IPRO 319

Logistics Outsourcing Tool

Project Plan

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Sponsor: Warehouse Education and Research Council and the Kern Family Foundation

Team:
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1 Objectives

The IPRO 319 team's objective for this semester is to create a model of a distribution operation which will aid companies seeking to outsource logistics operations. However, the team's main objective is to create a web based application for efficient and cost-effective analysis allowing companies to determine the effectiveness of outsourcing any aspect of a warehouse. This team will also attempt to establish a strong team-working environment based on the knowledge and capabilities of each individual given their different fields of study for the successful completion of the goals presented for the IPRO group, as well as gaining useful experience and knowledge for every member.

During the fall semester, the team has set forth the following objectives:

- Analyze logistic processes (Shipping, Manufacturing, Transportation, etc.)
- Define crucial resources used in these processes and structure them
- Research costs associated with logistic processes
- Develop a model that represents these costs associated with logistic process
- Develop a web based Logistics Outsourcing Tool

2 Background

Presently in industry companies are finding it difficult to maximize their profit. One of the ways that is used in the distributional activities to maximize the profit by determining the outsourcing benefits in operations. Many companies are spending a lot of time calculating financial figures that help them determine if outsourcing certain logistics of their company can benefit them. In an effort to help companies dealing with such issues the Warehousing Education and Research Council (WERC) has come up with a plan to develop a web based tool which will provide assistance to companies seeking to outsource logistics operations in figuring out vital information that will help immensely in the decision-making process. WERC is an association of distribution experts and specialists from bordering professions that come together in efforts to share practical knowledge and professional expertise with the aim of improving individual and industry performance (see attachment for more information). In their efforts in creating such a tool, WERC has decided to sponsor the students of IPRO 319 in hopes that they can be successful in this endeavor.

After an analysis of IPRO 319's objectives the student team has concluded that certain problems may arise before completion is possible.

The more significant problem that may arise is that the difficulty of the task may be too great for the likelihood of completion by the end of the semester, as the creation and presentation of a flexible model which can be used in general-terms is a great milestone itself. As a team we will try to utilize all technologies that will assist us in the completion of the project so we can reach our objectives as accurately and efficiently as possible. Such technologies include: web applications and databases; Microsoft programs (MS Project, Excel, Word, and Power Point); Programming Languages (C#, .NET, Java).

Further analysis of the problem being solved brings about a group of certain security issues that must be taken into account. Information privacy, especially today, is a big part of the industry and we would like to protect that. This issue has been given

substantial amount of consideration and we have come to conclude that most security protection issues involved with the Outsourcing Tool will be provided by WERC and the security resources already implemented on their website where the tool will be accessible. As far as budget costs of IPRO 319 go, it will be a relatively low-cost project. During the course of this IPRO the team will need money to cover transportation costs, software fees, presentation materials and miscellaneous costs.

The project will require research of logistics processes in a warehouse, resources and costs associated with such processes. An analysis of this research and any other practical solutions that we may discover will be conducted. At this time the team will do the following: define the type of industries that model can be used for; determine mathematical formulas and the creation of models needed to help in assisting the outsourcing decision-making process; and finally organizing the information discovered into a presentation. Every step of the practical solutions will be followed by feedback from WERC representatives which will help us to stay on track as well as assist us in making any changes in order to improve our development plan. If a final model is achieved then we will enter the development stage of the project. The construction of the Graphic User Interface (GUI) and the development environment it is written in (ASP, .NET, C #, Java) will be the determining factors of the end result of the project, the Outsourcing Tool.

It is challenging to find information on any successful or failed attempts on what we are trying to accomplish. Yet we feel very strongly that some private businesses possess functional methods to determine the effectiveness of outsourcing, and we feel that the task at hand can be accomplished.

Attachments-information about the sponsors provided with the hard copy.

3 Methodology/Brainstorming/Work Breakdown Structure

3.1 Defining the problem/Overview

The final product will be an online tool that warehouse managers can use to evaluate different costs associated with their processes to determine the feasibility of outsourcing parts or the whole of their operations.

This tool will help warehouses accomplish the following:

- Calculate different costs: for example costs associated with equipments, manpower, power requirements, tax structure, and more
- Evaluate which operations can be outsourced
- Comprehensive view of all the costs associated with managing the warehouse

There is enough space for optimization and utilization of various resources involved in the operation of warehouses. The operations and resources are sometimes not used to their optimum level or they are overused to the point where the process becomes complicated and confusing. Such processes result in additional costs, expenditures, and wasted time. As the result, management is often not informed enough about what will serve them best.

The following steps have been arranged to realize the objectives of this IPRO:

1. Understanding the requirements of the IPRO

On September 7, 2006 the team met two senior officials from Warehousing and Research Council (WERC) that will work closely with the IPRO for the duration of this semester. Robert L. Shaunnessey is the executive director and Rita M. Coleman is the deputy executive director of WERC. During the presentation on September 7, 2006 and an independent look at the WERC website the team was able to gain basic idea about WERC's expectations for this tool

2. Initial Organization

The team assigned officer responsibilities such as appointing project manager, assistant project manager, and a secretary on September 5, 2006. During the initial meetings the team identified tools to prepare the final deliverables such as Microsoft Excel, ASP, .NET, C#, and Java. Along with these software needs, we identified the information necessary from warehouse business experts such as information about various processes, costs, equipments, manpower, and operations

3. Developing the project plan

The team prepared an initial project plan/methodology to execute the goal of creating the Logistics Outsourcing Tool. We used MS Project, iGroups, and MS Word to organize the information

4. Assigning individual team member to sub-groups and tasks

To see individual assignments, please refer to section *7 Individual Team Member Assignments.* The assignment process was done in MS Project.

5. Warehouse visit

The tour is scheduled for September 22, 2006. The warehouse is owned by the Strive Group, whose mission is providing warehouse services and secondary packaging operations to the personal care product and food industries.

6. Meeting with a chief financial officer of a warehousing company

The meeting is scheduled for October 5, 2006. The team will be consulting with Bob Horwath from Keystone Aniline Corporation on the aspects of financial analysis that is used in the industry to track warehouse costs.

7. Meeting with a warehouse management official

The team will be consulting with Craig Berger of Alberto Culver Company on warehouse operations, resource allocation and other operational activities. This meeting will be scheduled for mid-October 2006.

8. Performing further research

The team will perform research using industry journals, please refer to section

9. Performing analysis of information received

Deciding on the variables (operations, and various costs, etc.) to be included in the final tool

10. Review the progress

The team will meet with WERC officials several times during the semester to assess the progress and get feedback about the work accomplished. The tool will be changed based on the feedback given by WERC as well as by other industry experts we will meet during this semester.

3.2 Research Process

To obtain the necessary relationships between variables that exist commonly between warehouses, relevant data must first be gathered. To find out how warehouses operate, the team will analyze the following aspects:

- activities that are necessary for warehousing
- equipment that is necessary for warehousing
- flow of materials, personnel, and equipment
- the relationship between the size of business and the costs
- the "make vs. buy" business decision with regards to outsourcing

This research will be attained by interviewing industry experts, analyzing balance sheets from sample warehouses, and finding pertaining information in industry-specific journals. Some of these journals include *Warehousing Management, The International Journal of Logistics Management, IOMA's Report on Managing Logistics, Modern Materials Handling,* and others.

3.3 Analysis

Once enough research has been gathered, the team will define the variables that affect efficiency of warehousing and discover correlations between them. The correlation ratio will be used to get a measure for more general dependencies in the data, including nonlinear data. This ratio is able to detect almost any functional dependency. Another applicable method is the mutual information/total correlation ratio, which will help us detect even more general dependencies.

We will use the resulting formulas with real business sample data substituted to check the overall validity of correlations and test the theoretical predictions against real world results. This step will ensure the legitimacy of our mathematical findings.

3.4 Development

The third phase of the project will be primarily focused on web tool development. The sponsor's current website operates under ASP.NET architecture. It is unclear at the moment which software programming language is used because the team has not had access to its solution. Thus far the plan is to use ASP.NET with C# code backend and SQL Server 2005 database backend.

There will be several distinct steps in the development process. First, the team will set up an integrated mini website that mimics the graphic unit interface of http://www.werc.org. This will provide aesthetic sufficiency and will provide customers with a friendly, clean environment to work in. Second, all the necessary variable inputs and constraints will be added to the page. As a rough estimate, both of these steps combined will consume 20% of the total development time.

The next step will be the core challenge of our project. The event handlers will be configured and the software will be written. The mathematical formulas that were previously researched and derived will be integrated seamlessly and transparently. The user should have no knowledge of these operations, and should receive their final information in a presentable manner. The team expects this portion of the project to take about 50% of the development time.

The final step is expected to take 30% of the development time. This time will be used for testing the program.

3.5 Developing Final Deliverables

Phase 1

After dividing into teams according to our sub teams plan (refer to *7 Individual Team Member Assignments*, each team will provide output information based on their research and create a basic Excel model.

Phase 2

The team will be testing and modifying the Excel model by using sample real business data. The output of the Excel model should get as close as possible to real life sample data. This version of the Excel model will be used as a base for the development of the web application.

Phase 3

This phase consists in the development of the web application based on Excel model. After the architecture of the application is defined, the work will be split between the different CS teams which will be assisted by the rest of the group for non CS related issues and for the testing of their module. (tests have to be specified before implementation)

Phase 4

After each module has been implemented and tested separately, the integration phase can begin. Specification of integration tests has to be defined then modules can be integrated into the main application. Tests have to be run so as to check for integration problems until all the results are satisfying.

Phase 5

At this point the program should be fully functional. The final deliverables will include information about everything done during the semester, such as the project plan, the research done, the mathematical features and data flows, etc. The team will also run tests on the final web tool based on predefined sample input data then analyze the results given by the program to check the validity.

3.6 Relevant Documents

All of the documents created during the project will be compiled in iGroups, including the following:

- MS Project document,
- Reports generated by secretary
- MS Excel sheets
- Recording of interviews (.mp3)
- Transcripts (available in our database)
- Handouts and attached documents from the expert resources

4 Expected Results

At the end of this semester our team will gain the comprehensive understanding of the warehousing industry required to build the model for optimizing warehouse performance. The team will accomplish the research by conducting interviews, investigating industry journals, attending warehouse visits, and performing analysis of sample financial information. We will formulate the mathematical correlations between different variables that are important to the warehousing industry. These variables will likely pertain to the equipment, activities, administrative functions, and building aspects of warehousing.

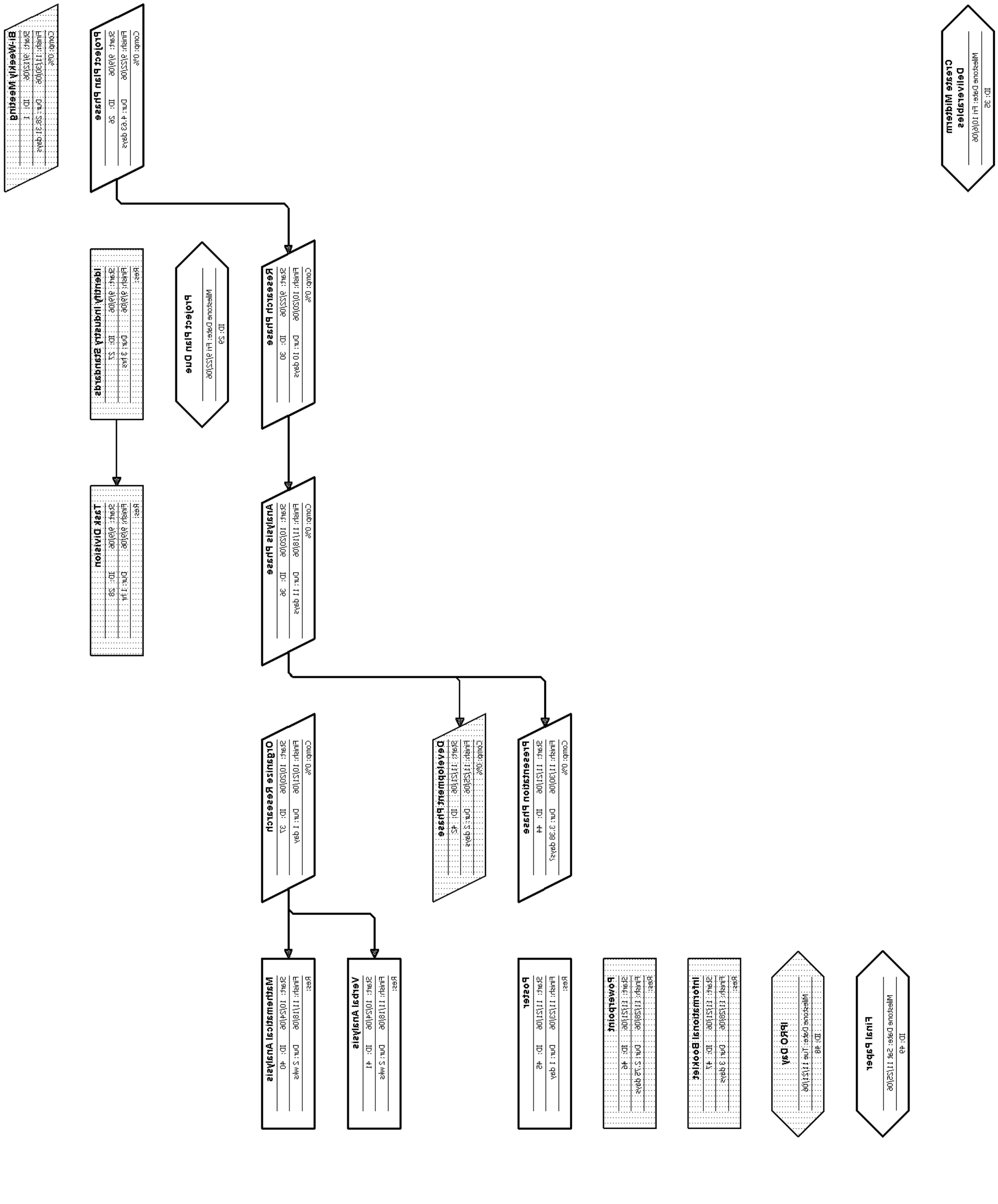
The expected product that will come out of this IPRO was clearly defined by our client, the Warehouse Education and Research Council. The formulas we derive will become the foundation of a web tool built to allow industry managers to minimize their costs and increase efficiency. The tool will be available to the public on the WERC website and will provide an important information source for people involved in warehousing businesses. The tool developed will directly answer the problem of our sponsor and their customers, which is getting cost and efficiency projections for this particular industry.

5 Budget

IPRO Day	$300.00
Marketing	$200.00
Miscellaneous	$200.00
Transportation	$200.00
Software	$20.00
TOTAL	**$920.00**

6 Schedule of Tasks and Milestone Events

Refer to the following page for the workflow chart.


Bi-Weekly Meeting
Project Plan Phase
Create Midterm Deliverables
Identify Industry Standards
Project Plan Due
Research Phase
Task Division
Analysis Phase
Organize Research
Development Phase
Presentation Phase
Mathematical Analysis
Verbal Analysis
Poster
Powerpoint
Informational Booklet
IPRO Day
Final Paper

7 Individual Team Member Assignments

7.1 Overview

Name	Role	Major	Other
Bae, Juhan		Computer Engineering	
Cho, HyoungTae		Computer Science	
Christopherson, Sean R.		Manufacturing Technologies and Management	
Gunale, Amol Venkat	Team leader (assistant)	Master of Industrial Technology and Operations	Warehouse experience
Hacker, Maxime		Computer Science	
Hammer, Kerstin		Computer Science	Interest in information systems
Mehta, Kabir		Computer Engineering	IPRO-experience
Rodriguez, Tito	Team leader; Weekly Timesheet Collector/Summarizer; Agenda Maker; Master Schedule Maker	Business	
Romanova Smith, Alexandra	Secretary; Minute Taker; Time Keeper	Architecture	
Schwarz, Nickolay		Computer Science	
Shields, Herb	Professor	Professor	

7.2 Sub-teams

Mathematical Modeling Team

The team will develop and build the mathematical model on which the web tool is based. This task must be done before other teams can begin.

Name	Role	Responsibilities
Schwarz, Nickolay	Sub-team leader	Overall Model

Gunale, Amol Venkat		Mathematical Model, Business Data
Rodriguez, Tito		Mathematical Model, Business Data
Christopherson, Sean R.		Mathematical Model, Business Data
Hammer, Kerstin		Mathematical Model, Business Data
Romanova Smith, Alexandra		Mathematical Model, Business Data

Tool-Development Team

The team will develop the online tool based on web technology.

Name	**Role**	**Responsibilities**
Mehta, Kabir	Sub-team leader	Overall
Hacker, Maxime		Web design and graphical user interface
Bae, Juhan		Backend development
Cho, HyoungTae		Backend development

Marketing Team

The team is mainly responsible for all marketing material used throughout the project and at IPRO day, and at organizing the presentations for the IPRO day.

Name	**Role**	**Responsibilities**
Romanova Smith, Alexandra	Sub-team leader	Material for IPRO day, Presentations
Hammer, Kerstin		Material for IPRO day, Presentations

8 Designation of Roles

Team Leader: Tito Rodriguez

Assistant Team Leader: Amol Gunale

Minute Taker: Alexandra Romanova-Smith is in charge of recording decisions made during meetings including task assignments or changes under consideration.

Agenda Maker: Tito Rodriguez is responsible for creating an agenda for each team meeting. This provides structure to the meetings and offers a productive environment.

Time Keeper: Alexandra Romanova-Smith will be responsible for making sure meetings go according to agendas.

Weekly Timesheet Collector/Summarizer: Tito Rodriguez is responsible for collecting weekly timesheets from each member of the team and updating everyone with a summary report.

Master Schedule Maker: Tito Rodriguez is responsible for collecting schedules from all the team members and developing a master schedule, which tells the team when members are available and how to contact them.