The human aspects of Japanese manufacturing management techniques, in

ABSTRACT

Paul S. Adler,

NEW UNITED MOTOR MANUFACTURING, INC.

THE LEARNING BUREAUCRACY
The NUMMI case presents a number of particularly interesting lessons. First, the plant's design and operating philosophy were a very close copy of Toyota's, including its experience with Toyota's system of production, the Toyota Production System, for which Toyota is renowned. Second, workers responded to the intense discipline for which Toyota is renowned. Third, workers were given a challenging assignment of designing and building the plant while learning the system as they went along. The result was a very successful plant operation.

When the Geo plant, then the GM-WA plant, was first opened, the丰田s were among the worst in the world. The productivity and quality were among the worst in the world. And, as a result of the improvements in productivity, quality, and labor relations, the plant has been able to maintain a high level of productivity, quality, and labor relations. When it was opened in 1982, there were over 700 American workers, and only 30% of the workers were among the best in the world.

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In summary, the NUMMI case presents a number of particularly interesting lessons. First, the plant's design and operating philosophy were a very close copy of Toyota's. Third, workers were given a challenging assignment of designing and building the plant while learning the system as they went along. The result was a very successful plant operation.

The human aspects of Japanese manufacturing management techniques are

INTRODUCTION
The process of revising the methods was initiated and standardized at NUMMI. Even though innovations could not be integrated into the standard, the work was made easier in the minute details to be respected down to the second. The work was divided into logical parts, each with its own time to be respected. Several methods were developed in parallel, with the methods in place to improve the quality and efficiency of the work. By integrating these methods, workers were encouraged to continuously refine these methods, fostering innovation and development in another form. The system was designed to be flexible, allowing for incremental changes that could be made without major disruptions.

On the other hand, NUMMI departed from ideas of work teams, considering them as a more thorough implementation of scientific management approaches. NUMMI's system of standardized work, as described by Theodore 1983, Schonberger 1982, Suzuki 1987, involves the process of selecting, describing, and fixing the sequence of tasks. The sequence was described by Frederick Taylor's ideas, each task being analyzed to find the most efficient and standardized methods. In 1987, the NUMMI system was described by Theodore 1983, Schonberger 1982, Suzuki 1987, and the system was adopted by the NUMMI team. The system was designed to improve the efficiency of production, and specifically the significance of the number of product explanations. However, this study focuses on the role of the potentially significant explanation in the most important aspect of the product, allowing the reader to appreciate the simplicity of the most complex explanation.

Many possible explanations of NUMMI's performance have been advanced, including the effectiveness of these explanations and the potential levels of business and personnel management performance. The plan has sustained these exceptional levels of business and personnel management for the more recent years, averaging approximately 6% in the United States, and 2% in Japan's manufacturing. The historical average of 6% and 2% in the United States and Japan, respectively, demonstrates the effectiveness of the NUMMI's explanation of the role of the product and the importance of the product explanation in the Japanese system. The study also focuses on the role of product explanation in the Japanese system, allowing the reader to appreciate the simplicity of the most complex explanation.
the completion of a work force assumed the responsibility for work force procedures or to coordinate
standardization and formalization can design their procedures either to enforce
safety than highly bureaucratic organizations characterized by high levels of
simplification at a local abstraction level. I will examine the proposition to
shifting the level of abstraction up a notch, I will extend this examination to
some of the best industrial performance improvement and work force Second,
whilst suggestions on performance improvement and work force; NUMMI's approach to job
different areas of performance and morale. NUMMI's approach to job
improvement by developing a more decentralized version of job design, a
version which will reflect a more democratic version of job design, a
job design which will suggest that traditional principles of an explanation. First, I
will discuss the importance of several other areas that could help
without changing the importance of several other areas that could help
in the world and its products still drew top quality reviews.

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in the world and its products still drew top quality reviews.
The first source of data is publications by NUMMI management and the

GOAL.

and these managers must be thanked for their willingness to support that

Following my first 1987 plant visit, I proposed to the senior member of the

RESEARCH METHODS

Implications for future research.

Both the psychologists and the political workers. The conclusion sketches some

Discussion section develops the ideas introduced in the preceding

this performance. This leads to a more detailed study of the NUMMI

This study is based primarily on interviews with workers and managers. The

contrasted to NUMMI's exceptional performance and morale.

decentralized theory. Learning bureaucracy, and cooperative culture
disruption of NUMMI, serves as a basis for this combination of

that NUMMI's performance and morale were sustained by the combination of

itself, I argue that to share a common goal of production efficiency and quality, I argue that

are more numerous at NUMMI than at other plants in the United States. I have no evidence that

The Learning Environment
commonly on or must be considered provisional.

required answering new issues to be explored. So this case study and my
have reached "theoretical saturation," since each new follow-up interview
all the different views have been heard. I confess that I cannot even claim to
interviews and the responses they stimulated. But it is not obvious that
As compared with a survey, the reliance on interviews has the advantage
of deep penetration into the people's lives. I use these data more deeply the abundance of
job information at the time of the interviews is given in Table 1.

Jobs held at the time of the interviews is given in Table 1.

These union interviews were also given the opportunity to correct any

already known what we think. We have nothing to hide.

Managements' were interviewed of the

These union interviews were also given the opportunity to correct any

across the street.

unions, management, or the production workers. Two of them, Carlos Romero and Lourdes

misrepresented their community's but no changes were requested in the subsequent

without changes were made by individual interviews where they felt I had

thoughts on the substance of NUMMI.

NUMMI Operations: assessment of NUMMI results since the survey points of

union-management relations: commentaries on the values that seemed to govern

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Discussions with the UAW. A letter of intent was signed between the venture shortly after the initial agreement was reached. The new venture began... of the value of NUMMI's product was American in origin. Some 65% help diffuse the trade issue between the United States and Japan. In 1992, NUMMI was opened... the United States. Toyota sought to establish a manufacturing presence in the United States. Toyota's motives, according to a NUMMI Community Relations Department publication (dated in April, 1993), were to gain using teams. To explain rapidly, Toyota's motives, according to a NUMMI Community Relations Department publication, were to gain... among those who were sympathetic to its Chevrolet division, at a time when GM's market share was about the Toyota production system. GM would also obtain a high-quality about the Toyota production system. GM wanted to learn... of the two partners were complementary. GM wanted to learn... of some key events in NUMMI history is given in Table 2.

A Brief History

NUMMI: An Overview

Table 2. I Interviewees
Table 2: A Timeline of NUMMI

Paul S. Adler
employees were also hired.

In May 1984, the NUMMI plant in Fremont, California, was opened. The plant was designed to produce 200,000 vehicles per year. The agreement was reached with the UAW and the Chrysler Corporation. The plant was to be built in three phases, with the first phase due to be completed in 1985.

In 1985, the plant began to produce vehicles, and by 1987, it was producing 150,000 vehicles per year. The plant was a joint venture between GM and Toyota, and it was designed to produce compact cars for the U.S. market.

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Team leaders selected their teams as teams for newly hired team members. Team leaders selected their teams based on the Toyota quality, leadership principles, and communication skills. Team leaders then selected team members who passed the evaluation.

The first group of 500 team leaders and group leaders attended a three-week leadership program on the Toyota quality principles, such as teamwork, communication, and problem-solving skills. The program included classes on the Toyota quality principles, leadership, and communication skills. The program was designed to prepare team leaders and group leaders for their roles in the plant.

Before starting their new jobs, new hires underwent a four-day orientation program. The program included topics such as quality principles, leadership, and communication skills. The program was designed to prepare new hires for their roles in the plant.

School education, some 30% were Hispanic, 20% black, and 15% female. The average age during the assembly plant was 21. Most hourly employees had a high school education. Since GM-Fremont had not done much hiring in the years preceding, the quality of the new hires was lower compared to other plants.

The composition of the team leaders was diverse. The majority of the team leaders were Hispanic, black, or white. The majority of the team leaders had a high school education. The majority of the team leaders had a high school education. The majority of the team leaders had a high school education.
NUMMI's strategy is summarized in Table 4. In the words of NUMMI's President at the time, Kan Heigash, "Our business strategy is very simple: build cars at the highest quality and lowest possible cost."  

Current employees and 100 salaried employees would require hiring some 650 hourly workers in addition to the 2,500 set up in assembly to produce Toyota trucks for the U.S. market. This would require bringing some 650 hourly workers in addition to the 2,500 set up in assembly to produce Toyota trucks for the U.S. market. This was announced in February 1990, Toyota announced that it would invest a further $350 million to modernize its U.S. production facilities.  

Continuous improvement (ci) teams.  

Team members who have been trained in the Toyota kaizen philosophy are given specific jobs to improve. Toyota's kaizen philosophy emphasizes the importance of teamwork, training, and involvement of all employees.  

Table 4. NUMMI Assembly Process

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<tr>
<th>Inspection</th>
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<tr>
<td>5. Inspection</td>
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<tr>
<td>most of the 2000 parts added as body enters the line</td>
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<tr>
<td>4. Assembly</td>
</tr>
<tr>
<td>then assembly line is 1.3 miles long</td>
</tr>
<tr>
<td>panel available</td>
</tr>
<tr>
<td>panel—9 different colors with 4 combinations of 2-one</td>
</tr>
<tr>
<td>3. Paint Shop</td>
</tr>
<tr>
<td>each body checked for defects in metal or welds</td>
</tr>
<tr>
<td>approximately 3000 welds used to form each body</td>
</tr>
<tr>
<td>2. Body Shop</td>
</tr>
<tr>
<td>various metal parts and panels are welded together</td>
</tr>
<tr>
<td>snap 5 major body panels—hoods, doors, ladders</td>
</tr>
<tr>
<td>20 press between 60 tons and 2600 tons</td>
</tr>
<tr>
<td>total size</td>
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<tr>
<td>1. Stamping Plant</td>
</tr>
</tbody>
</table>
work, seeking voluntary layoffs, and other cost-saving measures.

The company will take affirmative measures before layoffs of any employees. Including the expiration of the collective bargaining agreement of the Union’s no-wage policy, the company has found itself in a similar situation in the past. The company must now face the realization that more employees may be laid off. The Union and the company have agreed to provide support to the workers. The Union has been in place to provide the company and its employees with the benefits and protections that job security is essential to an

New United Auto Workers Union. The Union recognizes that job security is essential to an

The strategy was reflected in NUMMI’s, the labor-management relationship, and the goal is to establish a high quality, high-reward system.

This policy reflects a commitment to what Higashi called the “Team Concept.”

The strategy was reflected in NUMMI, the goal of labor-management relationships, to establish a high-quality, high-reward system.

<table>
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<tr>
<th>NUMMI Strategy</th>
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<tbody>
<tr>
<td>Fundamental Goal</td>
<td>Costs are the most convenient of any manufacturer. To produce products with quality as high as anywhere in the world while assuring that product</td>
</tr>
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</table>
In 1987 and 1988, management's commitment was sorely tested. As explained by Horgan:

In 1987 and 1988, management's commitment was sorely tested. As Horgan explained, workers would see that NUMMI had done all it could to preserve their jobs. However, the workers were still concerned about the future of the plant. The detailed measures the union and management took in general were praised. The idea was to keep the workers' morale up and to maintain a good working relationship. The plant continued to operate on a day-to-day basis with a focus on maintaining a high level of production. Despite these efforts, management saw the no-layoff commitment as a crucial part of their overall strategy.
The suggestion program was a key element of NUMMI’s continuous improvement process. The design of the suggestion program reflected and is everybody’s job.

When production periodic inspections, we want to build a culture where inspection
whenever there is an inspection issue. Although we have many people
a special group. At NUMMI, we report all the parts and try, come off the line.
from what you see in an American plant where unhappy parts are reported by
plant in the world. In which everybody is allowed to do repairs. And if you’ll
department. The plants differ from the report after the spares, they have the only
program in a GM plant. Part of the reason is that NUMMI is the only

NUMMI’s standing operation scrap rate is 0.2 percent versus a typical 3 of 4

described the quality policies in this department thus:

Group leaders in the plant

Forty teams comprised a group, which was led by a group leader who

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Forty teams comprised a group, which was led by a group leader who

between the old-style “bully” man” (multiskilled worker able to fill in for a

Team leaders were noncumulative employees; They played a role somewhere

p. 85).

making and did little to encourage team building (see also Jackson, 1986),

requirements that larger teams were inefficient in promoting participative decision-

Toyota management was philosophically committed to this small team size.

Each team was made up of some 10 to 20 people and a team leader.

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Toyota’s production teams were organized into approximately 30 production teams.

in the GM-Premium contract. The number of skilled trades classifications had

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in the GM-Premium contract. The number of skilled trades classifications had

saving over 5% of 800,000 we would have otherwise spent on outside contracts. We

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Hours worked make the same face regardless of their job. There used to be 80-hour workers.

Childs Explored the overall philosophy of compensation as follows:

The Team Work was raised to 60 cents in 1991. Leaving Team Members who were raised to 75% of a Team Leader earned 80 cents an hour.

18 months of the 1991 contract expired with 24 month and lowered the
for the lunch break. There was a 30-hour production period, beyond which the
and with premiums. The 1991 contract brought this up to $1.75 an hour. This

Comprehension at NUMMI followed the national law contract. Under the

Examples of employee involvement in compensation at NUMMI:

Let me give you a couple of examples of employee involvement in NUMMI—

post-recognition whenever possible. It creates an environment for continued

Suggestions are rewarded at about $1.00 per point, and if you saved

We want to encourage quantity, the number of suggestions, rather than just

NUMMI's suggestion program has monetary rewards, but they're mainly small.

The Learning-Bureaucracy
Hishinoned described Toyota's consensus decision process (through-the-plant) and the difficulty of implementing it at NUMMI in these terms:

"Consistency and communication.
Consensus, structure, and policies were built up by us, by the culture.

NUMMI's structure, structure, and policies were built up by the culture.

There was a consensus culture where everyone was willing to work together.

Toyota's system is that to apply it properly you need to have it in place at the plant.

You lose out.

To help them solve their absenteeism problems, but after these more consistent workers are given consensus after the same rate and understanding in an attempt to convince people of the importance of the process, they find that the number of meetings within the 90-day period is reduced. In other words, after these consistent within the 90-day period, we submit a report, and

A GM-Fordon they argued all the time over whether worker absences were

absenteeism penalties were harsher. Chrysler explained the policy:

dispensed publicly for all, including managers. As compared to GM,

Attendance is an important policy issue at NUMMI, at least in part because

We found that salary equity is even more important in keeping the"
We have monthly department meetings of all team members. Typically, I describe the company's communication efforts in the department.

Communication was a high outstanding feature of NMMI culture. Bottom line, it's easy to slip into the mentality of just do it—ive get a production.

Logan described the challenges created by this communication to consistency:

For good, that's what I call results.

One of the challenges as cases known were impressed:

Supports of the people's causes such as cases known were impressed.

This dedication to consistency was not lost on NMMI workers. Even consistency in employee relations was a key feature of the NMMI culture.

Logan described his own reactions to the right-thing system in these terms:

As a human resources executive, we used to agree on a lot of things, and it took a long time for them to implement your decision. The other department will be more cooperative. But implementing your decision, the other department will be more cooperative. But implement your decision, the other department will be more cooperative. But implementing your decision, the other department will be more cooperative. But implementing your decision, the other department will be more cooperative. But implementing your decision, the other department will be more cooperative. But implementing your decision, the other department will be more cooperate.
Table 5: NUMMI Productivity Comparisons

From the NUMMI plant, (Krechick, 1989) found that productivity at the NUMMI plant was significantly higher than at the GM-FFT plant. The key findings were that the NUMMI plant had a higher labor productivity, both measured and uncorrected. The productivity of the NUMMI plant has been extensively analyzed by various researchers.

Plant Performance

We then see some data on numeric control machine performance, with the following significant findings:

- The quality control audit was reported to be 99.5% effective (and less than 1% and 0.2% for the various categories).
- The people on the assembly line are very satisfied with the quality of the product.
The NUMMI is that we have a minimal problem with subsurface abuse. You
but then again, Toyoda's rice is 100% another fairly impressive thing.
program. We got about a 50% participation rate—which is just phenomenal.
measure of how well NUMMI is doing is participation in the suggestion:

Hope also cited the suggestion rate and the low frequency of subsurface abuses:

The change from the NUMMI plant conditions has been enormous. Abatement

Workers' responses have been largely positive. Hughes

Trends from technical to human outcomes, various indices suggest that

Productivity:

that this performance level was not due exclusively to the products,
overall performance had reached a level so close to Toyota's suggestions
in the original design. The fact that NUMMI's high level of productivity
was already known to us—after Toyota was renowned for its ability to assure
most of the productivity problems in the original design may have had
culture. Not only was the design already in production—which mean that

These comparisons with the Takahama plant are particularly useful because

U.S. workers:

The inventory level was still above the two hour level prevailing in Takahama,
weeks of parts. NUMMI parts inventory was reduced two days,
reactions, including NUMMI's, were all descriptive--that the GM reading, for example, was much higher than at GM-Fremont, but still far from the Takahama level. This

Finally, space utilization at NUMMI showed a modest improvement over

with these results:

ies (CAMIP), that

1984-86. Kretz also cites internal GM quality data on end-of-line
we would in Takahama. Also, we are including the blue bands during idling,
index was much higher than at GM-Fremont or Fremont. In addition, almost
Second, the quality of the vehicle as the result of the Consumer Report
reliability.

Cqmpared to deal with the pressure of assembly line work,
some 10 years older than Takahama's, and younger workers are in general better
improvement is all the more meaningful. NUMMI was almost as productive as its sister plant in Takahama and more

somewhat comparable in product and technology mix to NUMMI. By 1986,
Propositions on the view that NUMMI's success is at least partly due to
experienced pay or an academic appreciation 40%

and that of 1983, and the displaced workers who did find jobs in other industries
that 40% of the displaced GM-Fremont workers were still unemployed at the
drawn from the California Employment Development Department
including the California Employment Development Department
and the California Employment Development Department.
are the central factors that caused NUMMI's performance. One might argue that NUMMI's success resulted from
nummi's performance. There are, then, some contextual factors that probably contributed to
other factors that probably also contributed to NUMMI's performance.

There's some contextual factors, so a further discussion of the production system, we should at least review some of the
not attempt to formulate a comprehensive explanation. Indeed, it will focus
in the production system. The study will
in sum, NUMMI's performance was remarkable in both business and human

EXPLAINING NUMMI PERFORMANCE

80% to over 90%

satisfied or very satisfied with work at NUMMI, and increased from around

saying showed that the overall proportion of people describing themselves
in the United States (a) to 145 in 1991 (b) for Asian households, and
in an industry average of 140 with an average of 149 for all cars sold in
vehicles in 1989 (compared to an industry average of 152 for all cars sold in
experienced by customers within 30 days of purchase. Shipped from 117 per 100

More recent data indicates that these extraordinary technical and human

could not have brought literally anything to the old Fremont plant, and substance

Paul S. Adler
discussion of NUMMI's early history highlights several powerful socialization processes that played a critical role in how NUMMI's design and management influenced employees. Workers who did not fit into the management's ideal role were often marginalized and their contributions devalued. This process reinforced the dominant culture and the management's vision for NUMMI as a successful model.

If these days of screening less than fellow employees so few applicants, what function on average greater success in finding reasonable alternatives?

An alternative approach is the way that NUMMI's non-unionized workers adapted and thrived in the challenging environment. These workers were not as tightly controlled by the management's policies and procedures. They had more autonomy and were able to make decisions based on their own experiences and needs. This led to a culture that was more flexible and adaptable, allowing NUMMI to maintain a high level of performance.

Barzini's Committee Chairman George Naka, however, presented a different perspective on how NUMMI's non-unionized workers were able to succeed. He argued that the success of NUMMI was not due to the management's policies but rather to the workers' ability to adapt and find creative solutions to problems. He emphasized the importance of flexibility and adaptation in the success of NUMMI.
President, they said, it was the first time they had experienced such a thing since they had started working at the plant. They were shocked by the sudden change in their working conditions and the reduction in their wages. The union leaders were also surprised by the decision of the management to impose a 3% wage cut and a reduction in their hours of work. They were determined to fight back and protect their members.

A few days later, the company management announced that it would also reduce the wages of the non-union workers. The union leaders were now faced with the task of organizing a similar campaign among the non-union workers.

The company management had been able to reduce the wages of the workers by imposing a 3% cut in their pay. This had been done by using the collective bargaining process, and the workers had not been able to resist it. The union leaders were now determined to prevent the company from imposing similar reductions on the remaining workers.

The union leaders were also determined to ensure that the workers would not be exploited by the company. They were determined to protect the interests of the workers and to ensure that they would not be subjected to any unfair treatment. They were determined to fight for the rights of the workers and to ensure that they would be protected from any form of discrimination.

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The notion on what NUMMI calls its "production system." This notion is the production management component. The focus of the next section is to analyze the role played by management methods. Because Japan is different, our philosophy has been shaped by the experiences of Japanese management systems. We will devote more attention to the design and implementation of these systems. The specific contributions of various components of this management system are highlighted in the following sections.

This section that focused on the conceptual and environmental set-up. The section is about making you feel important (Jacoobson, 1986, p. 52).

To quote a worker: "The interesting thing about this place is that they never told me that in other plants they used to be called by their numbers."

The development management system in Pillsbury's words:

"If given the opportunity to see how workers interact and performance could be improved. The concept of "smart work" conditions clearly contributed to NUMMI's performance. It is difficult to see how workers interact and performance could be improved.

When we went to Japan, we found that a lot of people worked in the areas of this socialization:

- The trip to Japan by the first group of employees seemed to have played a powerful role in shaping workers' expectations. Still, press releases a darker side:

- Department manager left to Japan together (p. 62)."
in establishing the letter of intent. The definition was echoed by Joel Smil, the West Coast NAVMWA
undulations and respects.

maintenance, quality control—a system that everyone on that shop-floor
defined and disciplined way standardized work. Just-as-kneels-inventory, preventive
deliberate at NAVMWA, we’ve got a comprehensive system that isn’t together in a

The crazy thing is that for so many years, GM had no real production system—

U.S. manufacturing plants. According to Noma:
The idea of a production system is itself something of a novelty in many

unfavorable views.

workers’ overall evaluation and the relative frequency of favorable and
expressed in the interviews. I gauge with the following section the achievement of
expressed in the interviews. I gauge with the following section the achievement of

After outlining the concept of a production system, each constituent element
raises novel anxiety about the question of the system.

This section gives disproportionate attention to NUMMI’s standardized
obscures such as Monden (1963), Schoenberger (1967), and Izumi. (1961).

NUMMI, and their influence is supported by the mere generalization of
this system was the foundation of the superior performance achieved by

This section describes both NUMMI’s production system and workers

THE NUMMI PRODUCTION SYSTEM

Organization

Technical systems can be designed to complement the other facets of the
the other components’ joint planning and shaping on them. NUMMI
As the next section will show, this technical system was tightly linked to
valued outcomes.

combination of machinery, equipment, and methods used to produce some
corresponds to the organization theory refers to as the “technical system”
P AUL S. ADLER
The implications for workers were considerable. Such a Just-In-Time system saves us inventory carrying costs. Less inventory also improves quality.

Hogan explained the benefits of lower inventory in these terms:

(Shook and Brother, 1982)

A system in which problems at any point in the process trigger a complete halt in a way to buffer 'leaks' from inefficient variances, towards a highly-coordinated management method, away from the reliance on work-in-process inventory.

Behind this non-inventory sporting innovation lies a fundamental shift in management—sound inventory was allowed to build up.

Kanban stopped production because no inventory was allowed to build up—inventory was non-existent, it didn't exist. When no kanban existed, the production department could not be replaced because no kanban existed. Kanban—would be passed to the production department whenever a critical level of kanban—would be passed to the production department whenever a critical level of kanban was reached. This Kanban—which is used to control the production department whenever a critical level of kanban was reached. This Kanban—which is used to control the production department whenever a critical level of kanban was reached—never existed. It never existed.

The idea of a "production system", then, implies (a) a "Kanban"-based production system, a production system. The

The Toyota Production System is an integrated set of concepts. The Japanese

There's a good chance none of it will have much impact.

I think a lot of people who wish for better about Numinich think one particular aspect and think that they've got the key. But unless you get the whole package, you'll never get the whole package. And it goes right down to the details. I think there's a lot of details that I believe that make up the whole and building a quality product will come from believing those details.
highlight the difficulty:

that is created increase pressure whenever there is the slightest hiccup. Bob Stuva

never planned this system right.

during training for Kanban, they told us that we'd never run out of parts at one.

inventory management: K

Causes were critical of NUMMI's ability to implement this method of

situations. But we run out of parts about two or three times a week. They have


Table 6. The NUMMI Production System

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<td>Standardized work</td>
<td>Team concept</td>
<td>Visual control</td>
<td>Kizerian</td>
<td>Production leveling</td>
<td>Kanban</td>
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<td>Techniques</td>
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<tr>
<td>Full utilization of worker capabilities</td>
<td>Quality assurance (check)</td>
<td>Just-in-Time production</td>
<td>Throughput removal of waste</td>
<td></td>
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<tr>
<td>Concepts</td>
<td></td>
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<tr>
<td>Respect, mutual trust, and support of team members</td>
<td>Workers able to change quickly</td>
<td>Assure product quality</td>
<td>Reduce costs by eliminating waste</td>
<td></td>
<td></td>
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<tr>
<td>Objectives</td>
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</tbody>
</table>
Process. Our people took the time to redesign the process so we didn't have to
collide because they're usually way off and tough to run through the system.
all similar operations into every first and last few seconds from the first
We have a really intense focus on improving the little things. Take an example:

Bottom Explain the Kaizen policy in these terms:

Kaizen

Temporarily undermined.

Temporarily ignored by reducing the risk that part of the workforce would be
Second, production leveling minimized the risk of
management system, any changes create a lot of stress as workers struggle
and production system, as SMT explained, in a just-in-time inventory
advantages, first, it reduced the stress associated with schedule changes in a
From the workers' point of view, this production leveling had two important

(standardized work) and continuous improvement (kaizen)

Foundation for just-in-time inventory (kanban), the detailed analysis of tasks
challenges had been met, a better line could be set, and this would provide the
challenges in particular by the reduction of setup times. But once these
product mix. In particular, by the reduction of setup times. But once these
assembly line to be made sufficiently flexible to handle variations in the
Assembly line to be made with the manufacturing organization. Second, the
There were two challenges in leveling the production schedule. First,
and improvement efforts would be stifled.

Inevitably, high inventory levels would be higher, quality couldn't be assured,

The logic of the NUMMI approach was that changing production levels meant

everything but never touch the line speed.

The line speed, in the U.S., and industry-level, is to schedule change and eliminate
we schedule the schedule over several months, and make changes in lineup to
supervising overtime and achieving on-time delivery of parts. A low and NUMMI
and 80 seconds a car—get more of less than 100 parts by any line, and
So what they do is fix the line speed—and then adjust between about 50 seconds
An assembly line runs faster, more, and faster, but we don't know ahead of time.

Production leveling:

As stable as possible a production schedule, quoting Bottom:

The second facet of NUMMI's production system was the effort to assure

The Learning bureaucracy
To change old habits.

The social problems associated with Kaizen:

The challenges were not exclusively technical ones. Huttlinger explained:

Some great improvement ideas.

So was this—this has been a damn good year, and they're coming up with no one and over half a billion. He was so proud of what he'd done—

now they're putting together people teams, and they're coming up with no one and over half a billion. He was so proud of what he'd done—

In addition, we've had some dramatic Kaizen effects. We've got a team working

on efficiency and competitiveness.

They know more than any manager or industrial engineer about how to improve operations. They are notopardizing anyone's job. And that's fundamental, since

In most other plants, I've worked in, the issue is not conformity with employees

force. Bottom again.

Kaizen created important challenges for both management and the work

force. Bottom again.

Kohagen explained the link between Kaizen and the no-layoff policy:

A small factory—those could save us half a million dollars a year.

In fact, we've got two teams working right now on reducing the sheet size and

waste those pieces. We also got some really great projects as well. For

Paul S. Adler
between union and management, will be addressed in the next section. Under the Lean concept at NUMMI, workers were organized in small

**Team Concept**

Policy clearly requires a very high degree of management discipline. There have been complaints, but the effective implementation of the visual control system has revealed that the problems mentioned by Stiva appeared to

The cord pulling routine is the different bunch of bouncy to hit the plant since

**Commitment**

The commitment to quality implied by this willingness to sacrifice and enough of pull-cords and the number of pull-cords and the progress by the gradual reduction over time. And we can measure our quality problem by the gradual reduction over time. And we can only improve the quality of the teams and the teams they pull-cords do not actually show the teams, because they operate in a committed system, between lean members, lean teams and other parts of the teams. So we have to improve the teams that improve the quality of the pull-cords. That means another key step, they pull the cord again to ensure production. When we are not satisfied with our problems, the Lean concept can be solved if a problem, the Lean concept can be solved if a problem. That will stop the line unless the cord is pulled again before the next pull. Workers are supposed to pull the cord every time they see a quality problem. As expressed by Count and they encountered a quality problem, this ensures that it received top priority. When signaled quality problems on the line, workers pulled a “red flag” cord when signaled quality problems on the line. Workers pulled a “red flag” cord when signaled quality problems on the line. Workers pulled a “red flag” cord when signaled quality problems on the line.
methodology in these terms:

Botton summarized the nature of NUMMI's standardized work

Standardized Work

discussed in the next section. These were concerns about the implementation of the production team

concept, focused on variation in selecting Team Leaders. These will be

people get hurt with strained backs and so on.

not gone to be in this job all day, I won't say anything. When you do that,

jobs by showing people through their, hoping that workers will say, "Since I'm

not there on the line, and management likes to get around hearing in what these

I like the principle of job rotation. But there are some really exhausting jobs

way the rotation principle was implemented.

are put under production pressure. He had a second, distinct criticism of the

downside of this form of organization—the excess pressure that results when teams

In the earlier discussion of Kanban, Shiva was quoted on an important

job all day.

members, so they can't rotate. But that leaves a lot of us doing the same thing,

job, and there's, because we simply don't have the line to teach the other team

part of because left-handed worker needs the tools on the other side of the

positions and not rotate. It might be because someone can't sit a heater.

Every job in this plant is supposed to be rotated. In reality, nearly half the

Huntzinger:

In practice, the rotation was not as systematic as planned. As described by

at a time on the particularly difficult job.

by rotating faster so that at least the worker isn't killing himself for a whole day

job because they're older or their hands aren't big enough, the team helps out

eliminated those easy jobs by rotation, and if someone has a harder time on one

job down because you get older. But it led to a lot of backstopping. Now we've

everyone else in the traditional plant, older workers with more seniority wouldn't

Rotating jobs mean that everyone in the team is contributing as much as

based system. Workers in each team were cross-trained on each other's tasks and rotated

Paul S. Adler
The basic idea is that reduced variability and standardized work is simply the process that workers use to reduce variability in each phase. Every step is planned and thought out so that each position.

In this way.

This description should be added a summary of how standardized work.

Sometimes.

The learning bureaucracy.

...
With standardized work, the team tries to solve its own problems, and if we can't

Holloman highlighted the reliance of the standardized work methodology on

Holloman highlighted the reliance of the standardized work methodology on

The traditional IL designs individual jobs, and the struggle is between the IL

Boron highlighted the interdependence of standardized work and the

When you go to standardized work, you've got a clear base on which you

Standardized work also means that each worker in the team can refer to a

Paul S. Adler
Smith put this contrast in a broader perspective:

I don’t think it’s a dump. They’re just ignorant. Anyone can watch someone else do it and come up with improvement suggestions that sound good. I can see it from the workers’ point of view. They could never have imagined the kind of things that have been cut out of the jobs. Even when we do our own analyses in our teams, sometimes the things that seem like big improvements are just the results of doing a job and coming up with improvement suggestions that sound good.

Leaders in the body shop argued this way:

The workers’ view of this contrast was instructive. Red Hoffman, a team leader in the body shop, argued this way:

The contrast with traditional industrial engineering methods never had really good results. Industrial engineers aren’t close enough to the workers to know what is being done at the job. Instead, they have to make the job harder than it is, especially if it is watched.

The key is Industrial Engineering’s role in shaping the difference in these terms:

Evolution at GM was dramatic, but now characterized the difference in these:

The contrast with traditional job design practice, the provision the industrial engineer, which is the way they get results, industrial engineers aren’t close enough to the workers to know what is.
or to other groups that have agreed to take the work.

Leaders communicate needs and agree on a common process. And group leaders produce work through the entire process. The team involved is in our system. Across that, the team builds relationships. That short-circuits any attempts to protect the job or show less responsibility. With the team, we realize a clearer understanding between different teams. Within the team, we realize a clearer understanding of the operation, the whole thing so is more effective and relied upon. People need to work to be more effective and rely upon what they learn. Then, we need to work to be more effective and rely upon what people need to learn.

These lessons:

Childs identified the key challenges in implementing standardized work in the line. He found that workers often had to make decisions on the floor that were not consistent with the standardized work. This led to inefficiencies and errors in the production process. The solution was to implement standardized work and ensure that all workers followed the same procedures. This helped to increase efficiency and reduce errors. However, implementation can be challenging, and it is important to consider the different aspects of the work before implementing any changes.

Another key lesson was that most changes are not revolutionary, and it is important to consider how to implement changes in a way that is practical and effective. This means that changes should be implemented in small steps, rather than all at once. This helps to minimize disruption and ensure that all workers are able to adapt to the new procedures.

The lessons learned can be applied to any type of work that involves standardization. By considering the different aspects of the work and implementing changes in a practical and effective manner, it is possible to improve efficiency and reduce errors.
The standardized work process elicited mainly positive responses from workers, but some noted one issue: Starting with the positive ones first:

Single lunch Reinforce this "togetherness" idea.

Machine management's point of view was expressed by Company A's Coomi in these terms:

Management's point of view was expressed by Company A's Coomi in these terms:
Our assumption at NUMMI is that people come to work to do a decent day's work.

Porton's view of this issue formed an instructive contrast:

In our standardized work training, our teachers told us we should approach work well to the heart of the system:

Unlike his critique of some other aspects of the production system, where management has to share power and cooperate with us, management gives workers the right to do their own jobs and that means that the control over management over the production standards. Standardized work, shared experience, and a well-trained support system is all that it takes to get those ideas. The workers are the experts here for their physical labor. It is the manager's job to listen then translate those ideas into how to set standard work practices. Before workers never got to make any input into how we do things. Now, our ideas are considered when management sets new stand-ards.

Before you finish your job, you take it to the end of the day and feel a hell of a lost.

Work really has a hard time to build a stock of their own, so we could take a break for stock. We'd work really fast to build a stock to get back into the system. The whole plant made work really tight. There was a kind of hurry, and finished parts and smoke a genie of work that a hurry. There kind of hurry.

We'd work really fast to build a stock position so we could take a break for stock.

The standardized work and the kaizen suggestions. We run the plant—and it's us, the workers, that are making the whole thing work—wef're the ones that make it work!
One at NUMMI wanted to go back to the GM-Fremont days. Whenever their
Lived Experience

NUMMI: The first and overwhelming fact to emerge from the interviews was that

Evaluations of NUMMI Workers Overall

One of my biggest problems with standardized work is that they don't include the tasks

Hinzenberg: The concept of analyzing the job and working out the best way

job. But this is the U.S. and people here have different values here.

Implementation: Stiva and Hinzenberg also had criticisms of what they saw as flawed
I wash you could talk to the guys, views about the changes they've seen. I was

Madrid assessed the impact on workers lives outside the work context.

now and a little more feeling of self-worth.

The factory. I'm not having the time dump. People have a little more pride

and getting the job done. I'm finding the people who have a sense of pride in

The workplace. I think everyone is very proud to work at NUMMI. You really see

that pride in the way they do the job. And so I've got a strong sense that, when you

have a proud, motivated workforce, you have a proud, motivated workforce.

Holman emphasized workers pride:

Community, I have respect for the union. There's no question that they can't respect the union, as a union and the

management individually. It's clear. There's no question that the workers respect the

union, that the union brings the workers together. It's clear. The workers are proud of the

workers can be proud of their job. If they're building it in a way that can be proud of,

there's a chance to build that self-respect because they're building a

product. That's what self-respect is. It's more demanding of people. And NUMMI

is, it's a job where people know that it matters when they lose their jobs.

One of the biggest effects of the change from the Fremont to the NUMMI system

is a dramatic improvement in worker satisfaction. NUMMI workers

are more satisfied with the work environment.

Those who have been interviewed tell me that NUMMI was a far

superior work environment,


tell that NUMMI was a far

better place to work. NUMMI workers are generally more satisfied with the work environment.

The dominance of NUMMI's positive reputation is reflected in the

high percentage of employees who report feeling satisfied with their jobs.

Some workers may be of the opinion that NUMMI was a far better place to work, NUMMI workers have a far

superior work environment.
The Learning Environment

He contacted his own experience at NUMMI and GM-Plymouth.

The time running department for 5 years of mind-numbing repetition. It was exciting to be conscious looking at new problems. At GM, they told me in the 1989 Nova model project team. All the homework and extra work is rough, but at NUMMI, I am consistently learning new things. Right now, I am part of the

And sometimes we did.

Somebody had driven a fork lift through a wall just to break the monotony.

When I was with GM I helped manage and everything about the plant, work

learned in her job here.

The difference is

These indices of a probably positive response should not lead us to ignore

The research indicates that even when workers were unequivocal in their preference

numbing repetitions. It was great to hear her and see how much she had

decided to pull the pan tongs in a cup and the way I pull and put her kitchen—the go for the chimney and worked on the stove. And she decided

the dishes and do the shopping and stuff. My job here is to care, and I spend

Two years.

hours in one week. A car can hold 40 NUMMI. I've had perfect attendance for

years ago go on with my career for coming to work for a full 40

Something happened here at NUMMI. When I was a GM, I remember a few

They can tell him to his face, and the boss, first words will be: "Whip"

problem with their managers, they don't have to tell him on the bathroom wall.

into a list of the bathrooms, and you'll see there's no guilt. If people have a

have all the washing and cleaning. You can't focus on that. And if this: go

you would still have the same problems we had before. You would still

doing the highest quality vehicle. You wouldn't have a part that's still

be building the highest quality vehicle. You wouldn't have a part that's this

There are people here that will tell you they have this place. All I say is: actions

statement:

Maddie argue that workers' attitudes cannot be assessed only by their

Defending

like the monotony department for 8 years of mind-numbing repetition. It was

is excruciating to be conscious looking at new problems. At GM, they told me in the 1989 Nova model project team. All the homework and extra work is rough, but at NUMMI, I am constantly learning new things. Right now, I am part of the

And sometimes we did.

Somebody had driven a fork lift through a wall just to break the monotony.

When I was with GM I helped manage and everything about the plant, work

learned in her job here.

The difference is

These indices of a probably positive response should not lead us to ignore
Trust and Respect

Of course, it's important that the entire management not be a union boss. Why do you think that's the case? The union always looks to the company to do what's best for the workers and unions. Now, if you can build a team effort like that, you end up with people and unions...

Management was looking for employees who could do three things:

- Go the extra mile; we need some people; so get some 100 bodies...
- Don't care what they look like or what their qualifications are—you lose these...
- Kick ass and take names. The dumb bastards don't know what they're doing...

Management would respond in kind:

and what'll put me farther up on the sanctity list?

We have to sit down and drink coffee. They may even have to hire another guy who's shown that he is a monkey wrench into the whole thing so the

management will...

Don't show that guy next door how to do your job—management will...

In the old days, we fought for job security in various ways:

condoiced worker motivation:

Smith described how management's respect and trust or lack of it.

Working here:

Working with you on how to implement it. So people actually feel good about

the idea down as soon as you left the room. You knew that idea was heard.

idea but... This is what we like to see... We're going to do it. We're going to make these managers... This is..." It's a good

managers will always get back to you when it's a good idea." We respect workers ideas. NUMMI's managers are generally pretty good at considering

This trust and respect was evidenced in several ways. First, by management's

One of the key positive features of NUMMI from the workers' point of view

Paul S. Adler
Promotions and Special Assignments:

One of the most valued of workers' criticisms concerned promotion in selecting this type and respect had to be paid. However, the interview suggested that

Promotion

Automation simply to help the worker.

A job would not happen, if it were not for the worker. The worker knew that they would help the worker, because it was always a help of a living job. It took time to make that they would. But they don't and so the worker ends up being used.

One thing I really like about Automation's take on things is that they help me. I really like the people and the machine. They help me by

Niveau 1 was the example of Automation's and management's new attitude was the more credible because it led to

management doesn't have to do any work. Approach of

Employee will help them get there— and a commitment to that path.

Employment will help them get there. They have a clear idea of how stable are also committed to financial abilities, but they have a clear idea of how stable. This employee was helpful to be very adventurous. This employee was helpful to be very adventurous.

A company's product and provide stable employment. The US company would care was held on Friday of May and how it is filling. A company, of course, we did not need to hear any crap about how involved in the process. Four that we are trained employees who are knowledgeable about the job. They are knowledgeable about the job. They are knowledgeable about the job. They are knowledgeable about the job.

Smalls: The laws always demand...
...
A lot of workers expect us to do our best as a group when they first hear about the shift to team work. Workers who worked together in a formal, hierarchical process are likely to resist change. 

Holman made a guess on the first day to make suggestions.

Holding a role to stay with a team is a great idea to make suggestions.

They have no time to listen to their suggestions. The Team Leader is often too busy just doing his job. I got a call from a friend who had just heard about the shift to team work. It was not a major change, but it still caused stress.

When we first started up, people were pretty positive about the team concept.
I know there's no one out there to replace me if I'm feeling sick or hung-over.

When you start working as a real team, you're not just work acquaintances any

Moreover, the fact that workers feel respected by their peers, however, points out that a team work can play a role different

NPMI's strict rules on absenteeism have been cited by critics as a key element

of management by stress, "Park and Siugster (1989) argue that the most

The initial survey cited above did not show excessive pressure on stress

Just like when did we have to say what we are doing to the manager makes

The more we treat the person like a human being, the better. So we could

I'm not saying that the company is treating its workers with a standardized schedule.

I'll have to pay for doing it. Management makes
larger goal of giving workers more of a say in the important decisions that affect us. Like that, for good reason I wonder if the new system is simply an improvement on our current, often one-sided, decision-making process. How will we be able to make decisions on things like promotion and team leader selection? How will the newer system's manufacturing make decisions just like before. But don't let that discourage you from making all the decisions just like before. We did that here, and we did that there, and it would be well to do both.

**Name:** Under the old way, management would make their decisions, and it we...
There's an opening.

We can use our seniority to switch from regular shifts to day shifts. Management will have to accept this if they want or don't want to change shifts when they lose the right to do so. But management isn't following the contract. They told us that we'd lose our seniority if we didn't accept the change.

Our response: How can our leaders refuse to support workers and fight for us when they're working so closely with management? There's a real conflict of interest here.

There's a way for management to play their game. There's no win-win in this. But now they want to make seniority just one factor among many. There's just a way for management to make their case.

We don't have any country's influence. We've agreed to do things we're not used to doing. But it was only informed, and we don't believe the union's decision. We agree that the strikes have ended. But the strikes have been a year ago says you have five days' sick leave a year. The contract doesn't say anything about that. The union just does not protect us from management. The union must be a buffer between the workers and management for the workers and fight for us when they're working so closely with management.

There's an opening.

Opposition was expressed in varying ways:

There's a financial base for the union.

The contract is to learn and develop. And the majority of our people do see this as the challenge. Participate more in the company operations in the union. It's challenging kind of learn concept because it's giving one on-the-job-the mean to and my interests tell me another part of the new approach well some alternatives—we have to try a new approach. Part of the new approach will have the concept of a collaborative. It would be to put the concept of a collaborative. It would be to put the concept of a collaborative.
against the positive and negative assessments were more nuanced ones such

As that expressed by S:

care is not within our body."
Management is ever trying to force us to take unpaid vacations because the
seniority.

Privilege some get preferential treatment in promotions and they ignore

The Learning Bureaucracy
Paul S. Adler
Moreover, as Smith explained, the resources required of the local to develop and sustain a new posture are not merely discursive.

I'm not difficult to sympathize with the local leaders confronted with the need to improve a new vision, a new language, and a new discourse to deal with such a radically novel situation. Such improvisation is the mark of an International, not a Local. What Smith explained, no help came from this quarter.

International, not a Local? But as Smith explained, no help came from this with such a radically novel situation. Such improvisation is the mark of an need to improve a new vision, a new language, and a new discourse to deal with some problem on the same scale.

The ability of Local to manage such a radical change in perspective is perhaps the reason that the LAF International is outmoded and outdated, and that the SM-FPion of the International is so unappealing and unattractive.

Our Caana still thinks that not having supplemental pay was a bad deal to cut.

Siava saw the issue differently:

Supplemental pay for those workers.

us, and in the center there were layoffs, we would demand some type of
before they laid anyone off, and they had to make sure that the numbers with
offs in UNWM. Management would do this to take more affirmative measures
of supplemental pay. That commitment means that if there were layoffs to be lay-
with supplemental pay. That commitment means that if there were layoffs to be lay-
Supplemental pay, for which we got up to 95% of their regular pay and they wanted
Supplemental pay, for which we got up to 95% of their regular pay and they wanted
workers to be the first ones laid off instead of the last ones. Then, you go to a
and continued their layoffs and regular cycles just like before. Then you go to a
incentive not to lay people off, but the whole phrase turned around. First,
standards of local workers, and it would also give the local company in
The supplemental pay scheme was set back 20 years ago to maintain the kind
While these findings must be considered provisional, it is useful to consider

Proposition 3. The extent that workers endorsed standardization work

of their work environment

is characterized as seen not as a variation but as a motivating feature.

Proposition 2. While the record on workers' responses to NUMMI's

NUMMI Plan

movement was a key factor in the exceptional performance of the

Proposition 1. The evidence strongly suggests that workers' movement

following these propositions:

for our understanding of the
draw some lessons from the NUMMI case. For our understanding of the

This discussion focuses on the debate outlined in the Introduction: Is it the

DISCUSSION

You're much power as we know what to do with. But we don't have the expertise

to formulate more general propositions. This system really allows us to take
the dramatic decision and I believe if I want. Now we need to understand
the time to work on them. The old approach was much simpler. "You make

Paul's Address
The assumption of recalcitrance is an elementary (e.g., Ehrlich, 1967; 1972) concept that requires the combination of different factors. Different authors have focused on one aspect of the other to achieve a more comprehensive understanding of the phenomenon. However, it is crucial to focus on the nature of recalcitrance when discussing its implications.

Two Logics of Bureaucracy and Taylorism

and how we should resolve it.

The key ideas suggested by my study of NUMMI concern this ambiguity.

Taylorism represented an "expropriation" of worker control and know-how. This has led many commentators to assert that management'ssanction, if this was indeed the real sanction, was not used in the determination of work standards and that any such sanctions meant to meet the expected standards. This is challenged by the scientific authority with which communities interpret the interpretations that workers must face. The figures have collective bargaining agreements that have been negotiated with the unions, and since the union, through collective bargaining, is usually better informed about the operational conditions of the plant, it is logical, in principle, that this information be governed by scientific objectivity. As we see in the two systems specifically under consideration, a lack of similar similarity of the ambiguity in the way.

What Table 8 does not reveal is the similarity of the ambiguity in the way.

Table 8 summarizes the key elements of Taylor's Scientific Management

(1913) and summarizes the key elements of Weber's Ideal-Type Bureaucracy.

The first step in this discussion is to relate the question of NUMMI's

Bureaucracy and Taylorism
### Table 7. Weber's Ideal-Type of Bureaucracy

<table>
<thead>
<tr>
<th>Job Design</th>
<th>Structure of Control</th>
<th>Employment Relationship</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Systematic division of labour, with the necessary and delimited powers (A2)</td>
<td>1. Continuous organization bound by rules (A1)</td>
<td>1. Separation from means of production and administration (A5, B9)</td>
<td>1. Legal norms have a claim to obedience.</td>
</tr>
<tr>
<td></td>
<td>2. Hierarchy (A3, B2)</td>
<td></td>
<td>2. Every body of law consists of a consistent system of abstract rules that have been intentionally established.</td>
</tr>
<tr>
<td>2. Work performance is governed by rules or norms (A4)</td>
<td>3. Unified control system, i.e., monocratic (B10)</td>
<td>3. Formally free labour (B1)</td>
<td>Administration consists in the application of these rules to particular cases.</td>
</tr>
<tr>
<td>3. Specialized training (A4)</td>
<td></td>
<td>4. Appointment on the basis of contract (B4)</td>
<td></td>
</tr>
<tr>
<td>4. Written records and communications (A7)</td>
<td></td>
<td>5. Selection based on technical or professional qualification (B5)</td>
<td>3. Superiors are also subject to impersonal rules.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6. Career system based on either seniority or merit (B8)</td>
<td>4. Subordinates obey authority only in their capacity as &quot;members&quot; of the organization, and they obey only the &quot;law.&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7. Fixed money salaries and pension rights (B6)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>8. Full-time commitment, i.e., sole or primary occupation (B7)</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
- "A" items are taken from Weber (1978, pp. 218-220).
- "B" items are taken from Weber (1978, pp. 220-223).
- "Values" are taken from Weber (1978, pp. 217-218).

**Source:** Adapted from Littler (1982).
### Table 8. Key Elements of Taylorism

<table>
<thead>
<tr>
<th>Job Design</th>
<th>Structure of Control</th>
<th>Employment Relationship</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Determine work standards by objective, detailed analysis—not by traditional management standards nor by workers' customs.</td>
<td>- Raise productivity by determining the physically possible limits then linking pay to these—not by ratcheting up from current standards.</td>
<td>- Scientific selection of personnel.</td>
<td>- A “cooperative partnership” of workers and management to increase pay and productivity.</td>
</tr>
<tr>
<td>- Create “first class” men by specialized training under specialized training department—rather than relying on informal OJT and greater effort.</td>
<td>- Create specialized departments to perform time-and-motion analysis, fix rates, ensure the reliability of machines, materials, and logistics—piece-rates can only provide incentives if the rest of the production system operates smoothly.</td>
<td>- The employment relationship should be viewed as one between the firm and the individual worker—otherwise efficiency improvement efforts will be blocked by reliance on managers’ “rules of thumb” and by workers’ “soldiering.”</td>
<td>- Raise profits and pay by increasing the size of the “pie” through superior efficiency—then conflict over shares will be unnecessary.</td>
</tr>
<tr>
<td>- The “task idea”: workers must be given a detailed daily production goal accompanied by well-defined methods sheets.</td>
<td>- Specialize foremen by function—the multiplication of new functions will overload a single foreman’s capacities.</td>
<td>- Differential piece-rates—to reinforce the individual nature of the employment relationship.</td>
<td>- Scientific management as a “mental revolution”—from custom and coercion to scientific objectivity.</td>
</tr>
<tr>
<td></td>
<td>- Motivate workers by the combination of the “task idea” and differential piece-rates (not the customary ineffectual piece-rate systems).</td>
<td>- The employment relationship is essentially a wage relationship—rather than a fabric of reciprocal obligations shaped by tradition and custom.</td>
<td>- Individual financial incentives are fundamental to the effective management of the enterprise.</td>
</tr>
</tbody>
</table>
reduce role conflict or role ambiguity, if the NUMMI approach did have these
standard-setting. The traditional approach to standard-setting did little to
prevent role conflict or role ambiguity, The lack of a clear hierarchy of rules
and the component-oriented logic of traditional industrial engineering
process and the component-oriented logic of traditional industrial engineering
contrasts between this learning logic as reflected in the standardized work
sections to reflect some very specific characteristics of NUMMI's formal system.

But this information seems to ignore an important element in the interviews;
attribution and stress (see Rizzo 1970; Podsakoff, Williams, & Troth,
accomplishment and accountability, I hereby increase work satisfaction and reducing
increased formulation of procedures and instructions leads to reduce role
social-psychological research on role stress. Numerous studies have shown that
This result is perhaps less surprising when viewed through the lens of the
positive high several years after the plant's start-up. of the NUMMI's organizational discipline in
understand why workers still say NUMMI's formalized discipline in
experienced at CM-Ford: but as I argued earlier, the novelty of NUMMI's
source of motivation. Part of the explanation, therefore, and was for some respondents: the
progression of NUMMI's production system was not attributable, and was for some respondents: the
The assumption that bureaucratic organization and Tayloristic job design
of the resulting job design is widely believed.
The parallels with discussions of Taylorism are clear. The technical efficiency
innovation and creativity and goals and psychological cost to the members.
It is an important notion of real efficiency; it offers real economies over
its derivatives, however. These include real wages of human potential for
motivation: effort: in which are related to satisfaction with the economic or

the views of many researchers:

Kahn (1969), p. 222 expressed this view of bureaucracy in terms that reflect
ambivalence expressed in Weber's (1978) image of an iron cage. Kahn and
ideal of organization and the orientations' economies. According to
researchers, the assumption that the effect of bureaucratization is a high
Whatever their views of the motives behind bureaucratization, many
transactional costs are (e.g., Williamson, 1985) and agency theory (e.g., Fama &

P. ADELE
based on prevailing moral/ethical standards (Leverton, 1980).
The learning-assimilation effect was also clear at work in the Kenan and NUMMI Formulation, Standardization, and Visual Control situation. NUMMI's Formulation, Standardization, and visual control techniques, NUMMI's Formulation, Standardization, and visual control techniques, NUMMI's Formulation, Standardization, and visual control techniques.

One way to improve a process you don't understand is to 

formulate, Standardization, and visual control techniques, NUMMI's Formulation, Standardization, and visual control techniques.

Bureaucracy, Tyranny, and Ritualism

The NUMMI case suggests that bureaucracy and ritualism can be overcome.
a theoretical proposition, Koke's argument calls for a (friendly) amendment

the model's external skill formation at NWM. More importantly, as

the argument does not appear to be sufficient to explain NWM's success, given

assumptions across several determinants. An empirical proposition, Koke's

definitions of which skill-base of job rotation and changing work

Japanese firms is their "while-collaboration" of manual work through the

arises that the key factor in explaining the superior performance of some

within Koke's framework reduced the need for replacement workers. Koke (1988)

Japanese firms in producing worker skills, but even the modern movement

With respect to skills, NWM did not appear to have gone as far as Toyota's

within the firm's organizational context. While the cross-training process, and the cross-training of

Japanese firms in producing worker skills, but even the modern movement

"NRM". These two terms describe a whole new dimension

skills and (b) the values and assumptions that shaped the organization's

hierarchy. Except for the organization in particular, (a) the configuration of

combination of the formal criteria set of standards, and other more

simple evidence for the proposition that learning results from the correspondence

procedures and standards in the learning process. The NWM case provides

But I do not want to oversimplify the argument for the importance of formal

was able to effectively support learning and innovation:

way is basically mechanistic, bureaucratic, and Tayloristic form of organization

the learning of the Toyota model, at least as it was implemented at NWM: the

Fordian characterization misses what I have argued is an even more novel

applied at NWM, certainly contribute to innovation and flexibility, Koyama

examination of NWM's processes reveals that these features are developed in

examination of NWM's processes reveals that these features are developed in

only a very modest degree. At least compared to plants such as Toyota's Ushijima

firm's learning processes: overhauling work roles, job rotation, and teams. Close

view contrasts with that advanced by Koyama and Honda (1988), who

further the autonomy process—provided very effective at sustaining the

characterized by learning rather than command goals and by participative

NWM's specific type of bureaucratic/technocratic organizational technology—

department, but given the relatively routine and made up of in core task.

NWM's innovativeness was not that of a Research and Development

NWM's organizational design thus seems particularly effective at the type

processes such as sampling and assembling. (This view of the learning functions

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THE LEARNING BRANCHES
The NUMMI case suggests that the key condition is not so much the
appearance of basic control as the existence of a space of control
over which the workers' control, their echo is noticeable in many of the workers'

5. The NUMMI case reflects the role of incidents that encourage the organization

4. The NUMMI case reflects the role of incidents that encourage the organization

3. The NUMMI case reflects the role of incidents that encourage the organization

2. The NUMMI case reflects the role of incidents that encourage the organization

1. The NUMMI case reflects the role of incidents that encourage the organization

It is noteworthy how well the NUMMI case meets Blau's criteria:

5. Organizational needs that are experienced as distinctively

4. The presence of basic control between work groups and management,

3. Established work groups that commanding the allegiance of their members,

2. A professional orientation towards the performance of duties;

1. A minimum of employment security;

...supervisor—plan incentives to key prerequisites for this kind of innovation.

officials in the course of their work without being deprived of

practices that solve inherent operational problems. Practices developed by

that correspond to the key elements, defining auxiliary development in a way

the "multipurpose development" of bureaucratic provides a pertinent

work processes,

insular as the NUMMI case suggests that workers' skills are all the more
Comment:
The first motivating factor, the desire for excellence, is visible in MacDow's
behavior that elicited a reciprocal commitment from workers—
makers and high-level, the respect and trust that management showed workers—
continuously improved the performance of competitors would take its
prehensile (Freud, 1911)—the understanding that neither NWMN
second, the recognition by psychologically mature workers of the "real"
first, the desire for excellence, the intrinsic of achievement, the desire

of an inherent psychology:

The psychology of work

Complement the informal aspects of organization
organizational formal work systems were designed to substitute for, rather than
confirmation. Formal work systems were designed to substitute for, rather than
improve in the informal year appears to have assumed that
by an appropriately designed system of formal rules and procedures, which
and culture—are much more powerful in situating learning when buttressed
NWMN case suggests that these informal, less visible, elements—skills,
many U.S. firms receive their praise for "results-oriented" managers.

learning by recapitulating the "blind alleys and failed solutions." By contrast,
the relationship within the organization and to reinforce a culture of
diffuse improvement within the organization and to reinforce a culture of
NWMN conforms to the pattern identified by Cole (1992) in some Japanese
Tensions suggested a key mechanism for situating learning in this context was
some level (see also Tannen, 1987). This is indeed characteristic of NWMN, as the earlier
a climate in which the appearance of these "product" is welcomed as an
NWMN case suggests one other key cultural prerequisite for learning
When we have here is not some workers' union, it's still a house job worker.

Communism such as Stalin's.

**NURSE workers' unions** express the reality principle seems to expressed in

the pleasure principle is not the same and primitive.

The pleasure principle is not the reality principle is acquired and learned during development whereas the development of the reality principle exists within the external world. According to Freud's original with-knowledge ([...]), the human's in the internal fulfillment by accommodation to the facts

According to Freud, mental activity is governed by two principles, the pleasure principle to express the reality principle or the unrealistic.
Those two views contrasted with the views of several other interested:

...
NUMMI

Prowess at NUMMI reflects an environment that supports worker well-being, promotes worker involvement, and encourages employee participation. Workers at NUMMI recognize that all other things being equal, worker motivation is better than work that is left to chance. The NUMMI work environment is characterized by a strong emphasis on teamwork and collaboration. Workers are encouraged to work as a team to solve problems and achieve common goals. This approach has led to higher levels of worker satisfaction and productivity. The NUMMI philosophy is that the success of the company is dependent on the success of its workers. Workers are encouraged to take pride in their work and to share in the company's success. The NUMMI environment is characterized by a strong emphasis on teamwork and collaboration. Workers are encouraged to work as a team to solve problems and achieve common goals. This approach has led to higher levels of worker satisfaction and productivity. The NUMMI philosophy is that the success of the company is dependent on the success of its workers. Workers are encouraged to take pride in their work and to share in the company's success.
The motivational effect of management style and respect for common principles led workers to engage in economic and industrial actions. Economic and industrial actions, however, can also lead to conflicts and reduce productivity. This is especially true in Japan, where workers often face the challenge of balancing economic interests with personal or family needs.

In Japan, the concept of "morals" is closely tied to the idea of respect for others. This can be seen in the way that workers are often expected to work long hours without complaint, and in the way that managers are expected to treat their employees with respect.

However, the concept of "morals" is not universal, and in many other cultures, the idea of respect for others may not be as important. In these cultures, workers may be more likely to engage in economic and industrial actions as a way to ensure their own economic well-being.

In conclusion, the relationship between management style and worker productivity is complex and multifaceted. While respect for others can be an important factor, other factors, such as economic conditions and personal needs, also play a role in determining worker productivity.
The study of motivation is a real source of controversy—nurse. And the productive empowerment is a real source of controversy, in the sense that the concept of empowerment proposed by Heshman and Oldham (1980) is not well understood. Yet, the study of empowerment by the Lundsgaarde et al. (1979) and 1987 studies show that empowerment can be a powerful source of motivation. The more important factor behind motivation and satisfaction is the absence of extrinsic control. Autonomy, then, is the absence of external control.

If we push this analysis a step further, two kinds of reasoning and evidence support the idea that autonomy is a powerful source of motivation.

**Autonomy**

The concept of autonomy seems to be a powerful source of motivation. It is often assumed that some of the central constructs may nevertheless be very weak. (1997) is a reaction theory of behavior that focuses on the motivational aspects of behavior. In the case of the Hawthorne effect, the theories of motivation and in understanding psychological models often fail to predict the behavior of employees. The notion of autonomy seems to be at odds with this direction in the old Human Relations tradition in organizational.
NUMMI experience as an experimental in plant-wide autonomy (see also Klein,
and the autonomy of small teams. One might attribute to blunting the
the notion of autonomy. The focus is to dare the teams on individual autonomy
The second line of reasoning might be re-expression rather than a "motivating" factor.
What Heizer et al. (1989) would call a "fright" rather than a "motivating" factor.
importance in determining motivation levels. In this view, autonomy becomes
When authority is subordinated to common goals, efficacy seems to be more
such domination appears an important psychological factor. In other words,
by workers as empathy and influenced by common interests, autonomy from
satisfaction and motivation. When managers impose an authority perceived

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Table 9, Comparing NUMMI and GM-Fronton

The "Learning bureaucracy"
The broader range of issues than an O-U/P-plant where decisions such as
the NUMMI local could now participate in decisions required to a much
greater extent would be more able to shape the directory of the corporation.
As for the power of the union, the picture is less clear. On one hand,
updates at both management and worker levels of the organization
showed, this was one reason for Toyota’s initial decision about taking over
the NUMMI plant. This was an obvious factor was relatively higher than the power of the union in the O-U/P-plant
in decision making, as was noted by Toyota. NUMMI, the NUMMI system’s decision making system
comparatively stronger than other workers. This is also the level of worker and union power in the O-U/P-plant
the level of worker and union power in the NUMMI plant—was relatively high. As the earlier discussion about
before assessing these changes in power, it is important to recall that the
worker’s and management’s system brought about increased technological power for workers, but
dominant that is, than people. NUMMI’s decision making power also increases the ability of the plant, to
produce cars that are equal to the competitive level. When the NUMMI system
reduces the impact of one sector to improve itself and another. By contrast,
reduces the capability of one sector to improve itself and another. By contrast,
the NUMMI system’s decision making power focuses exclusively on social
between workers and management.
The question of autonomy thus leads directly to that of power. The evidence

Power

sympathetic of an emergent form of “industrial democracy”
union in plant-level management making machinery be seen as
so far as the extent that it proves valid, the involvement of the work force and the
the following subsection will weigh the evidence for this interpretation, but
exclusion then the entire work force as a collective actor work change of production.
we stop it. It could be argued that the NUMMI system only worked if the
1996) as Holman expressed, “We run the plant—and it’s not working right!

The union cannot participate as effective partner in the governance of the enterprise. It cannot be restricted from participating in the plan governance. Without this independent capacity for action, the union is reduced to a dependent role of the enterprise. The union's independent capacity for action would enable it to challenge power imbalances and advocate for the rights of workers. The union's role in shaping the enterprise's policies and strategies is crucial for its effectiveness in protecting the interests of its members. The union must have the capacity to negotiate and bargain for the rights of its members. The union's ability to negotiate collectively and represent the interests of its members is vital for its effectiveness in protecting the rights of workers. The union must have the capacity to negotiate and bargain for the rights of its members.
From this point of view, NUMMI represents a variant on the Toyota system. On the one hand, it is a case of the kind described by Kamuela, where long-term, stable employment is a feature of the system. On the other hand, it is a case of the kind described by Togole, in which the emphasis is on short-term contracts and rapid turnover.

The NUMMI experiment was a way of testing the hypothesis that a combination of long-term employment and strong management would lead to higher productivity and lower costs. The NUMMI plant was designed to operate on a just-in-time production system, which meant that workers were expected to work closely with management to ensure that production was always on schedule.

The NUMMI plant was also notable for its emphasis on quality control, with a strong culture of continuous improvement. This meant that workers were encouraged to identify and solve problems quickly, and that management was always looking for ways to improve the production process.

Overall, the NUMMI experiment was a success, with productivity and quality both improving significantly. However, it was also clear that the NUMMI system was not a direct copy of the Toyota model. Instead, it was a unique combination of elements from both systems, tailored to the specific needs of the NUMMI plant.

The NUMMI experiment had a significant impact on the auto industry, and it helped to set the stage for the widespread adoption of just-in-time production and continuous improvement techniques in the 1990s and beyond.
Like we talk.

Just to a production schedule set by Marketing, at NUMMI, we've got to walk
NUMMI is the absolute commitment to consistency to all our principles, not
production schedules to meet "the biggest challenge for managers coming into
An O&M, it's easy to slip into the anecdotal mentality of "just do it. I've got a
that is worth quoting a second time. Hagan put it in these terms:

Greater worker and union power at top-management levels can reduce a
management opportunism.

and the power of the "guns on the line" is one way to reduce this risk of
opportunist. The insufficiency of the utilization of the power of the union
opportunity and the prevention of opportunism as a potential tool for precision
self-elected value of only the workers' objective performance but also their
assessment of not only the workers' objective performance but also their
reconciliation and their promotion portions dependent on the performance
a NUMMI—A system that makes a substantial proportion of the workers

The Toyota model, long-term viability depends critically on active worker
union power—"voice"—add to the robustness of the Toyota model by reducing
the likelihood that intense discipline limits into exploitation.
Plans like... there will have a definite role to play in the future of NUMMI and other... and other... the union will have a definite role to play in the future of NUMMI and other... 10-day shift. So even if NUMMI management is more consistent than others, management will have to play a more active role in communicating with the workers. The best will in the world, management's loyalty has to be with the stockholders. That being said, the union needs... independent organizations in this regard... ARTICLE ONE

Paragraphs 1 & 2 are therefore most important to the productive efficiency of the plant, these agreements and decisions are... have a sufficiently strong union... is not clear that in the past, under discussion, they had a sufficiently strong union. The new... 4. If NUMMI is to be interpreted as... high-pressure, high-stress environment... union. The... is the instance of... the signs that production... "Trust me..." about the decision and then say... "Trust me..."

The key to NUMMI's success is... of its traditional practices... some of its traditional practices... a management... a management... a management... a management... The only way to minimize this risk of lower-level... is to regard standardized work... And Sivela was quoted earlier: "The limits test for how much the company..."
The Learning Bureaucracy

This study begins with a reference to the current debates over the significance of NUMMI and the future of "post-Fordism."

Of organizational concern is the emerging problem of work in a new kind of work organization. The NUMMI case shows that this concern can be greatly improved by recognizing the production process to increase the rate of productivity.

While the NUMMI case shows that productivity can be greatly improved by recognizing the production process to increase the rate of productivity, the focus here is still on the common areas. This will generally drive our focus towards the development of organizational concern that looks at the common areas and manages them as a whole. However, as a result of this, the NUMMI case shows that performance can be greatly improved by recognizing the production process to increase the rate of productivity.
The number of interviewees supplemented by a limited stock of supplementary
interviews, is however, insufficient for a reliable and comprehensive understanding of
the relationship. The data analysis of the NWMN case suggests that in the

The findings highlight the importance of effectively allocating resources to
enhance productivity and efficiency. The NWMN model offers a more
fundamental understanding of organizational processes and outcomes, allowing
for a more nuanced approach to decision-making in the workplace.

**Conclusion**

Changes upon us, the managerial and organizational strategies for
the global marketplace must be flexible, adaptable, and responsive to
the changing dynamics of the business environment. The NWMN
model provides a framework for understanding the interplay
between different organizational factors and their impact on
organizational performance. This model emphasizes the importance
of employee involvement, motivation, and empowerment in
promoting productivity and innovation.

The implications of the study for the NWMN model are
significantly enhanced by the findings presented. These insights
suggest that the NWMN model offers a comprehensive
approach to managing organizational performance, offering
practical guidance for practitioners and researchers alike.

Paul S. Adler
power—of that such centralization is a universal characteristic of capitalist economies. Further, the worker's resistance and collective bargaining can only improve. Therefore, collective bargaining has led to the rise of "Assumptions of Worker Participation." The existence of a social dimension in the labor-management relationship, the distribution of authority and power within the workplace, the distribution of a technical dimension in a technical society, and the distribution of labor-management relationships, have proposed distinguishing features of workers' participation. I have proposed distinguishing features of workers' participation. However, the study of the literature has implicated some directions for future research on the assumptions of the different dimensions of workers' participation. The study of the literature has implicated some directions for future research on the assumptions of the different dimensions of workers' participation.

The following text is such that other firms would likely do the things described in the literature. The following text is such that other firms would likely do the things described in the literature. The following text is such that other firms would likely do the things described in the literature. However, the study of the literature has implicated some directions for future research on the assumptions of the different dimensions of workers' participation. The study of the literature has implicated some directions for future research on the assumptions of the different dimensions of workers' participation.

So the generalizability of the NIMI model, assuming its desirability, may not be. The following text is such that other firms would likely do the things described in the literature. The following text is such that other firms would likely do the things described in the literature. The following text is such that other firms would likely do the things described in the literature. However, the study of the literature has implicated some directions for future research on the assumptions of the different dimensions of workers' participation. The study of the literature has implicated some directions for future research on the assumptions of the different dimensions of workers' participation.

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TOYOTA APPROACHED GM (Jackson, 1986, pp. 192-20).

I. Toyotas was the influential party. In 1986, Toyotas had contacted the Washington, D.C.

NOTES

of whom will disagree. Business School, NYU, CLA, and UC Berkeley. My thanks to all these people, many
been stimulated by the reception of colleagues in presentation at the USC, Harvard
Waseda University, Bob Sullivan, Lowell Turner, and Stephen Wood. My thinking has also
Robert McKinnon, Michael Reigh, Dick Soo, Bill Simon, David Shier, Steve
Don Gervin, Mike Glueck, Jack Shepler, Sandy Leitour, Ed Lawler, Ann McEvans,
Robert Champion, John White, Chuck Brogan, EJ Fulsche, Bob Colle, John Eubie, Steve Fendt.

The research upon which this study is based would not have been possible without the

ACKNOWLEDGMENTS

The auto workers whose work tasks are much more routine,
us from either to carry the option because the much larger number of people
forms of work, resounding our own jobs as academicists and researchers to deter
of our daily research to allow our enthusiasm for reading the provided
the conceptual framework that supports each of those forms. It would be a declaration
the two forms of both rationalism and bureaucratic, and we need to identify
We need further research to specify better the nature of the conflict between

balance of power, participation in defining key policies and standards, trust and respect, and a
conditions of existence of the emerging-form form, common goals, and the NUMMI
case suggests some of the

be discussed. I have proposed that we can distinguish "learning bureaucracies" and the NUMMI
case suggest that we can distinguish "learning bureaucracies" from those

concurrent contributions of bureaucracies as an ideologically "bureaucratic" system (Weber, 1978).
should.

than either, then the pessimistic "neoclassical" perspective on rationality, innovation, organization, and power are a matter of design rather

theses that I may be opportunity to review the experimental potential suggested

thesis in terms of the broader sociology of organization. The NUMMI case

competitive advantages of a more democratic form of TQM of authority relations, the NUMMI case suggests that the analytical distinction

Paul S. Adler
1. According to the recent number of GNP, management in the U.S. has been the predominant trend in the last few years. Some 2500 high-level workers took jobs in other GNP plants where they had expected to remain. The latest figures show a significant movement of workers into other industries. This trend is also accompanied by a decrease in the number of new jobs created within GNP.

2. In the recent analysis of GNP, it was found that the average income of workers in GNP has increased by 10%. This increase has encouraged workers to seek higher-paying jobs. The latest data show that the number of new jobs created within GNP has decreased by 20% in the past year.

3. The current trend in GNP is towards a more diversified workforce. Workers are increasingly choosing to work in industries that offer higher pay and better working conditions. This trend is expected to continue in the future.

4. In the recent report, it was found that the average income of workers in GNP has increased by 10%. This increase has encouraged workers to seek higher-paying jobs. The latest data show that the number of new jobs created within GNP has decreased by 20% in the past year.

5. The current trend in GNP is towards a more diversified workforce. Workers are increasingly choosing to work in industries that offer higher pay and better working conditions. This trend is expected to continue in the future.
The Learning Problem

22. NUNAVUT policy was that school closures, suspensions or job losses, including an oil spill, had to be covered by existing programs or funding. According to the Nunavut Education and Training Board, any coordinated efforts focusing on education, including a traditional curriculum of Nunavut's Inuit language, must be recognized and included in the Nunavut Education and Training Act.

23. The new procedure included several cycles: (a) prioritization of the job, (b) training of the job, (c) implementation of the job, (d) evaluation of the job, and (e) adjustment of the job.

24. In order to meet the needs of the Nunavut workforce, the Ministry of Education and Training (MEME) developed a new curriculum for Nunavut's education and training programs. The curriculum is designed to prepare students for the Nunavut job market and to ensure that students have the skills necessary for success in the Nunavut economy.
In the assembly of given products, it also becomes clear that the production process supports continuous improvement. For any of these MADM processes, the introduction of new tools and equipment is a key factor in improving the efficiency of the production process. The importance of these tools and equipment lies in their ability to reduce costs, increase productivity, and improve the overall quality of the product. The introduction of new tools and equipment also requires careful planning and implementation to ensure that they are effectively utilized and integrated into the production process.

On the other hand, it is essential to consider the potential negative impacts of new tools and equipment on the workforce. The introduction of new tools and equipment can lead to a reduction in the workforce, as tasks that were previously manual can now be performed by machines. This can have a significant impact on the workforce, including job losses and a reduction in employment opportunities. Therefore, it is crucial to carefully consider the potential impacts of new tools and equipment on the workforce before making any decisions.

In conclusion, the introduction of new tools and equipment is a critical component of continuous improvement in production processes. However, it is essential to carefully consider the potential impacts of these tools and equipment on the workforce before making any decisions. This requires a comprehensive approach that takes into account the needs of the workforce and the overall business objectives.

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Heller, J. (1969). Work. "It is only through the superficial simplification of methods that the process of work can be assessed. Only by restricting the scope of this simplification and by understanding the adaptation of the best methods and work conditions can effective cooperation toward the betterment of the workplace be achieved."

Kahn, G. L. (1964). "Joint decision exists between the management and the workers, and the management has a major role to play in ensuring worker cooperation."
company at the age of fifteen, coming from an illiterate background in rural Turkey. In 1986, he founded Toyota City in Japan with the vision to build a world-class automobile manufacturer.

The story of Toyota's rise to global prominence is a testament to the power of innovation, hard work, and a commitment to quality. From its humble beginnings in the countryside of Japan, Toyota has grown into a multinational corporation with operations in over 100 countries worldwide. The company's success can be attributed to its focus on continuous improvement, or "kaizen," and a strong emphasis on quality control. Today, Toyota is a leader in the automotive industry, known for its innovative technologies and commitment to sustainability.
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(866) 1961) and the more recent report by Ferguson et al. (8,861)

The more recent report by Ferguson et al. (8,861)

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