	One (1) or no components are missing in the portfolio; content and organization are clearly evident.	
Definition and Explanation of Issue (X1)	Definition and explanation of the issue are unclear.	Issue is somewhat defined and explained.	Clear and concise definition and explanation of the issue are evident.	
Research Base (X1)	Research is inadequate, and/or very few credible sources are referenced.	Research has been conducted appropriately, with some credible sources included.	Research indicates evidence of a comprehensive assortment of materials that are credible sources.	
Support Materials (X1)	Support materials do not help clarify the documentation or are of little significance to the issue.	Support materials are appropriate and help supplement documentation by providing clarity to the issue.	Support materials are of excellent quality; if not original, they are cited; support materials clarify the issue.	
Data Charts and Graphs (X2)	The data is not represented in charts and graphs.	The data is represented in charts and graphs and somewhat supports the analysis of the team.	The data is represented in charts and graphs and supports the analysis of the team.	
Quality, Effectiveness, and Mechanics (X1)	Portfolio appears to have been thrown together; distracting errors in punctuation, grammar, and spelling are evident in the documentation.	Portfolio is generally organized; punctuation, grammar, and spelling are generally correct, with few errors.	Work is of exceptional quality and well organized; punctuation, grammar, and spelling are correct, with no errors.	
			DOCUMENTATION PORTFOLIO SUBTOTAL (70 points)	

SCIENTIFIC POSTER PRESENTATION (90 points)				Record Scores in the column spaces below.
CRITERIA	**Minimal** performance	**Adequate performance**	**Exemplary performance**	
	1-4 points	**5-8 points**	**9-10 points**	
Definition and Explanation of the Issue (X1)	An unclear definition and explanation of the issue is presented.	Issue is defined and explained adequately.	The portfolio is clearly organized and has either one or no missing components.	
Explanation of Impacts (X1)	Explanation is missing a discuss ion of the issue's relevance to environmental, economic, social, and/or ethical considerations.	Explanation addresses some of the issues relevant to environmental, economic, social, and /or ethical considerations.	Explanation includes a full discussion of the issue's relevance to environmental, economic, social, and/or ethical considerations.	
Supporting Information (X2)	Support information is not represented in graphs/charts and does not help to clarify documentation, and/or it is of little significance to the issue.	Support information is representedin graphs/charts, is somewhat appropriate and helps supplement the documentation by providing some clarity to the issue.	Support information is represented in graphs/charts, is highly effective and of excellent quality.	
Research, References , and Resources (X1)	Documentation lacks an adequate research base, and d/or very few credible sources are referenced.	Research is conducted appropriately, with adequate credible sources.	Comprehensive research base that includes credible sources is evident.	
Communication of the project (X2)	It is difficult to understand the project being communicated; an illogical explanation presented; leadership and/or 21" century skills are not evident.	The project is communicated to some degree although some illogical inconsistencies exist; leadership and/or 21st century skills are somewhat evident.	The issue is communicated in an organized, clear, and concise manner; leadership and/or 21st century skills are evident.	
Creativity (X1)	The display lacks creativity; no, or very few, design principles are integrated in the display.	Some elements of creativity exist in the display, and essential design principles are generally evident.	The display exudes creativity; essential design principles and elements are well integrated.	
Aesthetics and Artisanship (X1)	Work is unorganized and sloppy; display seems to be an afterthought or thrown together.	Display shows an organized presentation of the issue.	Display is exemplary in logically communicating important data.	
			SCIENTIFIC POSTER PRESENTATION SUBTOTAL (90 points)	

Rule violations (a deduction of 20% of the total possible points for the above sections) must be initialed by the judge, coordinator, and manager of the event. Record the deduction in the space to the right.

Indicate the rule violated: _____

PRELIMINARY SUBTOTAL (160 points)

VISUALIZATION (80 points)				Record scores in the column spaces below.
CRITERIA	Minimal performance	Adequate performance	Exemplary performance	
	1-4 points	5-8 points	9-10 points	
Conceptualization (X2)	It is difficult to understand the concept being communicated in the visualization.	The concept is somewhat communicated, but many aspects remain unclear.	The concept is communicated in an organized, clear, and concise manner.	
Creativity (X2)	The visualization lacks creativity; no, or very few, design principles are integrated in the visualization.	Some elements of creativity are expressed, with most design principles integrated.	The visualization exudes creativity; essential design principles and elements are integrated.	
Aesthetics and Artisanship (X1)	Unorganized, sloppy work is evident; the visualization seems to be an afterthought and/or thrown together.	A largely organized presentation of layout and design principles is evident.	An exemplary use of layout and design principles to logically communicate important data is evident.	
Graphical Representations (X2)	Graphical representations do not help to clarify visualization, or they are of little significance to the project.	Graphical representations are appropriate and help supplement the visualization by providing clarity to the project.	Graphical representations are of excellent quality; and clarify abstract concepts.	
Originality (X1)	The visualization lacks imagination, originality, and artistic detail.	The visualization is somewhat effective, inventive, and inspiring.	The visualization is inspiring, inventive, resourceful, and motivating.	
			VISUALIZATION SUBTOTAL (80 points)	

Rules violations (a deduction of 20% of the total possible points for the above sections) must be initialed by the judge, coordinator, and manager of the event. Record the deduction in the space to the right. Indicate the rule violated: _____	
SEMIFINAL SUBTOTAL (80 points)	
To arrive at the TOTAL score, add any subtotals and subtract rules violation points, as necessary. **TOTAL** (240 points)	