Opportunity in Knowledge Work Environments

A UPS Industrial Engineering Case Study

A Major Qualifying Project Report
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Submitted By:

Zachary Rellstab

Submitted To:

Professor Joe Zhu, PhD – Foisie Business School

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Abstract

UPS has nearly mastered the science of manual worker productivity with production rates growing yearly. With new research emerging on the productivity of knowledge workers and the increasing knowledge workforce there may be untapped potential in knowledge work environments to gain and sustain a competitive advantage. This research explored the role of hub planner at UPS, with consideration towards emerging research on knowledge worker productivity, to find opportunity for performance and productivity improvement.

Acknowledgements

I'd like to thank Professor Joe Zhu for his support of this project, without which it would not have been completed. I'd like to thank Ryan Powers, formerly of UPS, for his contributions to the formation of the project goals and Dan Ryan for his continued mentorship, providing me with the background to perform this research. An additional thanks is owed to the entire IE team of the Northeast District for their endless support and encouragement as well as feedback and insight. A special thanks is owed to those who participated in interviews and provided their opinions openly. The support of this project from UPS and WPI allowed me to explore new frontiers that will hopefully benefit UPS and the goals of WPI in preparing its students for future careers.

Company Background

This project is based heavily on the context of the UPS Industrial Engineering Department and therefore it is essential to first understand the basic history and structure of UPS.

Company History

The American Messenger Company was founded in 1907 by James Casey and Claude Ryan in Seattle Washington. The company first operated out of a cellar and mainly handled delivery of packages from department stores. Between 1910 and 1920 the company was renamed several times as it found its footing in the transportation industry. It emerged in 1925 as the United Parcel Service, with offices in Seattle, Oakland, and Los Angeles.

The United Parcel Service (UPS) expanded its fleet of iconic brown delivery vehicles throughout the mid-20th century. The company made a transition from primarily delivering for stores as a contract carrier to becoming a common carrier. Common carrier status is governed by state and federal regulations, which made the transition an extensive process. By 1975 UPS had gained common carrier rights in all of the 48 continental United States. In addition to expanding common carrier services UPS began offering freight and next day delivery services.

Today, UPS is a Fortune 50 company with gross revenue exceeding $65 Billion and more than 434 thousand employees internationally. The company is investing heavily in new technologies and infrastructure improvements. New “Smart” buildings such as the mega hub in London or SMART in Georgia provide new opportunities for employees and require new knowledge to operate.

Structure Overview

The company is divided into a variety of operational units. The largest division is the small package operation and is responsible for $54 billion in revenue. The small package operation is broken into 7 regions; each region is then subsequently divided into districts. The scope of this project pertains to the Eastern American Region 07 and the Northeast District 36.

There are a variety of departments within each district that have varying responsibilities. In general, all departments share a common purpose of supporting and growing the operation. Some of the larger departments in the 07/36 district include Human Resources, Business Development, Engineering Services, and Operations.

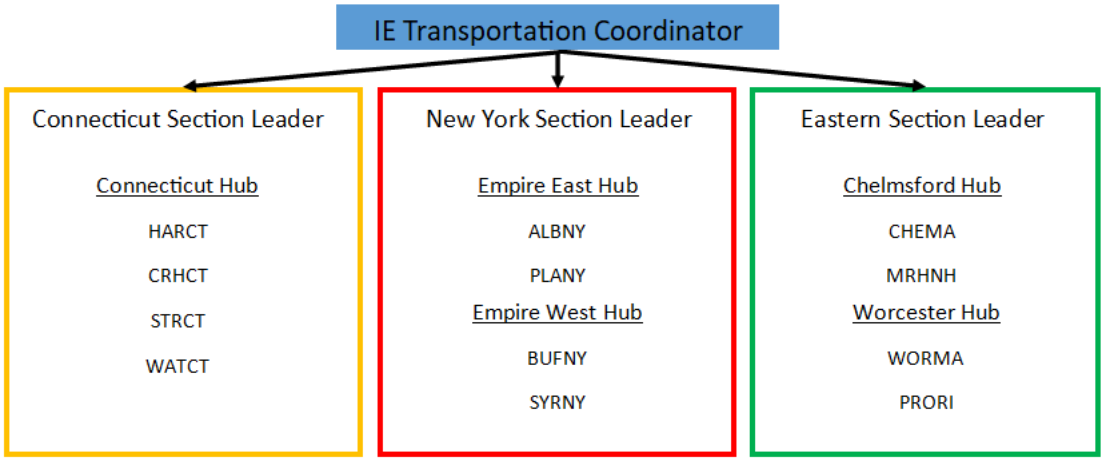
This project primary pertains to the Engineering Services department. The engineering services department includes a wide variety of roles from plant engineering to air planning. The most common role is the hub planner. Industrial engineering planners work directly with specific operations to help them plan and improve.

Operations enable package flow at UPS through a variety of sorts that handle packages in different ways. The three primary sort distinctions are local, hub, and preload. Local sorts collect packages from customer pick-ups and load them in trailers for hub processing. Hub sorts flow packages from local sorts, commercial customer pickups and other hubs to preloads and to hubs further along a package's path. Preloads prepare delivery trucks for a day of delivering. Local sorts and Preloads fall under the purview of the package division. Hub sorts are in the Transportation division. The Feeder department manages the movement of trailers to and from UPS locations. Delivery vehicles are managed by an 'on road' portion of the package team.

The Northeast District

The Northeast District contains 9 hub facilities and 88 local or specialty facilities. The hubs are divided into five transportation divisions, Empire West Hub, Empire East Hub, Connecticut Hub, Worcester Hub and Chelmsford Hub. These operational divisions are overseen by division managers. The structure of each division can be seen in figure 2.1.

Figure 2.1 – Northeast District Hub Divisions



The industrial engineering employees in each division are overseen by an IE manager. IE managers are often responsible for multiple hub divisions. The Worcester and Chelmsford divisions are the responsibility of the East IE Manager. Empire East and West are the responsibility of the Empire IE Manager. The Connecticut division is the responsibility of the Connecticut IE Manager. An IE Transportation Coordinator oversees all of the Transportation IE Managers.

The Hub IE Supervisor

A Corporate Job Model defines each position at UPS. A Job Model includes the basic duties and required knowledge for any job in the company. While each position may vary from

the job model in some ways, the model provides the fundamental purpose of the role. The Job Model for a Hub IE Supervisor includes 7 job duties:

Develops Work Measurement to Optimize Operating Plans

Develops Various Operating Plans

Provides Support in Improving Operations

Conducts Training for Operations Management

Monitors and Audits Processes

Conducts Operational Forecasting

Supervises and Develops Others

The complete duties section of the job model can be seen in appendix 2.1. Many of these duties are broad and encompass several tasks but the model provides a good overview of the intent for the role.

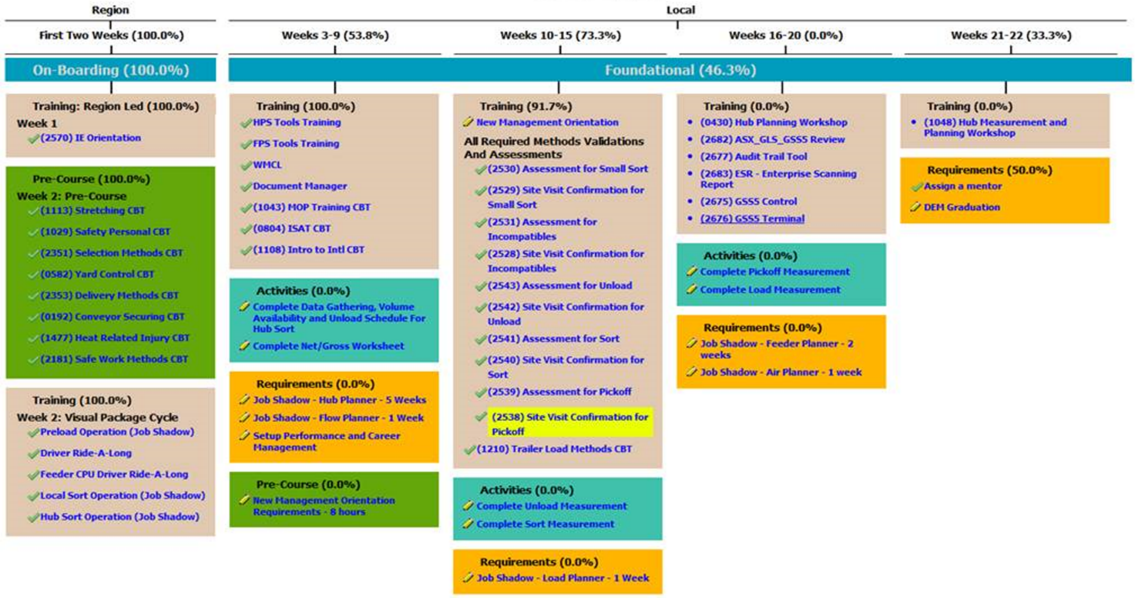
The Engineering Development Program

New industrial engineers in the Northeast District become part of an Engineering Development Program. The program is designed to prepare newly hired engineering employees for a position in the company. It is a 22-week program that includes formalized trainings, job shadowing of multiple positions, site visits and knowledge testing. Trainees in the program are introduced to many aspects of company culture and operations.

Figure 2.2 shows a typical EDP program. There are various EDP "tracks" depending on the intended post EDP position for the participant. The different tracks have slight variations but

the primary difference is in the assigned mentor. Additionally, the tracks determine where a participant will spend there time working when they are not working directly on EDP tasks.

Figure 2.2 – EDP Training Track



The EDP program helps to shorten the learning curve of institutional knowledge and familiarize new employees with UPS processes. UPS has many unique systems that an employee would not be exposed to prior to employment with the firm.

Introduction

This project aimed to identify areas of opportunity for improvement of productivity and performance in the role of Hub IE Planner in the Northeast District of UPS. Three tenants of company policy guided every aspect of the project;

"We build our organization around people"

"We support the development of our people"

"We standardize our systems, processes, and procedures."

These policies have supported the growth of UPS for over 100 years and are sure to continue to do so in the future.

While UPS is known for its efficient use of personnel and advanced logistics, there may be untapped opportunity for improvement in knowledge worker roles. As with most companies, UPS is experiencing an increase in knowledge workers as a result of technological advances. Over the past 100 years there have been significant improvements in the roles of manual workers, allowing them to process more packages with less strain. As the knowledge workforce grows it is becoming increasingly important to examine those roles in a similar fashion to the roles of manual workers. Enterprise firms may stand to gain a significant competitive advantage by improving the utilization and productivity of knowledge workers.

At UPS, the industrial engineering department is the largest, and most expensive, knowledge workforce and is therefore a clear focus for this project. The department is primarily responsible for optimizing and planning, in a variety of ways, the operations of the company. The department is made up of many different roles, with the role of IE Hub Supervisor being the most common. Each IE hub supervisor is responsible for specific sort operations. The responsibilities of an IE supervisor are broad and change based on the needs of the sorts and the company. This project served as an exploration of the role in the hopes of discovering opportunities for improvement and competitive advantage.

Literature Review

The existing research on knowledge work is limited in nature when compared to other fields relating to worker productivity. Documentation of successful utilization of knowledge work principles to elicit benefit is even more limited, although is emerging quickly. The foundations of knowledge work were laid by Peter Drucker and built upon by decades of

researchers (Holtshouse. 2010.) The research focuses on several principles that are believed to be at the core of knowledge worker productivity. These principles will be discussed in detail in this paper and the foundational theory for knowledge worker productivity is available in the "Foundational Theory" section.

The methods for implementing changes in companies to take advantage of new research are available in a wide variety of research. These methods include lean process improvement, six- sigma, and Deming's total quality management, among others (Naidu. 2006. ; Barney. 1991.) All the techniques for improving an organization center on understanding the organization and how it operates then implementing changes that will most benefit the organization.

Case research has been shown to be one of the most effective tools in developing and implementing new theories in management (Voss et al. 2002.) Case research methods offer the opportunity for qualitative understanding of complex phenomenon. Case research can include qualitative and quantitative methods to perform research. A research using a case framework seeks to understand the entire context relating to a research question in a broad sense. A case researcher may have multiple broad research questions that are developed through the case as opposed to one focused research question (Meredith. 1998.) In some cases it may be beneficial in operations research for a researcher to have direct involvement in an organization in order to have full participation in addition to potentially obtrusive research methods (Voss et al. 2002.)

Methodology

The goal of this project was to explore the role of hub planner at UPS to find opportunities for improvement and competitive advantage in the role of hub planner. The framework for this study was a blend of interpretive case research and experiential enquiry to provide research flexibility and allow for better contextualization of research results. The primary method of this

research was participatory observation, although interviews were used for exploration of specific questions. The continuous loop of research, observation, and informal interviewing enabled full exploration of the role of hub IE planner and the synthesis of new and existing ideas.

The research scope included three UPS hub locations and 8 hub sorts in the Eastern Hub Division of the Northeast District. Each hub has unique characteristics that may affect how a role operates and therefore it was important to consider multiple locations to better ensure the validity of results. While it may have been beneficial to include more hubs in different divisions and geographic locations, that was outside the scope of this project. All three of the hubs considered in this study are members of the Eastern hub division of the Northeast District. By focusing on a single division the research was able to ignore possible discrepancies in IE and District management that may cause variations in the role of hub planner.

The three main pillars of this research were to understand, to explore, and to support. The first step of the research was to understand the IE hub planner role and the existing research on knowledge work. The second step was to explore the role for opportunities by observing, interacting with, and interviewing planners. The third step was to support the identified opportunities with research, employee opinion and in some cases sample implementation. Similar to any engineering design process, the pillars of this research were not entirely linear but instead moved through as necessary to support the research goal.

Understand

The first stage of this project involved understanding the role of IE hub planner and the context for the role in the division. As the primary researcher for this project it helped to have a history as an employee for the company and experience in the department that served as the case

for this research. This phase involved background research into company policies and programs that related to the hub planner role including the EDP, IE Assessment, and Corporate Job Model. This phase also included interviews with current planners and IE management people to better understand the perspectives of employees in the role and those who manage them. The interview questions used are included in appendix 1. Not all interviewees were asked all interview questions as they were exploratory in nature and not used as empirical evidence for conclusions.

Explore

The second stage of the project was to explore the role of hub planner and identify areas of possible improvement or opportunity. This stage involved a synthesis of existing research with new perspectives in the context of the role. Observations of current planners and participation in the day to day work of the planners provided the base for this stage. This phase implemented strategies used in engineering design such as brainstorming, idea development, confirmation of validity and redesign as necessary. This process was shaped as the project continued and possible areas of exploration arose.

Support

The third and final stage of the project was to support the opportunities that were identified with business justifications. The justifications were broad in nature, including not only financial justifications but also social and competitive justifications. This stage made use of existing research, employee opinion and data analysis to provide justifications for recommendations. In some cases, sample implementations were to show the feasibility and value of some recommendations as well as to provide examples for implementation. Plans were

developed in this stage for recommendations that involve implementation outside the timeline of this project.

Theory and Results

The primary value of this research is derived from the application of emerging research on knowledge worker productivity to the context of the UPS Industrial Engineering department. The research flowed between observations and interviews of people in the department and background research. For that reason, the theory and results of the study are presented together to clearly show the synthesis of ideas and research.

Foundational Theory

Motivation

All workers are motivated to perform their job duties in different ways. In order to fully understand worker productivity it is important to understand what motivates an employee to perform at all. The two primary forms of motivation are extrinsic and intrinsic (Frost et al. 2010.) Extrinsic motivation is based on gaining a reward or avoiding a punishment. Examples of extrinsic motivation include a salary or a suspension. Intrinsic motivation is based on personal satisfaction or fulfillment. Examples of intrinsic motivation include contributing to a team or personal improvement.

Different management techniques leverage the two types of motivation differently. A technique like ‘command and control’ almost exclusively takes advantage of extrinsic motivation by setting standards and holding employees to them through discipline. While this technique does have its uses, such as in the military, most firms are shifting away from a strict implementation of command and control. While there isn’t a clear management style that purely

leverages intrinsic motivation, because all employers by their nature offer extrinsic motivation in the form of wages, there are hybrid models that take advantage of both types. One such hybrid management style is the transformational model. In the transformational model leaders leverage personal values to motivate employees to work towards a common goal (Humphreys. 2001.)

Companies are able to leverage the different types of motivation for different employees to elicit job performance. Through combination of the two motivation types companies may be able to use lower compensation levels and experience the same employee retention and performance. Some studies have shown that there are limits to each motivations style and therefore each type can only be effective to a certain point (Frost et al. 2010.) Employees who are financially stable may not be as highly motivated by financial motivation and instead intrinsic motivations may be more useful. Companies must know how to balance the two methods to maintain motivation in the workforce.

Knowledge Worker Productivity

The prominent management theorist, Peter Drucker first introduced the idea of knowledge work in his 1959 book "The Landmarks of Tomorrow". He defined knowledge workers as people who use theoretical and analytical knowledge to produce value (Drucker. 1999.) The management of knowledge workers is referred to as knowledge management. In this study knowledge management is generally defined using Stankosky's definition of "leveraging relevant knowledge assets to improve performance, with emphasis on improving efficiency, effectiveness, and innovation." (Stankosky. 2005.) In 1999 Drucker published an article in the Harvard Business Review affirming and expanding on his beliefs in the value of knowledge workers in the changing economy. In "Knowledge Worker Productivity: The Biggest Challenge", Drucker laid out 6 guiding factors of knowledge worker productivity.

The six major factors where:

- Knowledge-worker productivity demands that we ask the question: “What is the task?”
- It demands that we impose the responsibility for their productivity on the individual knowledge workers themselves. Knowledge Workers have to manage themselves. They have to have autonomy.
- Continuing innovation has to be part of the work, the task and the responsibility of knowledge workers.
- Knowledge work requires continuous learning on the part of the knowledge worker, but equally continuous teaching on the part of the knowledge worker.
- Productivity of the knowledge worker is not—at least not primarily— a matter of the quantity of output. Quality is at least as important.
- Finally, knowledge-worker productivity requires that the knowledge worker is both seen and treated as an “asset” rather than a “cost.” It requires that knowledge workers want to work for the organization in preference to all other opportunities.

Drucker’s principles formed the basis for knowledge worker productivity research and are used in this study to organize research and results into six categories: Clarity, Autonomy, Innovation, Learning, Quality, and Preference.

Results

Clarity

Theory

The first, and possibly most foundational, aspect of knowledge worker productivity is clarity of purpose. In manual work the purpose is generally clear, such as putting packages in a trailer or taking them out. In knowledge work the purpose is often broader and more difficult to define. If it is possible to narrow the task to one actionable step, then the nature of the work is no longer knowledge based but instead manual.

All facets of knowledge work rest on the clarity of purpose. If a knowledge worker does not know what they are supposed to be accomplishing, or what goal they are working towards, they cannot succeed. Organizations may struggle to find a balance between too narrow and too broad a focus for knowledge workers (Langfred et al. 2016.) The purpose of a role must be defined through collaboration between manager and employee to find goals that grant the knowledge worker enough autonomy and the organization enough control. The importance of collaboration between management and employee will become a trend in this paper.

Clarity of purpose serves as a means of intrinsic motivation. When workers in a team share a common purpose they are able to function as a team instead of as individuals (Chen et al. 2018.) One of the primary challenges in the definition of purpose that firms may experience is that of multiple objectives. In both knowledge and manual work, the more objectives there are, the more difficult it becomes to meet them all. A firm must insure they never have conflicting objectives within roles or between roles or else face the risk of internally competing.

Results

In the formal interviews of this research participants were asked “What is the role of the IE Planner?”. One planner responded “It's a do all, a little bit of everything. The Swiss army knife of UPS.” This response summarized the responses of other planners who all expressed that their role has many purposes and responsibilities. Another planner said “it depends on the flavor of the week.” All management employees of UPS are held to a wide variety of metrics ranging from the production of their hourly employees to the number of packages that were misrouted or left in the building. These metrics, one management employee pointed out, cause a “flavor of the week approach to fixing things” where employees work to fix one metric while it is being talked about but then move onto something else the following week without making any sustainable progress on the previous item.

It became evident through interviews that many employees are working towards different goals, there doesn’t seem to be a uniting purpose. For example, in an effort to improve productivity in a building trailers might be moved from Chelmsford to Worcester or vice versa but such a move would be difficult for the Feeder department to orchestrate and so while a planner might want to move them a feeder manager may not. The two parties do not have one obvious single goal to work towards because they are responsible to different managers and held accountable to different metrics.

Recommendations

UPS would benefit from providing its knowledge workers with clarity of purpose. One of the best ways to do so would be to emphasize a common mission between departments and roles. An example might be “Provide the best service to our customers at the lowest prices by moving their packages safely and productively”, or “Ensure all packages get from point A to point B without injury to employees or parcels as quickly as possible.” While these statements may seem

obvious it is important for the company to emphasize one so that all employees at all levels know what they are working for.

The department would also benefit from an increased focus on the corporate job model. The job model defines high level functions for the role and would give planners increased direction while also supporting autonomy in how they complete the goal.

Autonomy

Theory

The goals of knowledge work are often broad and nested. Knowledge work in general involves applying knowledge to problems in context. It is rare for a knowledge worker to address the same exact problem multiple times and each problem or task may require the knowledge worker to follow a different process (Langfred et al. 2016.) Uncertainty in the process and outcomes of knowledge work require autonomy for productivity. Once clarity of purpose has been established a firm can more easily allow autonomy. If a worker must get approval or direction every time the circumstances change then there is no autonomy and the knowledge worker has once again been transitioned to a manual worker. In addition to autonomy knowledge workers must also be given responsibility for their productivity (Drucker. 1999.). When autonomy is present it becomes incredibly difficult to track productivity and so the workers themselves must do it. As Peter Drucker wrote, “It demands that we impose the responsibility for their productivity on the individual knowledge workers themselves”.

Similarly, to the struggle companies may find with goal clarity, they may also struggle with autonomy (Langfred et al. 2016.) Once again the manager and employee must work collaboratively to choose the level of autonomy that most benefits the firm and the employee. The employee’s unique knowledge of their role and preferences may allow them to develop the

most effective job setup. A manager may have broader insights regarding how one employee's job setup may affect others and therefore is also an important perspective in defining the job setup and autonomy for an employee.

Results

There was a variety of feedback in relation to autonomy in the role of hub planner at UPS from management and planners. In general, planners are given great autonomy over the structure of their workday. They are not given strict guidelines for when they must be in the office but instead are given leniency as long as they are in the facility during their sort and when the operators need them. They are, for the most part, able to choose when they perform the tasks they must perform. There is nobody micromanaging planners throughout the day. In these ways UPS is successfully leveraging knowledge worker autonomy.

Planners expressed specific dissatisfactions when they felt their autonomy was stifled. Four of five planners that were asked about the level of autonomy they experience in the planning of their sort using HPS were dissatisfied and felt they were micromanaged in this respect. HPS is the primary UPS application used for operational forecasting including volume and staffing planning. One planner said "more autonomy and responsibility, not being a report monkey. It's not planning it's somebody that can keystroke" The planner went on to elaborate that it sometimes feels as if the planners do not have the autonomy to plan. This is either a case of micromanagement or a case of poor clarity in which the planner is not able to perform knowledge work that satisfies management.

Recommendations

UPS should continue to allow employees autonomy in shaping their workdays and completing tasks. As UPS adapts to other aspects of knowledge worker productivity the

autonomy of knowledge workers will become increasingly important and the existing structure will support the productivity and performance.

A toolkit for planners may help to support autonomy by ensuring all planners have the best tools to perform their jobs. During observation of planners it became evident that sometimes their performance is affected by the need to search for or design tools. The planner toolkit could be comprised of the tools that the various planners have designed and be updated when new tools are created. This communal toolkit could help to reduce planner dependence on others for simple processes.

The company should strive to reduce micromanagement at all levels by training planners to make decisions that management might currently make. If a manager is making a decision because a planner doesn't have the skills or information to make it then the manager should always strive to train the planner to make the decision. This helps in terms of succession planning so there are people with the skills necessary to take on higher level roles and helps to allow managers to focus on more difficult decisions. Additionally, training planners in such a way that they are able to make decisions enables them as knowledge workers.

Innovation

Theory

Innovation is at the base of value in knowledge work. Knowledge workers solve new problems in new ways. Smaller firms often experience an advantage in innovation due to the ease of implementation and communication of innovations. Companies don't innovate, people do. If a company wants to take advantage of innovations, they first need employees to generate innovations and second need to successfully implement the innovation. Companies benefit from an environment that promotes and expects continuous innovation. In terms of knowledge worker

productivity, innovation is a major source of value and therefore major component of productivity.

Technological turbulence as well as advances in industry can cause the "rapid obsolescence and advancement of knowledge" (Chen et al. 2018.) Innovation is critical to the success and value of knowledge workers to keep them at ahead or at least at par with the rest of the industry. The response of knowledge workers to innovation in the industry is dependent on their awareness of the innovation. In teams where innovation is expected and normalized, knowledge workers are simply more likely to do it. Teams that perceive high levels of change in their industry develop tendencies to innovate while teams that do not perceive high levels of change do not. This phenomenon, while simple, is also the key to unlocking innovation in knowledge work environments. When the norm is to innovate, people do it. When the norm is not to innovate, people don't do it.

Results

UPS leverages performance expectation to promote innovation in the role of hub planner by mandating yearly ROI projects. The ROI projects cover a broad range of innovation and as a part of yearly performance reviews provide an extrinsic motivator for innovation. Although, it is important to note, the ROI projects are not necessarily innovative. One manager noted that they are at some points more of a formality and not as successful. While one planner may develop new processes for tracking and moving irregular packages, those weighing over 70 lbs or requiring special handling, another may simply implement a tool for improving flows between buildings year after year. Both projects provide a return on investment, but only one is innovative.

Hub planners expressed that innovation is the most valuable thing they believe they do but when asked how often they perform "Innovation activities" they revealed the time spent is

minimal. In general, innovation in the role of hub planner relates to the operation. New operational processes or methods stand to produce the biggest return on investment. Most planners however, when observed, spent less than 15 minutes in the operation during the length of their sort.

Recommendations

Hub planner productivity in terms of value created would benefit from additional time dedicated to innovation activities such as developing and implementing new processes and tools in the operation. Planners should be expected to spend more time on the floor working with processes.

UPS may benefit from requiring more unique or significant ROI projects year to year. While this would increase the difficulty in meeting the requirement it would also likely increase the influx of new ROI projects. Planners could collaborate or swap ideas and implement them between sorts to increase value.

UPS should establish a method for spreading innovation and developing ideas. A system for submitting possible innovations to teams with the skills to implement them may produce valuable projects. Many planners saw opportunities in software tools that would add value to the operation but lack the skills to develop them and therefore do not. A set process for submitting those ideas for possible development may stand to benefit the company.

Learning

Theory

Continuous knowledge sharing, learning and teaching, promotes the growth of employees and therefore of the entire organization. As knowledge is the main asset of knowledge workers the sharing of it can boost the productivity and performance. “For an organization to performs its

activities successfully, it needs to create, share, and utilize information and knowledge" (Palvalin, Vuori, Helander. 2018.) Knowledge work environments leverage the individual and differing skills of all employees to gain broad perspectives on problems. The most effective knowledge work environments have a set of employees that have varying expertise and are able to share knowledge effectively.

Knowledge sharing can be promoted by an organization through its structure and systems. Some small and medium sized firms are able to adopt new experimental structures designed to support knowledge workers such as the C-Form or I-Form (Frost et al. 2010.) The challenge of knowledge sharing grows with the size of the organization (Palvalin, Vuori, Helander. 2018.) The potential for implementing structures in a large firm such as UPS is limited by the complex nature of business units and their interactions. The lessons learned in these experimental forms may still prove valuable to enterprise businesses.

Knowledge transfer in organizations is critical not only in employee productivity but in job satisfaction which has also been shown to correlate positively with productivity and retention. Knowledge transfer supports all other principles of knowledge worker productivity in this paper. Knowledge is the primary resource of knowledge workers; without it they simply cannot produce.

Results

The knowledge sharing within offices at UPS is fairly effective and prevalent but sharing between buildings and roles is limited. Employees from both Plant Engineering and Human Resources when asked what planners do on a day-to-day basis acknowledged that they weren't certain. UPS hub operations are expected to hold weekly center planning meetings that gather management employees from various departments. In the three hubs that were involved in this

study CPM meetings were held informally if at all. This means that the knowledge transfer between departments is limited.

The tools and processes used by planners in the three buildings addressed in this study differed dramatically. The Worcester building seemed to have a more prevalent automated information flow and more developed tools for forecasting than Providence or Chelmsford. The rotation of planners through various positions is the best method implemented by UPS to promote the disbursement of knowledge. This however only happens when a move is made.

UPS, in a similar fashion to most major corporations, maintains a 'corporate university' where employees can take free online classes on a wide variety of subject matter. In interviewing current hub planners only 1 out of 5 who were asked have taken advantage of the available trainings in the corporate university curriculum other than those required for compliance. Some planners explained that they spend time outside of work developing skills to use in their work because they do not feel comfortable learning during the working day.

The company has a steep learning curve in relation to institutional knowledge due to complex systems and company specific terminology. UPS makes use of enough acronyms to justify maintaining an acronym dictionary. Figure 8.1 shows a list of systems used by planners on a weekly basis and their associated acronyms. Many employees don't know what the acronyms mean but do know what they refer to. The company should limit acronym usage whenever possible to decrease this learning curve. Even with the EDP and acronym dictionary, the acronyms sometimes make it difficult to communicate with those unfamiliar with them.

Figure 8.1 – Acronyms for Systems used by IE Planners

Programs/Interfaces Used	
APRS	Access Provisioning Request System
DIV	Dynamic Interactive Viewer
ESR	Enterprise Scan Reporting
ETT	Electronic Tracking and Tracing
FPS	Feeder Planning System
GFTS	Global Forecasting and Tracking System
GLS	Global Lineup and Sort Planning
GNPS	Global Network Planning System
GSS	Global Scanning System
HFCS	Hub and Feeder Control System
HPS	Hub Planning System
Igate	Corporate IE Transportation
NGSS	Next Generation Small Sort
NIS	Network Information System
SEAS	Service Exception Analysis System
TFCS	Trailer Forecasting and Control System
WML	Work Measurement Library

Recommendations

UPS has a significant opportunity to improve knowledge work environments by promoting knowledge sharing. A company with as many departments and employees is likely to encompass many talents and specialized skill sets that provide great potential for knowledge sharing. The company can leverage these different skill sets by promoting training by employees. A bi-weekly or monthly training led by employees from varying departments for everybody would promote both learning and teaching and also empower employees. Departments could use the same model internally. In the case of the industrial engineering department a planner could host a video class and teach other planners about some aspect of the job or a skill they possess. Additionally, the company should consider mandatory continuing education for planners. A simple requirement of 2 hours a quarter of UPS university training would increase knowledge flow into the role.

UPS may also benefit from scheduling cross functional meetings similar to the center planning meeting. These meetings could follow the example of C-Form organizations in which employees meet for a short amount of time to share what they've worked on since the last meeting and what they will be working on. This structure allows employees to create their own

network of accountability and leverage off of the ideas of one and other. ‘Circle’ meetings can include employees from multiple departments or just a single department. The Northeast District of UPS would benefit from both forms of circle meetings to promote knowledge sharing between and amongst roles. It is important to also include management employees in circle meetings to bolster communication. These managers should share their tasks in the same way as all other employees. Circle meetings not only help to bolster knowledge transfer but also enhance communication and trust.

There is potential for knowledge sharing in mixed work areas. Although this is difficult to implement with limited space and flexibility, it is worth noting. Mixed work areas allow for non-formal and continuous sharing between roles. UPS should consider mixing work areas whenever the opportunity arises and especially in the design of new facilities

Quality

Theory

In knowledge work, value is not derived from the quantity of work alone but instead by the quantity of quality produced. This represents another distinction between manual and knowledge work. The productivity of manual workers is measured based entirely on the quantity of work that is above a minimum standard. The productivity of knowledge workers is based entirely on the value of the decisions and information they produce regardless of quantity (Erne. 2011.) In knowledge work, 1 page of highly groundbreaking content may be more valuable than 1000 pages of the mundane.

The most difficult part of increasing knowledge worker productivity is in measuring the productivity itself. The challenge in measuring lies in the often complicated if not completely intangible nature of knowledge work. Lazzolino and Laise propose a novel measure of

knowledge worker productivity, which is derived from the value added by human capital and the investment in human capital. While this method does provide an adaptation of classical calculations of productivity it does not answer the complicated question of how to calculate the value added by knowledge workers. In environments where knowledge workers produce for the market it may be possible to calculate sales and the productivity of the entire team. However, knowledge workers generally work in teams in which it is hard to gauge individuals' contributions. Additionally, in environments where knowledge workers work on internal processes or systems such as the case of most industrial engineers it is difficult to measure the value of their contributions. In research to date it has become generally accepted that knowledge workers themselves are the best at gauging their productivity.

Results and Recommendations

UPS emphasizes quality in most if not all cases. The company values accurate and timely information. Planners are gauged in quarterly performance reviews as well as during the IE assessment. The infrastructure of UPS supports quality work and the emphasis on quality work should be maintained.

Preference

Theory

Knowledge workers have much more mobility in terms of where and how they work thank manual workers. Manual workers need the production systems of the firm in order to be productive while knowledge workers on the other hand carry their means of productivity in their heads. The knowledge workers themselves are the means of production and just as a company may invest in a machine they must invest in their knowledge workers. "It is generally accepted that a strategy based on investment in knowledge workers is the greatest competitive weapon of today's organizations" (Lazzolino, Laise. 2016.)

Manual worker turnover has been known to be expensive but in the case of knowledge work where the learning curve may be longer and the company may invest in the asset there may be even greater turnover costs.

In addition to a more available choice in what firm to work for knowledge workers have a more available choice in how they work and why they work. As previously discussed, firms may leverage extrinsic and intrinsic motivation in different ways to elicit productivity and performance from employees. In the case of knowledge workers who may have their extrinsic needs entirely satisfied or have a choice between extrinsically equal opportunities it is important to shape a work environment in which they may experience intrinsic motivation.

Research has shown that leveraging the intrinsic motivation of employees using behavioral science proves effective in increasing productivity. If for example an employee shows a preference for working early in the mornings the firm may place that employee in a role compatible with morning work.

Results and Recommendations

UPS provides employees with opportunities to express preference. Planners have flexibility in their schedules depending on the timing of their sorts. Additionally, with an abundance of positions available UPS makes it easy for employees to apply and move from position to position in alignment with their preferences. As the company takes advantage of opportunity in knowledge work environments they should continue to consider the preferences of employees.

Implementation

The recommendations of this project pertain primarily to the pillars of Clarity, Autonomy, and Learning. The recommendations of these sections represent the greatest opportunities revealed by this research. The recommendations are summarized as:

1 – Promote Information Sharing

- ‘Circle’ Meetings
- Training by Employees
- Mix roles in work areas
- Reduce Acronyms

2- Promote Autonomy and Accountability

- Empower workers as decision makers
- Establish feedback and teaching loops
- Develop Planner Toolkit

3- Relate to a mission

A majority of these recommendations are outside the timelines scope of this project and need both management and employee support to implement. It will fall on IE management to implement the lessons of this research, although planners themselves may begin to make use of the lessons as well.

Planners can make an effort to communicate amongst each other more often in regards to the projects they are working on. They can follow up with their managers when they feel they are

being micromanaged to learn why it is occurring and potentially gain the skills needed to do it next time without direct management. Planners can seek to spend additional time on the floor and in the offices of other roles to increase information gathering and sharing.

Planner Toolkit

As a part of this research a "Planner Toolkit" was started. This creation of this toolkit shows the potential benefit of knowledge transfer. The toolkit includes tools from planners in each building. Some of the tools were modified based on the combination of multiple tools. The creation of the Planner Toolkit motivated the creation of a new Forecasting and Simulation tool. The "Simtool" leverages several tools designed by planners and combines them to make a consolidated tool. Simtool allows planners to forecast their daily incoming trailer and package volume within minutes. This process is significantly faster than current/previous processes used by planners.

Simtool also provides the outbound distribution of incoming packages which allows operators and planners to see where packages will flow in the building. Figure 10.1 shows a view available in Simtool that includes information on the inbound loads and where their volume is destined. This tool allows planners to communicate easily between buildings because they all forecast using the same tool. It has been implemented in 2/3 buildings in the Eastern Division.

Figure 10.1 – Simulation Forecast and Outbound Distributions

Load Data						VOLUME TOTALS				Net Distributions							
						129506	91648	34998		pd-2	pd-3	pd-4	pd-5	pd-6	S1	S2	SS
Loc	Origin	SLIC	ULD	Update	Ld_Activity	Gross Volume	Net Volume	Small Sort Volume	Bulk	12%	10%	12%	12%	15%	19%	17%	4%
0169	234QV	234QV	UPST842363	10/4/18 2:48	I	0	0	0		0%	0%	0%	0%	0%	0%	0%	0%
0169	278QV	278QV	BDS16201	10/4/18 3:22	I	0	0	0		0%	0%	0%	0%	0%	0%	0%	0%
180AM	180AM	ABE4	BDS531105	10/4/18 3:30	O	1018	1018	0		14%	10%	11%	11%	18%	**31%**	6%	0%
6039	6039	ADDIL	UPST180859	10/3/18 3:12	O	1381	946	312		9%	15%	14%	10%	10%	**29%**	9%	4%
6039	6039	ADDIL	UPST879752	10/2/18 8:01	P	158	156	3		1%	16%	11%	13%	7%	**47%**	3%	1%
1229	1229	ALBNY	UPST337249	10/4/18 4:04	O	431	311	135		17%	14%	13%	18%	**25%**	6%	1%	5%
0169	1229	ALBNY	UPST366646	10/4/18 8:21	I	1431	983	486		20%	8%	11%	13%	**35%**	6%	4%	4%

Reflection

Design Process

This project involved process analysis and improvement in the role of hub planner at UPS with the goal of increasing productivity and performance. The recommendations of this research were developed using an iterative design process in which a hypothesis was created and validated with research and employee feedback and then redesigned if necessary. This project considered many factors in the design process including information, people, existing systems, and limitations.

Large companies such as UPS experience different constraints than most companies. Enterprise firms are often slow to adapt as a result of their size and complex management hierarchies. They do, however, have great ability to adapt due to a high level of resources and investment capabilities. In this project it was important to consider the constraints placed on a division by a district or by the corporate offices. It was outside of the scope of this project to redesign management hierarchies at any level or even job roles. The primary constraints considered could be considered social and systemic. The recommendations of this project span several feasibilities and require different levels of hierarchal support. Some recommendations can be implemented easily in one office while others would require corporate changes. By designing recommendations of multiple levels it is more likely that UPS will be able to being implementing them regardless of constraints.

The Project Experience

Gaining experience in a company like UPS is invaluable. This project allowed me to explore ideas and areas of the company that I would not have normally encountered in a class or my normal work at UPS. In this project I've learned about the complexities of organizations of all sizes that affect how they grown and change. In this project I learned about management

skills that will be applicable in the new knowledge work economy that aren't generally covered in classes because the research is almost too new. Industrial engineers at all levels are faced with management challenges.

This project revealed to me new roles for industrial engineers in developing systems for knowledge workers. The industrial engineers of the 20th century had it easy in applying the concrete principles of scientific management. Industrial engineers in the 21st century will face new, much more complex challenges that require broad understandings of engineering principles as well as psychological and sociological principles that affect how people work. All the easy process design work has already been done and newest process gains will be much harder to design. The learning experience in this project will continue in my professional career as I continue my work at UPS.

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Appendix

Appendix 1 – Interview Questions for Planners and Management

The following questions are part of a Worcester Polytechnic Institute Major Qualifying Project entitled "IE Planner Role Study at UPS". All answers to these questions will be used in completion of this project. No participant names will be recorded. All potential Personally Identifiable Information recorded as a part of this interview will be kept confidential or presented in aggregate.

EDP Question

What's the purpose of the EDP?

Were there previous versions of the EDP?

Is there anything you think could or should be added to the EDP?

What are the most important parts of the EDP?

What type of value adding things do EDP participants contribute during the program?

How successful is the current EDP?

What do retention rates look like out of the EDP?

Planner Questions

How long have you been a planner?
How many sorts have you been the planner for?
How many hours a day do you work on average?
What do you see the role of IE Planner as?
Are there tasks that you perform that you think should be done by others?
Which tasks?
What is the most time consuming or difficult task you perform?
What tasks do you perform daily?
Monthly?
Intermittently?
If you could change one thing about the role what would it be?
How often do you interact with managers?
How often do you interact with FT sups?
How often do you interact with PT sups?
How frequently do you perform training?
How much time do you spend on the floor in a week?
Were you a part of the EDP?
What is the most valuable thing you do in your role?
What is the least valuable thing you do in your role?
Is there anything else you think is important in defining the role of IE Planner and designing a standard training and toolkit?
What is the most important thing for an IE planner to understand?

IE Planner Role Study ZRellstab@UPS.com

Appendix 2 – IE Hub Planner Job Model

Job Duties — Expand Section

Develops Work Measurement to Optimize Operating Plans

- Develops and maintains work measurement for all operations to support all necessary operating plans and reflect current normal conditions.
- Works with Operations to develop a shift plan (i.e., schedule that defines the shifts, area of coverage, specific work, and movements needed within a specified parameter), which supports both operation and customer requirements.
- Uses work measurement to improve processes and job set-ups which reduce the hours required to perform the operation.
- Reviews impact of standards changes or updates with Operations and Division Managers to jointly develop implementation plans.

Develops Various Operating Plans

- Based on work measurement, work with Operations and Hub Managers to develop all components of the Master Operating Plan (MOP), Daily Presort Plan, and Seasonal Plans to improve operational efficiency.
- Analyzes current operating plan to determine opportunities for improving the operations process and workflow (e.g. analyze process flow charts and production schedules, etc.).
- Reviews recommendations (e.g., improved job set ups, operating plans, etc.) with IE Section Manager and Operations managers for approval.
- Develops contingency plans for unexpected situations.
- Updates operating plans to stay current with new services or changing conditions.
- Conducts follow-up with Hub and Division Managers to discuss plan effectiveness and influence decision making.

Provides Support in Improving Operations

- Works with sort managers to set operations strategies for improving cost and service levels.
- Utilizes work measurement, gap analysis, statistical analysis, discussions with management, and operations visits to identify issues and problems impacting the achievement of performance and service goals.
- Develops solutions to operational issues and provides recommendations to improve operations.
- Participates in Business Review and Planning meetings, and works with the operations management team to implement solutions and conduct follow-up.
- Works with operations management team to implement changes in the operations to reach desired cost reduction and service improvements.
- Audits and analyzes internal processes and reports to identify areas for potential operational improvements and efficiencies.
- Consults with and guides sort managers on desired action steps to improve operating results in all areas of the operation.

Conducts Training for Operations Management

- Identifies issuesrequiring training or re-training (e.g., Operating Plan execution, process adherence, proper methods, work measurement, use of technology, etc.) to improve the efficiency and effectiveness of operations.
- Delivers training to management and staff via classroom (virtual), conference calls, electronic material, or one-to-one to promote learning transfer, ensure training compliance, and improve employees' operational performance.
- Provides training to management for implementation of new procedures, processes, services, and technology to maintain operational effectiveness.
- Coordinates with process writers to create training documents.

Monitors and Audits Processes

- Ensures Work Measurement Control Log is updated and verifies the proper application of work measurement to ensure the accuracy of daily operations measures.
- Works with Finance and Accounting to ensure HFCS Standards Files are updated and match the current work measurement to maintain operation report accuracy and compliance.
- Conducts audits as needed (e.g., Recycles, Belt Counters, Service Analysis, Volume Reporting, Timecard Accuracy, Operating Plan, On-Time-Network [OTN], Hub Flows, etc.) to identify areas or processes that are out of compliance.
- Monitors operations for adherence to the operating plans and identifies any areas out of compliance for review with the operations management.
- Identifies and records non-compliance exceptions and reviews them with managers to ensure compliance with Corporate, Region, and District policies.
- Works with operations management team to develop action plans and obtain commitments to address all non-compliance exceptions.
- Obtains commitments from impacted management for resolution of action items and conducts follow-up as needed.
- Works with operations management team to implement operational change commitments.

Conducts Operational Forecasting

- Reviews and researches daily and weekly trends (e.g., historical volume, marketing forecasts, recent economic data, etc.), and develops volume projections for planning to forecast future resource needs.
- Develops annual staffing projections by week and by day of week for processes to provide a cost-effective operating plan.
- Provides short-range staffing forecasts to assist managers and Human Resources in developing hiring *plans*.
- Develops quarterly and yearly plans to forecast resource needs to ensure UPS's ability to meet business plan objectives.
- Reviews and updates forecasts as required to maintain validity of forecast projections (i.e., ensure measures are still relevant and conform to accepted IE principles) and adherence to Business Plan goals.
- Assesses the impact of forecasts (long and short range) on business plans to determine when updates are required.
- Assumes project management responsibilities and conducts financial analysis when required to ensure project remains on budget and schedule.

Supervises and Develops Others

- Determines employees' training needs to produce continuous development plans.
- Provides on-going feedback and support to improve performance.
- Conducts performance evaluations in a consistent, fair, and objective manner to encourage continuous performance improvement.
- Holds others accountable to established performance levels to achieve individual and group goals.
- Resolves individual and group performance issues in accordance with UPS's policies and procedures in a timely manner to motivate and foster teamwork.