Master Solution

Designing Project Organizations

1.	Do we need a project organization? If yes, justify your recommendation[1].

In class we discussed the three classical forms of project organization: influence organization, matrix organization and dedicated project organization. The following criteria must be considered when selecting one form over another in the context of a particular project:

Scope *(# tasks)* Large compared to the size of the company. Doubling the product development and manufacturing capacity will require substantial resources, attention and hundreds to thousands of tasks, once the 25 meta-tasks given in the assignment are further refined.

Duration *(# years)* From the description we can infer that the time span of the project is 2008-2010 (3 years). This is large (>2 years) and points to a dedicated project organization.

Uniqueness *(# similar proj.)* The main business of PTI is the development of specialty engines. Any new type of engine (e.g. for the UAV application) is a new challenge, but experience and process templates would exist. This project, on the other hand, is unprecedented and unique for the company.

Complexity *(#dependencies)* The complexity of the project is high, since a large number of entities are involved and interdependencies between the existing and new parts of the company must be designed and implemented: information flow for product development, internal material flows and logistics, financial accounting, common strategy …

[1] Note: The project organization is not to be confused with the future steady-state organization of the company. Rather a potential project organization would be responsible for achieving the capacity increase.

Ambitiousness *(prob. of success)*- challenging.

Significance *(for company)* – the future of the company depends on the success of this project. The main objective is for the company to improve its competitiveness against the foreign competition by increasing capacity. This should lead to fewer contracts lost to lower quality suppliers as well as better on-schedule delivery performance.

Risk *(impact of failure)*- the risk of failure is mainly mid to long-term in that not increasing capacity would lead to further losses in market share. Other risks are a loss of corporate identity with two separate sites and quality problems at the new production site, among others.

Cost *(total budget)*- The total budget of the project is not given, but we can do a rough order magnitude (ROM) estimate. The 2008 revenues of this small/mid-size company were $40 million. It was estimated that the company could inject $20 million of its own funds into the project. Looking at GE's financials for 2002 might reveal some parallels (size is not one of them!). GE (without financial services and affiliates) had 2002 revenues of $79 billion and total assets of $125.3 billion. Based on the 1.6 asset/revenue ratio we estimate that PTI may have assets on the order of $60 million, which would be nearly doubled by the present project.

Simultaneity *(# concurrent proj)* – this would be the only project of its kind for the company.

Based on the discussion above we conclude that a dedicated project organization is indeed needed. The way that the project was handled so far is essentially an influence project organization, which did not work well. Matrix organizations are more appropriate for projects that are equal in scope and nature to other development projects inside the organization and that have a recurring nature.

2. What project organization would you recommend (dedicated, matrix, influence)? Should PTI consider some form of a hybrid project organization?

A dedicated project organization is desirable as explained above. The problem is that the company does not appear to have the personnel to staff a project organization with high-level people that are 100% dedicated to the project. If CEO Miller attempted that, he would strip the

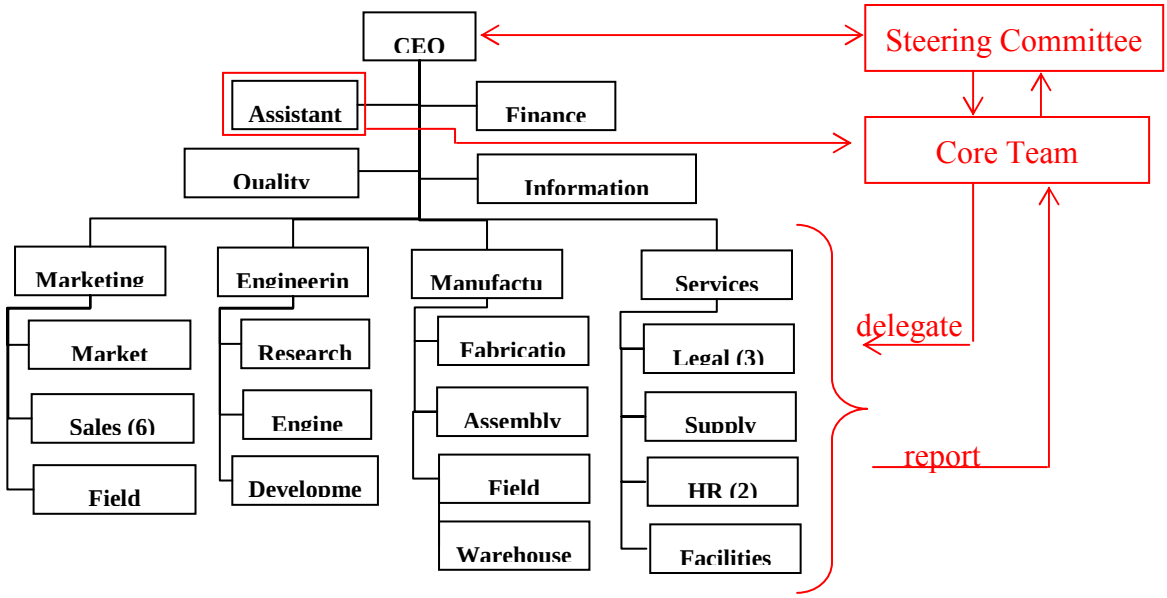
department's of their leadership and potentially jeopardize the day-to-day operations of the company.

The proposed solution is to create a PROJECT CORE TEAM with one of the VPs as a dedicated project manager. Peter Hoffman (Manufacturing) seems to be an ideal candidate, provided he has the appropriate experience, skill set and personality for this job. The CORE TEAM would have executive power on the project, but would have to report to the STEERING COMMITTEE. The composition of the team and committee are discussed below.

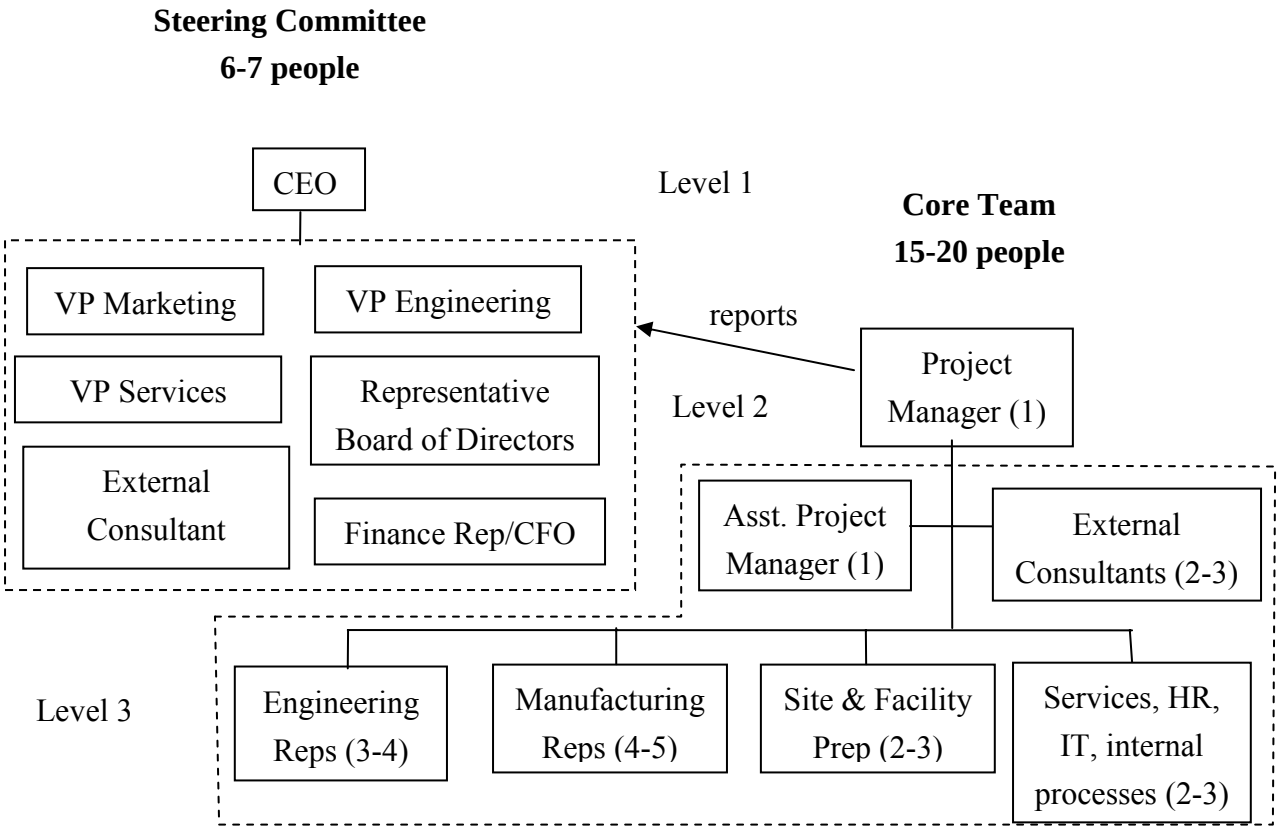
Some detailed tasks would still have to be carried out by personnel in the existing functional organization. **Thus, this is a hybrid project organization between a dedicated and an influence organization. The first two levels of the CORE team are dedicated. Lower level tasks have to be carried out within the existing functional organization (influence organization)**. The boundary between the dedicated and influence parts of the project are expected to shift over the course of the project (see below).

3. Sketch out an organizational chart of the project organization to at least 2-3 levels of decomposition. Formulate recommendations for how to staff the organization.

The solution is to create a CORE TEAM, with oversight by a STEERING COMMITTEE.



The Core Team and Steering committee could be structured as follows:



In this proposal the steering committee would be headed by the CEO and be composed of the three VP's of Marketing, Engineering and Services. This assumes that the VP of Manufacturing will head of the Core Team. This way checks and balances are introduced in the project. The steering committee would be augmented by a senior external consultant who has had significant experience in such expansion projects. A representative from finance (e.g. the CFO) should also be present on the steering committee to set the budget constraints and arrange for internal and external financing. A representative from the board of directors would be present to ensure consistency with the company's overall strategy and acceptance by the board. The steering committee would comprise 6-7 people. With exception of the external consultant, these would be part-time positions.

The core team would comprise 15-20 people initially, which would be engaged 100% in the project. The Project Manager would have one assistant and a team of 2-3 external consultants as staff. These consultants would be more junior than the consultant on the steering committee and

would support the execution and monitoring of the project from an operational perspective. The other members of the core team would be broken down into four sub-teams[2]:

Engineering (3-4 people): Coordination of expanded product development capacity, potential separation and specialization of activities among target markets: aerospace, marine, construction, logistics. Tasks: J, K, L, X

Manufacturing (4-5 people): This sub team would be responsible for the detailed tasks of new factory layout optimization, specification of machining and assembly equipment, etc… These are essentially tasks C, F,G, L, M, P, R

Site Survey and Preparation (2-3 people): This team would deal with surveying potential sites for the new factory, establishing and scoring site selection criteria, as well as organizing the move at a later phase of the project etc… Tasks: A,B,C, S, V

Internal Processes (HR,IT) (2-3 people): This team would focus on coming up with the new internal processes that ensure that the old and new parts of the company will function as one. Infrastructure planning and implementation (IT), screening, hiring and training new personnel (HR) etc. These are mainly tasks: K, O, Q, T, Y

4. Who should be chosen as the project manager? What are the recommended responsibilities and skills for this position?

There are essentially two fundamental choices for selecting the project manager:

(a) A high-level internal person in a significant management position, e.g. the VP of Manufacturing (Peter Hoffman) could make a good candidate for this job. Advantages of this solution are: (1) good knowledge of products, markets and internal processes at PTI, (2) commands respect and influence within the organization, (3) committed to success of the project. Potential disadvantages are: (4) need to create advancement career opportunities for that individual and not a dead end, (2) potential for conflict if the views of that individual and the steering committee do not coincide.

[2] It is probably not appropriate to call these sub-teams "IPTs", since their main responsibility does not encompass the design or manufacture of a product, or subsystem.

(b) An senior external project manager with experience in such expansion projects. This is probably less desirable, but could be made to work if the right individual is found.

Important skills for this position are:

- strategic thinking and planning
- good communicator within the organization and with external stakeholders
- extensive experience in development and manufacturing of specialty engines
- positive, motivating personality
- accepted by management and workers in the company

Main responsibilities

- lead core team on a day-to-day basis
- report to steering committee
- provide information basis for site selection by the steering committee
- create rough layout and transition plans
- put resources and plans in place for capacity expansion, including necessary additions to company infrastructure, processes and personnel

5. Formulate the main responsibilities of other key positions and committees within the project organization.

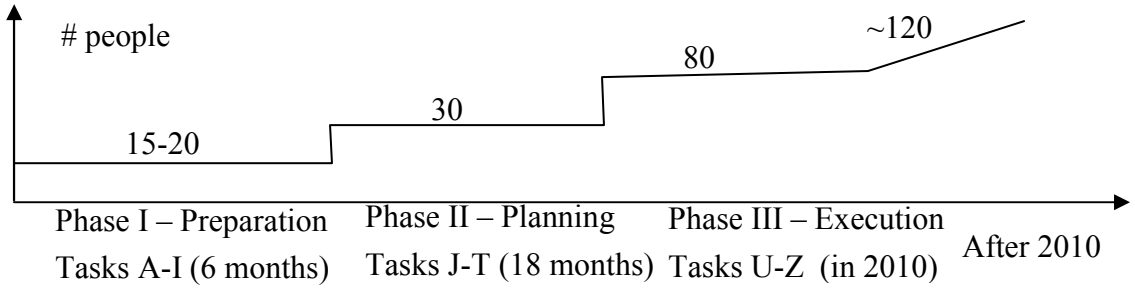
The answers are provided above under point 3.)

6. Describe in words how you would expect the project organization to change over the course of the project.

Initially the project organization will closely reflect the organization as shown above. This would be true from 2008-2009 (essentially the first two years of the project) and allow to carry out tasks A-T. The transition of the core team to the new organization is critical. One potential way of doing this is to morph the core team into the organization of the new plant in a more or less seamless fashion. This is preferable to disbanding the core team after completion of the project.

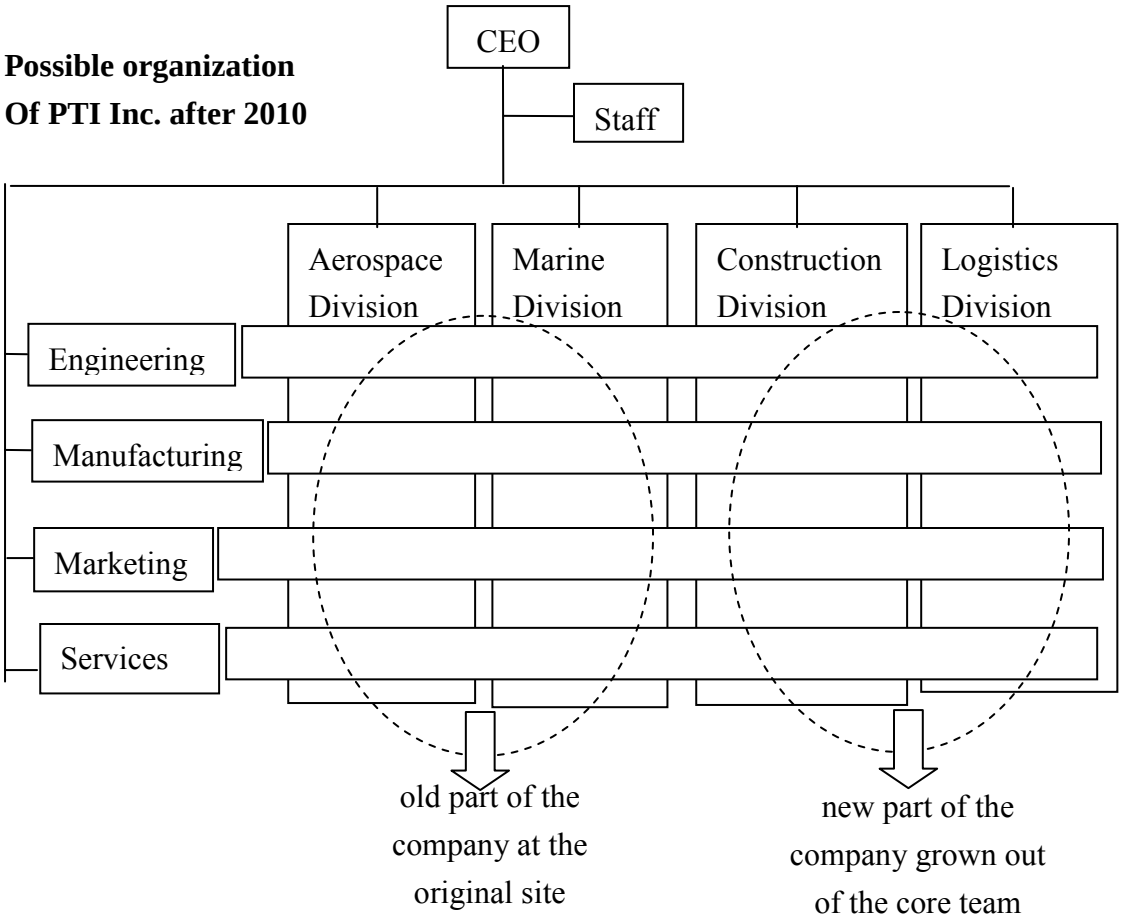
In terms of staffing, we can anticipate a step curve that begins at 15 people for the core team during project preparation (Phase I – tasks A-I), goes up to 30 people for Phase II (Project planning – tasks J-T) and up to roughly 80 people by the time the project is implemented in Phase III (tasks U-Z). The steady state for the new company might be close to 120 people. We don't

expect to exactly double the number of PTI's employees due to some synergies and sharing of resources between the two sites.



It is possible that the new organization of the company would feature both product divisions and functions in a matrix type fashion. The aerospace and marine sectors could be located at one of the sites, while the commercial and logistics products could be located at the other site.

Possible organization
Of PTI Inc. after 2010



Challenge Question

7. Demonstrate how well your hypothetical project organization matches the tasks to be undertaken as well as the architecture of the new facility using the "DSM overlap method" discussed in class. It is admissible to make simplifying assumptions if information that you would need is not provided in this assignment.

This assignment was mainly intended to get you to start thinking about how the tasks laid out for the project map to the project organization you suggested earlier. There is not a single, unique solution.

The following answer is used as the master solution.

Assuming each task is handled by one leading function, the following table demonstrates the tasks distribution among each function. Quality Assurance and Market Research do not have their own tasks; nevertheless, they are in close collaboration with other functions.

Tasks	Leading Function Involved	Other Function Involved
E	Engineering	Manufacturing, Quality Assurance (QA), HR
J	Engineering	Manufacturing, Supply Chain
R	Engineering	Manufacturing, Supply Chain
G	Facilities	Engineering, Manufacturing
M	Facilities	Manufacturing, Engineering, HR
O	Facilities	Legal
V	Facilities	Manufacturing, Engineering
H	Finance	Manufacturing, Engineering, Facilities, Legal
I	Finance	Legal
A	HR	Supply Chain
Q	HR	Manufacturing, Engineering
Z	HR	
K	Information Technology	Manufacturing, Engineering, Services, Marketing, Finance, QA, Finance
T	Information Technology	Manufacturing, Engineering, Services, Marketing, Finance, QA, Finance
Y	Information Technology	Manufacturing, Engineering, Services, Marketing, Finance, QA, Finance
B	Legal	Supply Chain, Finance, Manufacturing, Engineering
U	Legal	
C	Manufacturing	Engineering, HR
D	Manufacturing	Engineering, Quality Assurance, HR, Market Research
L	Manufacturing	Quality Assurance
P	Manufacturing	Engineering
W	Manufacturing	Engineering, Facilities
X	Manufacturing	Engineering, Quality Assurance
F	Manufacturing,	Engineering, Facilities
S	Supply Chain	Manufacturing, Engineering, Facilities

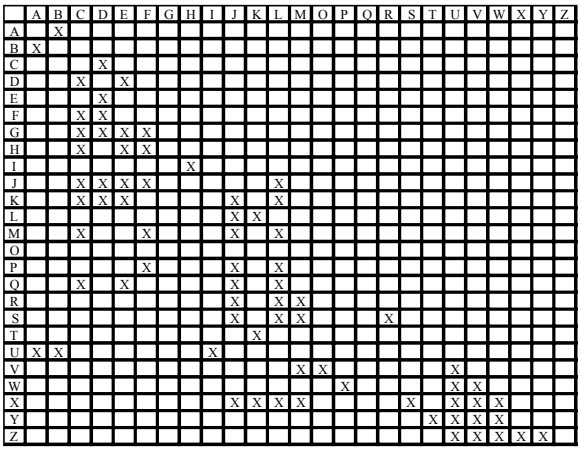
* Services includes: Legal, Supply Chain, HR, and Facilities.

The following table is the number of tasks each function involves (sub-divisions of Engineering of Manufacturing are viewed separately as a whole):

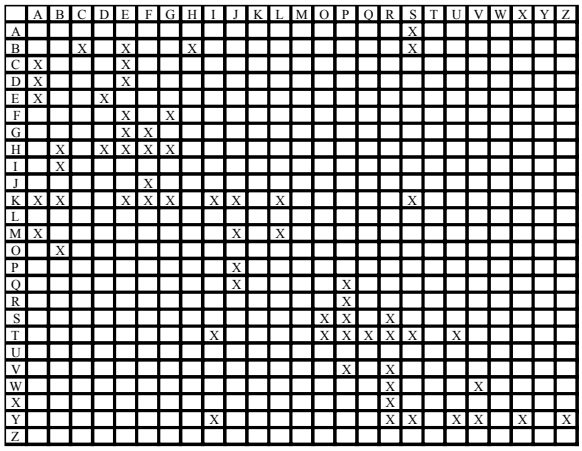
Function name within the project organization	Number of tasks involves
Manufacturing	20
Engineering	19
Facilities	11
HR	10
Supply Chain	8
Legal	8
Quality Assurance	7
Finance	6
Information Technology	3
Market Research	1

Note that Manufacturing and Facilities together own 31 tasks. Thus it is reasonable to place a supervisor atop these functions. It is also reasonable to place a supervisor atop the Engineering conglomerate, which has 19 tasks. (Note: This reflects well the organization of the core team as suggested above.)

DSM overlapping method:



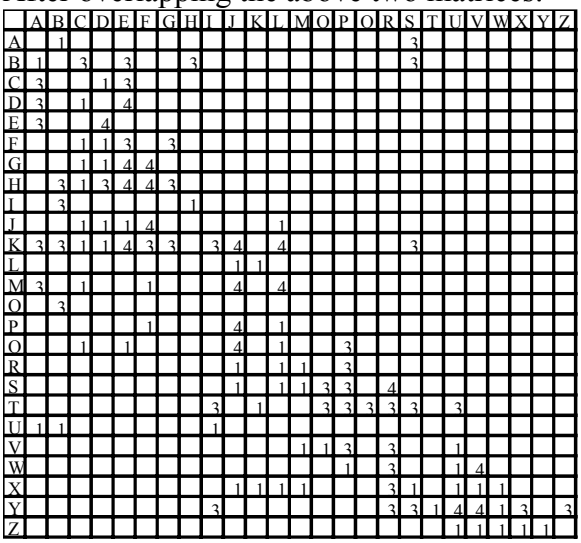
Process Interaction Matrix



Team Interaction Matrix

(Assignment assumption: Each function has multiple assignment of tasks, however, if a function needs to interact with others, the same function but closer has the priority.)

After overlapping the above two matrices:



Team Interaction	No (541)	***1***: 54 (10%)	***0***: 487 (80%)
	Yes (59)	***4***: 18 (3%)	***3***: 41 (7%)
		Yes (72)	No (528)
		Process Interaction	

e_{11}=65, e_{12}=476, e_{21}=7, e_{22}=52, $\chi 2=\sum \sum [(o_{ij}-e_{ij})^2/e_{ij}]$

Since $\chi 2$ = 22 >> Critical $\chi 2(0.99,1)$ = 6.635, **We reject the null hypothesis that *"team interactions are independent of process interactions."***

Conclusion: However the project team is organized it probably ought to cluster around the following four main task groups: Manufacturing, Engineering, Facilities/Site preparation and Processes (HR, IT…).