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# Methods of Prioritizing Knowledge Work in Comparison to Lean Methods

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## Abstract

The Lean method of prioritization (First in, first out) is the most used strategy in manufacturing and studies support its effectiveness. The present study examined strategies of task prioritization in knowledge work and compared them to performance to assess effectiveness. Four methods of prioritization were compared to five aspects of performance. Participants, who were recruited from LinkedIn contacts and through Amazon Mturk completed a survey on SurveyMonkey. There were 76 participants, 52.6% were male and they had an average work experience of 8.9 years. In contrast to manufacturing results, "due soonest" was the most used prioritization strategy. The first in, first out method correlated significantly with quality of work. "Shortest preparation time" correlated with creativity in performance. Future studies could examine specific types of work

## Introduction

The question of why administrative work, or "knowledge work", seems to be stuck in an antiquated version of itself has consistently been raised by many, including Blackburn in 1992 who stated that these administrative processes "...still resemble the factories of the 1950's and 1960's" (p. 99) even though there has been great advancements in manufacturing since the 50's or 60's due to the implementation of Lean Methodology.

Lean methodology examines "all aspects of manufacturing including the phases of designing, producing, managing the supply chain and customer service" (Blackstone, 2013). They focused on boiling down the entire processes in manufacturing to the essentials, what are called value-adding (VA) activities. They had found that a preposterous amount of resources were wasted on non-value-adding (NVA) activities like just sitting in a state of "work in progress (WIP)". Lean sought out to cut waste down on activities like this in the manufacturing line in order to get the maximum efficiency from the process. Studies found that this reduced the time it took to get the finished product out and increased customer satisfaction.

In contrast, administrative processes, or "knowledge work", are still working like the pre-lean factories did. Their set up resembles what is called "batch processing". This is when one person finishes their part of the work and sends it to the next person, this causes pile ups in front of the next person until there is a sufficient amount of work to be completed. This complex system has many places in which a single piece of work is stopped for a long amount of time in a WIP state, you can see this in Figure 1 (each triangle is an inventory where the paperwork is in a WIP state). As you can see there are far more stopping points in this batched system which adds a great deal of time to the entire process. Blackburn (1992) did studies to see how much time, in these white-collar jobs, was spent on VA activities vs NVA activities and he found that a fraction of the time was spent doing the actual work and a majority of the time it took was spent sitting around waiting. For example to get a consumer loan from a bank it only takes about 24 hours, but of that day only 34 minutes are spent on VA activities. Another example from these studies was new life insurance policy, it takes about 72 hours for the entire process, of that 72 hours only about 7 minutes or about 0.16% of the time was spent doing something value-adding.

One way to reduce NVA activities in the workplace it to implement task prioritization strategies. There are five common prioritizing strategies; First-in-first-out, due soonest, shortest processing time (tasks that are quickest are done first), shortest preparation time (tasks that require similar tools or skills are grouped together), and remaining steps after you (tasks requiring the largest number of steps or people, after my input, gets done first). The most common prioritizing strategy in Lean is first-in-first-out possibly because it works well within a system of Lean called Kanban.

Very few studies have been done on prioritizing in knowledge work. The present exploratory study was designed to assess the use of the five prioritizing strategies among knowledge workers and to correlate these strategies with performance measures. A survey was in which the participants answered questions about their job, how they prioritize their workload within a day and how they view their work performance based on self-assessed performance measures.

## Method

### Participants

- 76 Participants; 52.6% Male, 47.4% Female. *M* age=33.7. *M* work experience=8.9 years

### Procedure and Measures

- Participants completed a survey we sent to them on SurveyMonkey. We got participants from LinkedIn contacts and Amazon Mturk.
- There were five prioritizing methods (On a 5 pt. scale, 1=Never - 5=Always/Most of the time):
  - First-in-first-out
  - Due soonest
  - Shortest processing time
  - Shortest preparation time
  - Remaining steps after you
- There were four performance measures (On a 5 pt. scale, 1=Strongly disagree - 5=Strongly agree):
  - Timeliness (getting things done on time)
  - Productivity (getting lots of work done)
  - Quality (how well the work gets done and how satisfied customers are with it)
  - Creativity (finding better solutions for the long run)
- Williams and Anderson's (1991) seven item performance measure, with two items reverse scored
  - The 7 item scale had a Cronbach's alpha=0.74. Item total analysis revealed that eliminating one item would increase reliability, resulting in a 6 item scale with Cronbach's alpha=0.81

## Discussion

- The results show that there is a significant correlation between Lean methods (FIFO) and quality (how well the work is done).
  - This stands along side the hypothesis of Lean methodology which is based on customer service
- Although FIFO is high in quality/customer service it is not the most popular prioritizing strategy
  - Quality/customer service was the most commonly used performance measure.
- The correlation between shortest processing time and creativity seems to make sense. The more time spent in one state of mind doing similar tasks it gives the brain a chance to come up with creative ways to do the work.
- One very interesting result is the correlation between remaining steps and productivity as well as creativity.
  - There was a significant negative correlation between remaining steps and productivity as well as a significant positive relationship between remaining steps and creativity
  - It's possible the participants were confused by the wording of the question, they may have read the Remaining steps description as the individual working within a group of people rather than being a piece of a machine that passes work on to the next piece. This would explain the negative correlation of productivity (the work takes more time because everyone in the group is working on it and trying to agree on things) and the positive correlation with creativity (more minds on a problem or task leads to more creative solutions).

### Strengths

- Untapped area of research
- High completion rate
- Highly significant results

### Limitations

- Lack of adequate previous research
- Some items were skewed
- Some questions unclear
- Self-assessed performance measures were subjective

### Future Direction

- Compare entry level workers to higher management workers (or other levels of workers)
- Use managerial performance reviews rather than self-assessed reviews
- Examine task prioritization strategies of university students with objective performance measure (GPA, Course grades etc.)

## Results

In terms of popularity of prioritizing strategies due date was seen far more frequently than any other ( $M=4.21$ ) this was far beyond the rest of the strategies which were all within about 0.5 of one another, shortest processing time ( $M=2.96$ ), FIFO ( $M=2.89$ ), shortest preparation time ( $M=2.67$ ) and remaining steps ( $M=2.43$ ). In regards to popularity of performance measurements quality/customer service was most common ( $M=4.55$ ), followed by achieving deadlines or timeliness ( $M=3.92$ ), number of tasks completed or productivity ( $M=2.80$ ), and finally creativity ( $M=2.66$ ). Other interesting observations along side the frequencies of prioritizing strategies and performance measurements we found that out of the participants almost all of them (73 out of 75) use more than one strategy one being a dominant strategy and the others at least sometimes. Another interesting finding is that shortest preparation time and due soonest were not correlated with performance.

Figure 1

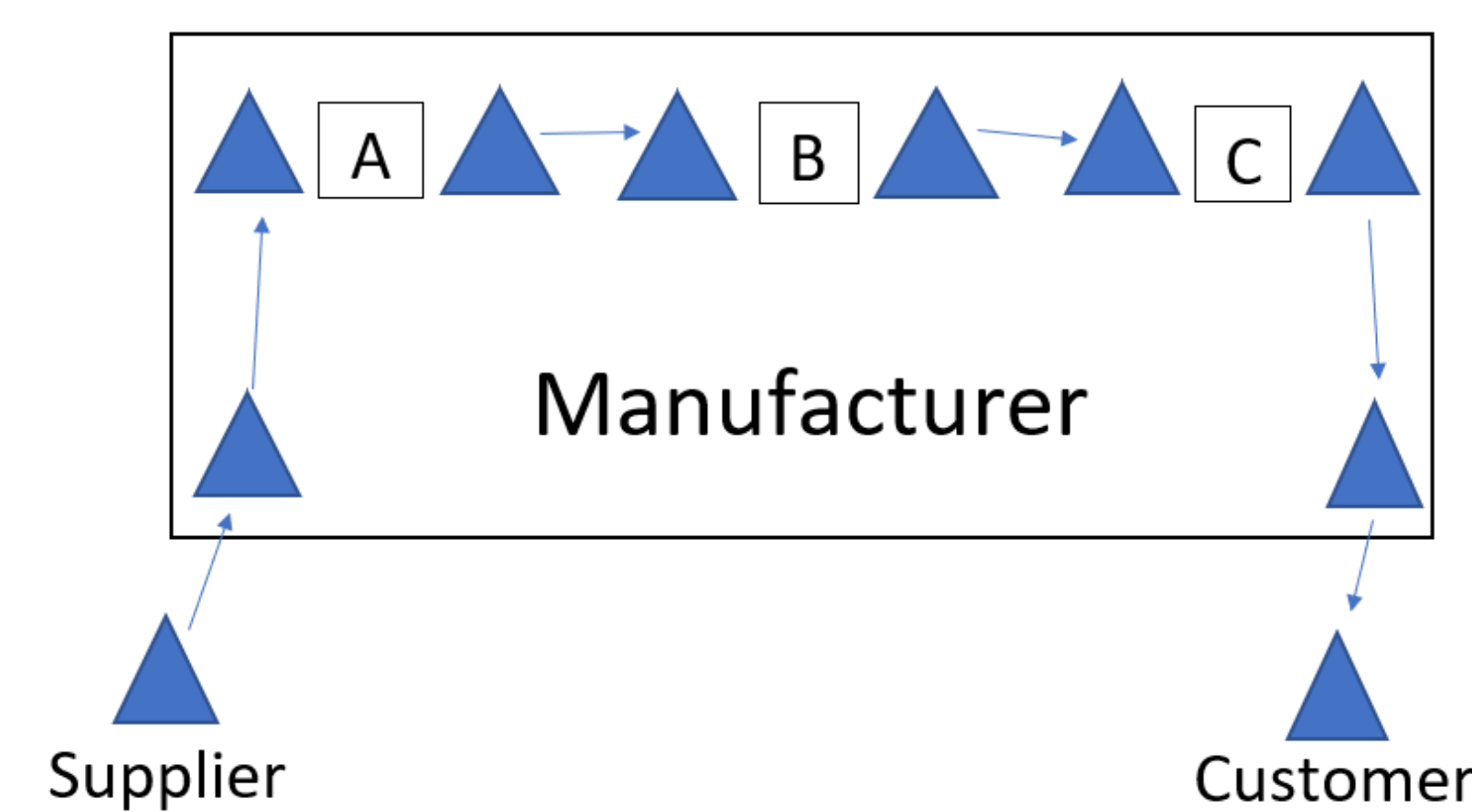


Figure 1 shows how a system based on batch processing works (A, B, C are workers who complete different parts of the work and triangles are piles of inventory to be completed). This system works on a "push system" (pushing work through to next rather than completing it when it's asked for).

Figure 2

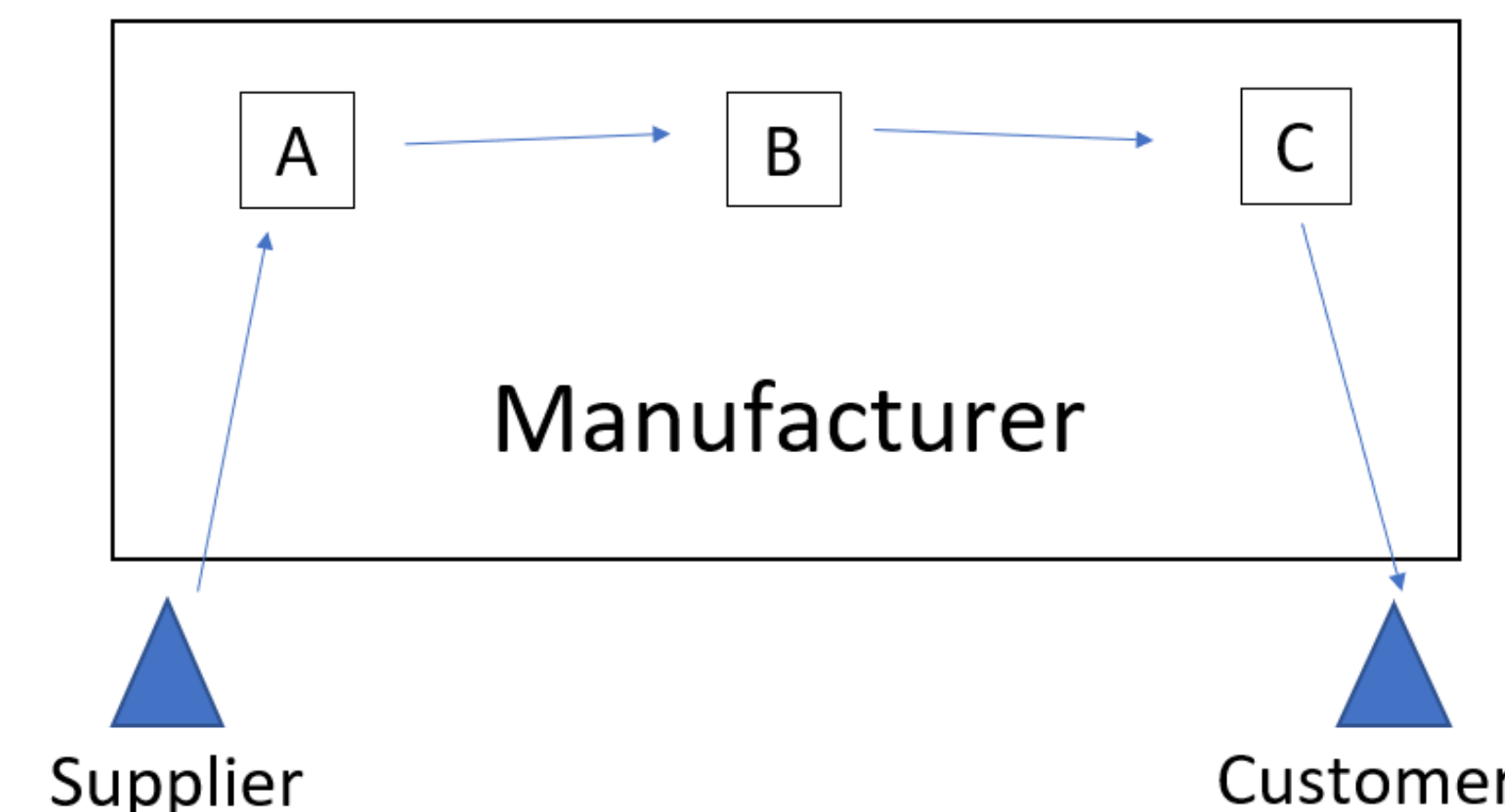


Figure 2 is an example of how lean cleans up the process. It eliminates the batches and bases the work on a system called a "pull system" work is completed when the customer requests it, cleaning up inventory and created a smoother more efficient process.

Table 1

Correlations between task prioritizing strategies and performance measures

	Timeliness (getting things done on time)	Productivity (getting lots of work done)	Quality (how well the work gets done)	Creativity (finding better solutions for the long-run)	Performance scale
Due soonest- pick the next task to start based on how soon it is due, including a manager or corporate or customer requested it, or colleague's "emergency"	.215	.120	.041	.043	.205
Shortest processing time - pick the next task based on how much time is required to finish it, tasks that can be completed quickest are done first	.129	-.032	-.019	.299*	.020
First in-first out- tasks are completed in the order they arrive to me	-.008	-.037	.339**	.020	.130
Remaining steps after you - tasks requiring the largest number of steps or people after my input get done first	-.133	-.244*	-.112	.243*	-.238
Shortest preparation time - tasks that require similar tools or skills are grouped together, like doing all calls at once, then all emails	.059	-.033	-.103	.042	-.110

\*\* p < 0.01. \*p < 0.05. N=74-75

### Significant results

- Shortest Processing time significantly correlated positively with Creativity
- First-in-first-out was significantly positively correlated with quality
- Remaining steps significantly negatively correlated with productivity
- Remaining steps was significantly correlated positively with creativity
- Remaining steps was significantly correlated negatively with the Williams and Anderson scale