

An Investigation of Personnel Issues Affecting Kanban Performance: A Case Study

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Abstract: This article describes a case study conducted to examine the factors that affect Kanban performance at the organizational level. The Manufacturing Engineering (ME) Department of a small mid-western company implemented a Kanban system aimed at producing 95% of their orders on time. Unfortunately, they were unable to meet this goal, so the management partnered with the Industrial and Management Systems Engineering Department at the University of Nebraska-Lincoln to identify the cause of poor Kanban performance. A descriptive study was developed and results showed that ineffective communication, weak reward systems, incompatibility of expectations, and a dissonance between values declared and values supported by the organizational systems were creating a culture focused on individualism and production rather than teamwork and quality. An engineering manager can use the results presented in this article to better prepare their organizations for the implementation of new processes or initiatives.

Kanban is a parts-movement system that relies on cards, boxes, or containers to transport parts from one workstation to another on the production line. Kanban stands for Kan (card) and Ban (signal). Kanban is a system that allows for the management of the overall supply chain, efficiently and effectively. It accomplishes this by linking production demands and the management of supplies strategically and operationally. The cards, boxes, or containers allow for material flow control between workstations. The “pull” system of production/materials control requires employee participation and involvement strategies. The spirit of the Kanban concept is that components are only delivered to the production line

as they are needed. Within the Kanban system, workstations produce/deliver desired components when they receive a card, box, or empty container, indicating that more parts will need to be produced. This process facilitates a reduction in material or product storage in the production area.

Personnel Issues Affecting Kanban Performance

Organizations are constantly looking for ways to achieve their goals through the commitment and effort of their workers. In order to accomplish this, they establish guidelines, define policies and processes, and make available the necessary resources. The coordination and management of the relationship of these elements plays an important role in the success of any organization (Altman, 2000; Schneider, Gunnarson, and Niles-Jolly, 1994).

A relatively new approach that managers are using in the manufacturing process to empower workers is work teams. Studies have demonstrated that teamwork is a beneficial way to achieve good worker performance (Cohen and Bailey, 1997; Katzenbach and Smith, 1993; Hackett, 1997; McNabb and Whitfield, 1997; Guzzo and Dickson, 1996; Devine, et al. 1999; Banker, et al. 1996); however, all teams do not perform successfully. According to Katzenbach and Smith, there are differences between teams that perform and other groups that don't. They mention that successful teams have a clear understanding of what it means to be a team. Lately, the word team has become so familiar that managers think by simply calling their workgroups “teams,” they are going to perform successfully.

Team Performance. There are many definitions of the team concept. According to Cohen and Bailey (1997), the most commonly used definition was developed by Hackman. Hackman

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(1977) defines team as a collection of individuals who are interdependent in their tasks, share responsibility for outcomes, see themselves and are seen by others as a social entity embedded in one or more larger systems, and perform tasks that affect others.

Furthermore, Katzenbach and Smith (1993) give a complementary definition of a team. They define it as a small number of people with complementary skills who are committed to a common purpose, set of performance goals, and approach for which they hold themselves mutually accountable.

From these definitions, it seems that some characteristics of what it means to be a team are: a group of individuals, commitment to a common purpose and approach, mutual accountability (trust), complementary skills (interdependable), and collective outcomes that exceed the quality of any individual endeavor (Smart and Barnum, 2000).

Another point that has been studied is team effectiveness. It is defined as performance and employee satisfaction (Gladstein, 1984). More explicitly, Hackman (1991) defines it as the degree to which a group's output meets requirements in terms of quantity, quality, and timeliness; the group experience improves its members' ability to work as a group in the future; and, the group experience contributes to individual satisfaction. It's important to see the relevant role that employee satisfaction plays in team effectiveness. Studies indicate that team effectiveness is a function of the task, team composition, coworkers, environmental factors, organizational structure design (including job description), internal process (communication systems, supervision), external process (contact with other areas of the organization), as well as group psychological traits such as beliefs and values, reward systems, and performance assessment system (motivation). All of these elements are related to worker satisfaction and in some way are going to impact team performance (Hackett, 1997; Guzzo and Dickson, 1996; Cohen and Bailey, 1997).

Workers' Performance, Satisfaction, and Motivation. As aforementioned, workers' performance is related to workers' satisfaction and this has to do with motivation (Martinko, 1995). There are different theories that support different points of view about motivation. Martinko (1995) makes a good review of some of these theories. He states that motivation is a complex, multi-faceted, and interactive process involving people's perceptions of the environment at a particular point in time related to the individual's unique needs and abilities. Furthermore, according to Martinko (1995) and others, there are some elements indicating motivational problems. Among these elements is employee perspective, which is related to dealing with the match between a less productive employee's perception of the environment and managers, supervisors, and the more productive employees' perceptions. Employees' perceptions are developed based on the day-to-day actions of managers and supervisors rather than on what management, the company newsletter, or the annual report proclaims. Workers observe what happens to them and around them, shaping their perspective and drawing their own conclusions (Schneider, Gunnarson, and Niles-Jolly, 1994; Butcher, 1994).

Communication also plays an important role in the motivation process. Forms of communication can include talking and listening, modeling and practicing, communication face-to-face, written, by phone, and by all means available. The most important aspect of communication is making sure that

employees share a common understanding of the same message (Smart and Barnum, 2000; Snavelly, 1995; Cohen and Bailey, 1997; Butcher, 1994).

Another element is the match between rewards systems and employee needs. There must be a match between employee needs and the rewards that an organization offers. More specifically, these systems must be related to the organization's vision, mission, objectives, and process, desired outcomes and desired workers' behavior such as teamwork (McNerney, 1995; Saunier and Hawk, 1994; Butcher, 1994). Managers must be careful when designing and applying a reward system because they can reward some behavior while other behavior is not rewarded at all (Kerr, 1995).

The workplace environment is another element defined by Martinko (1995) as having an influence on performance. Hygiene (characteristics of the work environment) and content (task to do in the job) influence worker performance. Workplace conditions and challenging tasks are strong motivators on work performance.

Expectations are key elements in the motivational process. Employees have to understand that they are going to be compensated for their performance, but it is very important that a match exists between managers, supervisors, and worker expectation. Each party must be clear on their expectations from each other and how their expectations are linked to organization's vision, mission, objectives, process, and outcomes (Schneider, Gunnarson, and Niles-Jolly, 1994; Martinko, 1995; Butcher, 1994).

Equity is another important issue within the motivational process. Equity relates to the workers' perceptions of fairness in treatment, benefits, payments, and rewards. It's not that all workers have to be treated in the same way, but that each must be treated in relation to their performance level (equity) (Nadler and Lawler, 1977; Schneider, Gunnarson, and Niles-Jolly, 1994; Findley, Amsler, and Ingram, 1999).

Finally, feedback through a properly implemented and managed performance measurement system has an important impact on motivation (Findley, Amsler, and Ingram, 1999). Workers as individuals and teams must have clear goals and objectives by which they are evaluated (Fitz-Enz, 1997). Furthermore, the performance appraisal system has to be linked to values of the organization, vision, and mission. It also has to be flexible enough to accommodate business changes and show workers in what measure they are achieving their expectations and company expectations (Bulger, 1995).

Organizational Climate and Culture. Organizational climate and culture affects individual and organizational performance by encouraging (or discouraging) motivation and commitment from the people in the organization (Stam and Sodano, 1991; Schneider, Gunnarson, and Niles-Jolly, 1994; Stetzer and Morgeson, 1997). Organizational culture refers to the mores, norms, and values of the organization (Schneider, Gunnarson, and Niles-Jolly, 1994; Ogbonna and Harris, 1998) that people perceive from outcomes of the organizational systems. On the other hand, climate refers to the atmosphere employees perceive (Schneider, Gunnarson, and Niles-Jolly, 1994). It's a complex mixture of shared perceptions and expectations, policies, and procedures that summarize the way things are done in the organization (Stam and Sodano, 1991; Shadur, Kienzle, and Rodwell, 1999). Studies have found that a supportive climate based on goal emphasis, emphasis on understanding the meanings of the values, process and results,

reward orientation, task, and socio-emotional support are a significant predictor of teamwork and communication (Butcher, 1994; Shadur, Kienzle, and Rodwell, 1999).

Culture and climate are not the same but are related. From organizational climate perceptions, workers interpret what management believes in and values and set their own priorities accordingly (Schneider, Gunnarson, and Niles-Jolly, 1994). In order to achieve a climate that supports a positive workplace culture, all organizational systems must be aligned with the vision, mission, and goals of the organization without losing the link with workers expectations and needs; otherwise, the organizational climate could be one that demotivates workers and produces negative attitudes towards programs and systems in place in the organization (Shadur, Kienzle, and Rodwell, 1999), which would in turn affect organizational performance.

Case Study

The ME department of a small mid-western company, located in Lincoln, Nebraska, searching for methods to improve customer satisfaction implemented a Kanban system aimed at producing orders on time, and to align their organization with the lean manufacturing philosophy.

This location, part of an international organization, is dedicated to manufacturing circuit breakers for residential, commercial, and light industry markets. Parts produced at this location are shipped to external customers, sister plants in Mexico and Ireland, and partners in Thailand, Iowa, Missouri, Indiana, and Kentucky.

Implemented in 1996, the Kanban system was not operating at the goal level of 95% and the scrap level in the stamping area was increasing. This caused plant management to partner with the Industrial and Management Systems Engineering Department at the University of Nebraska-Lincoln to diagnose the factors

causing low performance. To this end a survey was developed and administered in order to gather the necessary information.

The ME department consists of five business units: the tool room, stamping, plating, maintenance, and total productive maintenance (TPM), each of them considered a team. The focus of this study was the tool room, plating, and stamping departments as required by the ME manager. The stamping and tool room operate three shifts while plating operates two. As of June 2000 the ME department employed 126 employees including supervisors, workers, support, and technical staff.

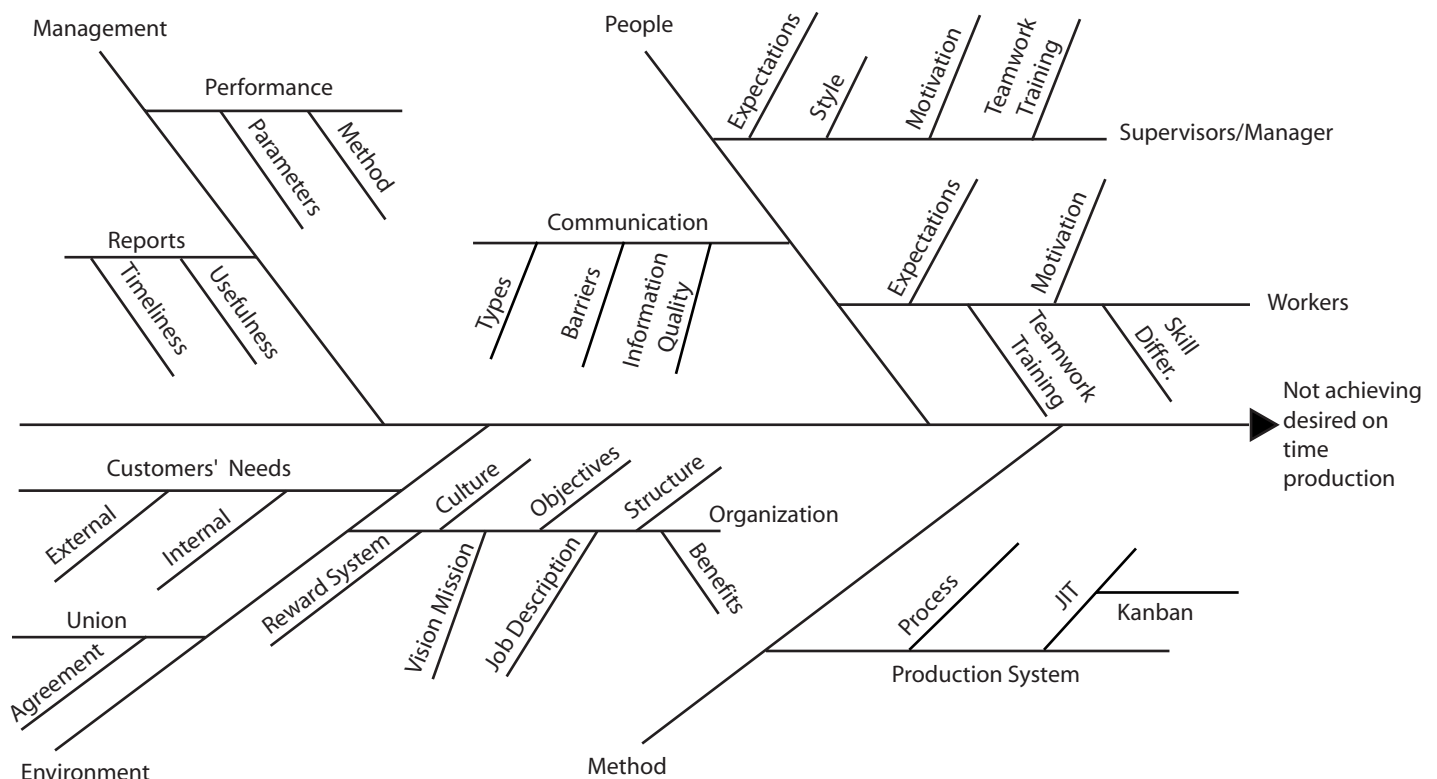
The tool room department's main functions are making, repairing, and maintaining tools, jigs, fixtures, punches, molds, and dies used primarily by the stamping department. The stamping department's main function is setting-up and running the equipment to carry out the production process. The plating department's main functions are coating, plating, and treating manufactured parts.

A fish bone diagram was developed to organize feedback from the departmental manager, supervisors, and workers in an effort to identify the factors affecting performance. Analysis of the fish bone diagram, shown in Exhibit 1, led to the hypothesis that employee behavior was the main factor affecting performance.

The ME manager indicated that workers had received training and support to work with the new system; the required equipment and resources had been provided to make the system accountable; however, performance had not improved to the desired levels. As such, he was interested in determining what specific attributes were preventing the teams in his organization from working together and doing their job effectively.

Having reviewed the literature on the various factors influencing team performance, and after discussions with plant management, it was decided to conduct a descriptive study. This

Exhibit 1. Fish bone diagram



type of study allows for a diagnosis of a situation by identifying the specific characteristics of said situation. In this case, a descriptive study was conducted in order to identify the factors affecting performance in the ME department. Information was gathered from the field by doing a survey. This survey was based on a questionnaire applied to workers from all shifts from the tool room, stamping, and plating departments. Furthermore, individual interviews with the supervisor from each shift and department, as well as the ME manager and human resource representative were carried out to gather the information from the different stakeholders.

Population and Sample. The population consisted of all workers of the tool room, stamping, and plating departments. In this case the population was known, limited, and small and there was the ability to access all workers in the ME department; the survey was to be administered to all of them. The total number of workers reported on payroll was 54, and 53 of them participated in the survey. The questionnaire was administered in a meeting led by one of the investigators. That allowed participants the opportunity to ask any questions regarding the questionnaire, and for the investigator to collect feedback from the workers. The meeting was held during business hours at a time agreed upon by the manager.

Data Collection. The use of questionnaires is one of the principal methods for gathering information, and is also the most popular and widely used data-gathering method in this kind of study (McClelland, 1995). Supervisors, the ME manager, and a human resources (HR) representative were interviewed to obtain information required to identify and define the problem. From this information and the literature review, the following set of preliminary factors influencing teams interactions were selected: motivation, teamwork, culture, communication, performance measurement, and reward. The research team used these factors as the foundation for the development of a questionnaire to be administered to participants. Appendix I shows the relation of each question to the factors considered in the preliminary analysis.

Due to the broad spectrum and scope of the possible factors, a combination of closed-ended, open-ended and multiple choice formats including the "other" option were used in the questionnaire design. This combination allowed the investigator to overcome the issue of missing relevant information. The investigator could unknowingly fail to include all possible options that were relevant to the respondents; moreover, this format allowed the investigator to identify other factors not considered in the preliminary analysis.

Prior to being administered, the questionnaire was reviewed by supervisors, the ME manager, the HR manager, and the union president. This feedback allowed for improvements to be made in the instrument and also provided an opportunity for questions from the union to be fielded. Furthermore, a sampling of workers from the plating department completed the questionnaire to offer feedback on the design of the questions.

Data Analysis and Results

Demographics. Of the 53 employees participating in this study, 50.9% worked in the tool room, 32.7% were in stamping, and 17% were in plating. With regard to shift composition 52.8% were on 1st shift, 26.4% were on 2nd shift, and 20.8% were on 3rd

shift. The gender breakdown shows that 74% of the participants were male and 26% were female.

Results. The results of the survey showed that 75% of the workers indicated they are aware of the company's vision and believe it to be related to customer needs and quality. When asking about the primary function of the company, most of the workers (60%) indicated that it was to produce circuit breakers. Comparing these results with the statement of the company mission (which is focused on customer satisfaction through commitment to quality based on core values of trust, team work, intelligent risk taking, and results), it seems that workers do not fully understand the vision, because in practice, they are more centered on production than quality.

Of the workers, 82% mentioned they felt the company expected them to do the job in the best way. Interestingly enough none of them mentioned any of the core values of the company. Supervisors expect workers to come to work and do their job. Although the lack of data in some departments didn't allow us to determine the statistical significance in the difference between ranking means, analyzing values of means and standard deviations (SD) on workers' expectations, it seems that good salary ($M=1.51$, $SD=0.82$), health plan ($M= 2.44$, $SD=1.97$), and insurance plan ($M=2.84$, $SD=2.06$) are the main priorities for workers. Workers' expectations for the company showed that the work environment elements have the highest priority for workers.

Workers mentioned they are able to contribute firstly with time ($M=1.93$, $SD=1.34$) and knowledge ($M= 2.36$, $SD=1.39$) to the company performance, and lastly with loyalty ($M=4.21$, $SD=1.94$). This shows the level of workers commitment to the company. These results, also, complement the results obtained from workers' opinion on the main function of the company.

Quality of work done ($M=1.73$, $SD=1.14$) was the measurement unit that workers would prefer to be used when the company is assessing their performance. This is different from the performance measurement that the ME department uses as on-time Kanban performance and reducing of scrap, and also from those used by supervisors such as production completed, time used to do the job, attendance at work, scrap level, and others.

The majority of workers (92.3%) said that they know where the outputs of their job functions go. It is interesting to see that the percentage (68%) of "knowing what units are going to receive inputs from" is less than the percentage "knowing where the outcomes generated are going to." Also, it seems that there are marked differences in opinion between shifts.

From the open-ended questions of the survey, it's observed that there is no consensus in the responses given related to what department is going to receive outcomes or what department is going to supply inputs. Smart and Barnum (2000) state that workers require a common frame of reference and understanding of processes used in the workplace. Without open, explicit communication about tools and processes, workers have trouble communicating to one another what they are doing. As a matter of fact, when asking about the main complaint that workers receive from peers from other shifts, they mentioned low level of communication (58.5 %) and low level of cooperation (54.7%). Moreover, the main complaints from other departments were related to timeliness (60.4%), quality (52.8%), and low level of communication (54.7%).

Forty-six percent of workers think they are working as teams, and of this number 23.1% have played the role of facilitator,

13.5% as information seeker and 3.5% of leader. Only 9.6% mentioned that they had played the role of helper, trainer, or had union involvement. This reduced percentage in role participation indicated that workers were not working as team.

Respect (M=1.84, SD=1.39), trust (M=2.52, SD=1.96), and openness (M=2.67, SD=1.31) seem to be the characteristics the workers like the most from their coworkers (same shift, same department). According to Katzenbach (1993) and Hackett (1997), these are favorable elements in the process of team building. Furthermore, for the tool room department, camaraderie (M=1.80, SD=1.93) and reliability (M=1.86, SD=0.90) are other characteristics of relevance creating an advantage of being more inclined to work with teams within their section and shift.

Again, respect is the characteristic that workers value most from their partners (other shifts, other departments) (Exhibits 2 and 3); therefore, these could serve as the basis for creating a better relationship between shifts and departments. Between shifts it's observed that the characteristics vary from shift to shift. Furthermore, the minimum rankings given by the 3rd shift with regards to the 1st shift when indicating the characteristics they like the most from coworkers from other shifts are relevant. The minimum ranking value given was 3.20 to the "respect" characteristics. It seems to reflect a conflict situation between these two shifts. Moreover, it's relevant that the percentage of responses was higher when asked about perception from preceding shifts versus following shifts.

Considering the process of communication, it seemed that the type of communication most used by supervisors was verbal communication (M=3.08, SD=1.21) followed by posted communication (M=2.60, SD=1.19). Verbal communication was rated as sometimes used, and this, according to Snaveley

(1995), indicates a weakness in the communication process since face-to-face transactions tend to be the best way of communication. Additionally, it is observed that workers tend to receive new information from other sources faster than from supervisors, especially during the 3rd shift and in the tool room department. This confirms Etorre's statement that indicates that in 55% of U.S. industries, workers receive more information via "the grapevine" (informal information network) than from the formal information network (Etorre, 1997). In these instances, the information could be misleading and it could produce undesirable outcomes.

When asking about feedback and support for new ideas from the company, it's seen that workers feel they don't receive feedback about their performance (rating as seldom) and there is no support for new ideas (higher percentage in "none above" choice). Once more there is a difference in response between shifts. Finally, 36.7% of workers mentioned that they felt the company cared about them.

Implications of the Case for the Organization

The root of the low performance problem at this company stems from a broad scope of issues related to workforce. From the results, issues dealing with communication, motivation, performance measurement and assessment, reward, leadership, and team development seem to be affecting workers' feelings and behaviors. This means that the organization culture and climate are experiencing changes that are having an effect on the performance of the ME department.

According to Snaveley (1995), communication is the process by which two or more people share meaning. The foundation of this definition is to view the concept or idea (communicating and

Exhibit 2. Perceptions from coworkers (other shifts). Mean (standard deviation) on ranking.¹

Shift	1st		2nd		3rd	
	2nd	3rd	1st	3rd	1st	2nd
Trust	2.57 (1.99)	2.57 (1.99)	3.00 (2.31)	3.80 (2.49)	4.50 (4.95)	2.50 (0.71)
Respect	2.22 (1.64)	2.10 (1.60)	2.00 (0.71)	1.60 (0.55)	3.20 (2.77)	4.00 (0.0)
Reliability	3.00 (1.93)	2.64 (1.91)	3.25 (1.26)	2.17 (1.60)	4.67 (3.51)	5.00 (0.0)
Openness	1.57 (1.13)	1.80 (0.92)	2.75 (1.50)	2.50 (1.05)	4.67 (3.06)	1.00 (0.0)
Collaboration	3.57 (2.99)	3.44 (2.55)	4.20 (3.11)	5.00 (3.00)	7.00 (1.41)	4.00 (2.83)
Autonomy	5.60 (3.29)	4.83 (3.49)	5.00 (3.46)	5.00 (3.46)	8.00 (0.0)	7.0 (0.0)
Camaraderie	3.83 (2.56)	3.00 (2.40)	3.75 (1.71)	4.33 (1.53)	4.00 (3.61)	1.33 (0.58)
Method of work	4.00 (2.52)	3.44 (2.46)	5.67 (2.08)	3.50 (3.54)	5.33 (3.79)	8.00 (0.0)

¹Priority ranking scale: 1 highest – 8 lowest

Exhibit 3. Perceptions from coworkers (other departments). Mean (standard deviation) on ranking.²

Department	Stamping (ST)		Tool Room (TR)		Plating (PT)	
	TR	PT	ST	PT	ST	TR
Trust	2.71 (1.98)	2.50 (2.38)	2.14 (1.86)	3.00 (2.83)	3.13 (2.47)	2.50 (1.73)
Respect	1.45 (0.52)	1.20 (0.45)	2.11 (1.45)	1.75 (0.50)	2.33 (1.32)	3.00 (1.41)
Reliability	2.91 (1.64)	2.30 (1.34)	2.50 (1.20)	2.00 (1.07)	3.50 (1.87)	4.50 (1.91)
Openness	2.09 (1.22)	2.17 (1.17)	2.33 (1.21)	2.50 (0.71)	2.86 (1.95)	3.75 (2.06)
Collaboration	3.60 (2.17)	4.00 (3.08)	2.75 (1.71)	7.00 (0.0)	4.00 (1.41)	3.75 (2.06)
Autonomy	4.50 (2.65)	4.00 (3.46)	2.20 (2.17)	4.50 (4.95)	3.80 (2.28)	6.00 (2.65)
Camaraderie	4.50 (2.65)	4.00 (3.46)	2.20 (2.17)	3.50 (3.54)	3.80 (2.28)	4.00 (2.65)
Method of work	3.67 (2.50)	2.83 (1.72)	3.40 (2.51)	2.00 (1.41)	6.75 (0.96)	7.67 (0.58)

²Priority ranking scale: 1 highest – 8 lowest

receiving) in the same way. The results in this case demonstrate an unsuccessful process of communication because workers are not “sharing meaning” with regards to information. Information related to expectations, objectives, values, needs, priorities, and process is different among the members of the department and the company. The ME department can’t achieve good performance without a good system of communication—communication in both ways: giving information and listening. This has to be part of the core values of the department in order to support cooperation and trust between workers and set the foundation for real teamwork.

Workers, supervisors, and company have different expectations. The company expects workers to do quality work through teamwork. One of the supervisors expects that workers come to work and do a good job. Another supervisor expects process improvement, work safety, good communication; yet another supervisor expects workers to work in a self-directed manner, with accuracy, while following directions. On the other hand, workers expect a good salary and strong benefits package (health and life insurance, disability, and other such programs) as compensation for the work they accomplish during scheduled shifts.

The perceptions that workers have about how the department functions are making the workers behave in a manner contrary to the department mission. Issues exist with regards to communication between shifts, departments, workers, and supervisors as well the issue of a lack of a structured reward system and performance assessment are creating a non-favorable climate in which the department cannot achieve its goal. A difference in priorities (values) between workers, supervisors, and the manager creates a conflict in workers who, at the end of the production chain, have to deliver the final product. This type

of conflict causes a drop in motivation level and, consequently, negatively affects performance levels.

Performance assessment is considered an important tool to motivate good performance (Findley, Amsler, and Ingram, 1999; Fitz-Enz, 1997; Bulger, 1996; Hackett, 1997). At this particular company there is no program for performance assessment as stated by the ME manager, supervisors, workers, and HR representative; therefore, the company is missing the opportunity to motivate and create a climate that impels employees to achieve the company’s goals. In addition, the absence of feedback and support for new ideas discourages workers from creating and contributing to departmental goals because the workers think these kinds of contributions are not important or valued within the unit. (Stam and Sodano, 1991; Findley, Amsler, and Ingram, 1999; Martinko, 1995).

Another important issue present in this case is the reward system. According to Nadler and Lawler (1977) and Kerr (1995) companies get what they reward. In the company, the current reward system is outlined by the union agreement which establishes wages, benefits, and conditions of employment based on hours worked, job classification, and seniority. For that reason the results showed that workers perform according to the reward they receive.

According to Schneider, Gunnarson, and Niles-Jolly (1994), climate refers to the atmosphere created in organizations by its practices and procedures that employees perceive on a day-to-day basis. Furthermore, climate is molded by the complex mixture of perceptions, expectations, policies, and procedures that summarize the way things are done in the organization (Stam and Sodano, 1991). This means that a good balance between these elements will contribute to a good way of doing things in the organization, which will result in good performance. For this

particular company, the elements shaping department climate such as supervisor behavior, vision knowledge, values, employee perceptions of coworkers, expectations, and organizational support are in conflict, which has created an environment hindering good performance.

Another issue arising from the results is the organization's culture. This has a strong influence on workers' behavior (Schneider, Gunnarson, and Niles-Jolly, 1994; Ogbonna and Harris, 1998). Workers interpret the organization's culture in the same way they do climate—managerial and supervisory behavior and from the systems supporting organizational processes (Schneider, Gunnarson, and Niles-Jolly, 1994). Based on this statement, workers interpreted different core organizational values from the messages they receive from supervisors, union, and reward systems. This situation produced different outcomes from those articulated through the company vision.

While this company, like many others, is focusing on teamwork as a core value to improve performance, it seems to be merely a declaration in the vision statement because there is no action supporting team building. Managers have taken for granted that teamwork is a natural function of the worker. They incorrectly assumed that teams don't need to be trained or supported. There are no teams present at this company—merely individuals performing their jobs in order to meet expectations and their understanding of what supervisors want from them: to focus on production.

In summary, there are many factors influencing the negative organizational climate in the ME department of this organization. Ineffective communication, a weak reward system and an incompatibility of expectations between employees and their superiors are the most relevant of the issues this organization is facing. Moreover, dissonance between the values declared and values actually reflected by the organizational systems are creating a culture focused on individualism and production rather than teamwork and quality. In order to address these issues, a true teamwork system needs to be implemented within this organization—one where employees at all levels understand the true nature of teamwork as a collaborative process where the means are as important as the end. This system of teamwork should include training and evaluation before, during, and after the team implementation process. An ongoing system of rewards and performance reviews needs to be established so that employees are able to truly feel that the work they do is valued, and so that supervisors and managers can truly feel that employees are performing at acceptable levels of productivity. Furthermore, employees need to be able to receive and give feedback in an open, uncensored manner. Finally, the vision and mission statements of this organization need to be thoroughly reviewed so that employees not only understand the mission but also are able to fulfill that mission to the best of their ability. In order to address their problems, this company needs to bridge the gap between the ideal vision of the workplace environment and the reality of the workplace environment.

Current Status of the Manufacturing Engineering Department.

The authors of this article recently contacted the organization to inquire about how the recommendations of this study had been implemented. Managerial representatives indicated that the recommendations were not implemented due to the

company's economic situation. Since this study was conducted, the organization has reduced its workforce by 50% and has moved several production lines to other countries. Although the organization was pleased with the recommendations, they have been forced to focus their attention on other initiatives. The new department manager believes that the recommendations are still valid given that the same problems persist in the department and are preventing the organization from achieving their goal of 95% Kanban performance.

Conclusion and Implications for the Engineering Manager

Results of the study revealed several factors which led to the inability of the organization to meet its Kanban performance goal. At the root of these factors was the lack of a clear communication system. Before implementing Kanban or similar manufacturing processes, engineering managers have a responsibility to prepare the organization and its employees for the impact from the new initiative. When implementing a new initiative, the organizational infrastructure and operational systems (e.g., planning, scheduling, accounting, rewards, training, etc.) must be adapted accordingly to fully embrace the transition or incorporation of a new system prior to full-scale implementation.

The engineering manager should take this into account as they go about designing a system that facilitates efficient communication allowing for a common understanding of expectations, needs, objectives, priorities, and values at all levels of the organization. Furthermore, engineering managers should examine how the new initiative impacts the work to be done by the employee. The reward system should be aligned with the performance assessment system and be consistent at all levels. Failure to do so has the potential for several results: a system that does not function at the expected level, workers who are dissatisfied and therefore lack motivation, and/or poor communication across the organization.

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Appendix I. Questionnaire design analysis

Please answer each question, following the instructions. Thank you for your participation.

1. Do you know the Vision of the company?	YES ___ NO ___	
If YES, it is related to: (Mark all that apply)	<input type="checkbox"/> Customer relationship <input type="checkbox"/> Production process <input type="checkbox"/> Production quantity <input type="checkbox"/> Employees benefits <input type="checkbox"/> Owners benefits	<input type="checkbox"/> Suppliers relationship <input type="checkbox"/> Product quality <input type="checkbox"/> Service quality <input type="checkbox"/> Work life quality <input type="checkbox"/> None above
2. Do you know what the company expects from you?	YES ___ NO ___	
If YES, could you mention what is it?		
3. What do you expect from the company? (Mark all that apply and rank them in order of priority) (Start with 1 as the highest priority)	<input type="checkbox"/> Good salary <input type="checkbox"/> Moral recognition <input type="checkbox"/> Economic recognition <input type="checkbox"/> Social recognition <input type="checkbox"/> Promotion <input type="checkbox"/> Paid overtime <input type="checkbox"/> Health plan <input type="checkbox"/> Job security <input type="checkbox"/> Being listened	<input type="checkbox"/> Training <input type="checkbox"/> HR assistance during your shift time <input type="checkbox"/> Safety <input type="checkbox"/> Opportunity for higher education <input type="checkbox"/> Let you make work decision <input type="checkbox"/> Others:
4. What characteristics are you able to contribute to the company based on what you feel the company gives to you? (Rank them in order of importance) (Start with 1 as the highest priority)	<input type="checkbox"/> Time <input type="checkbox"/> Effort <input type="checkbox"/> Commitment <input type="checkbox"/> Knowledge <input type="checkbox"/> Loyalty <input type="checkbox"/> Other:	
5. What is your understanding of the primary function of the company. Check one.	<input type="checkbox"/> Produce circuit breakers <input type="checkbox"/> Manufacture parts for circuit board <input type="checkbox"/> Sell circuit parts <input type="checkbox"/> Delivery products on time	<input type="checkbox"/> Manufacture quality products <input type="checkbox"/> Employ people <input type="checkbox"/> Other:
6. How would you like for your performance to be measured? (Mark all that apply and rank them in order of priority) (Start with 1 as the highest priority)	<input type="checkbox"/> Produced units <input type="checkbox"/> Task done <input type="checkbox"/> Quality of the work done <input type="checkbox"/> Grade of cooperation in your work team	<input type="checkbox"/> Worked Time <input type="checkbox"/> Timeliness of the work done <input type="checkbox"/> Customer satisfaction <input type="checkbox"/> Other:
7. Do you know which department(s) or business unit(s) is going to receive the product/outcomes of your work?	YES ___ NO ___	
If YES, which is it?		
8. Do you know which department(s) or business unit(s) you will receive work/inputs from your area?	YES ___ NO ___	
If YES, which is it?		

9. What are the main complaints that you have received from people of other departments that you have relationship with? (Mark all that apply):	<input type="checkbox"/> Part or product arrive late <input type="checkbox"/> Poor quality of the part or product receiving <input type="checkbox"/> Poor quality of the process done	<input type="checkbox"/> Low level of communication <input type="checkbox"/> Low level of cooperation <input type="checkbox"/> Other:
10. What are the main complaints that you have received from people of other shifts which you have relationship with? (Mark all that apply)	<input type="checkbox"/> Problems on machine don't solved <input type="checkbox"/> Problems on production don't solved <input type="checkbox"/> Not organized workplace <input type="checkbox"/> Work left to next shift <input type="checkbox"/> Not reporting of the work do	<input type="checkbox"/> Lack of support <input type="checkbox"/> Low level of cooperation <input type="checkbox"/> Not making the right decision <input type="checkbox"/> Poor quality on production <input type="checkbox"/> Other:
11. What are the main complaints that you have received from your supervisor? (Mark all that apply)	<input type="checkbox"/> Arrive late to work <input type="checkbox"/> Poor quality of your work <input type="checkbox"/> Low production rate <input type="checkbox"/> Lack of communication	<input type="checkbox"/> Frequent absence to work <input type="checkbox"/> No cooperation <input type="checkbox"/> Other:
12. Are you happy with your performance in the company?	YES ___ NO ___	
Why?		
13. Are you working in a team?	YES ___ NO ___	
If YES, what is your role in it?	<input type="checkbox"/> Leader (Leading the team) <input type="checkbox"/> Facilitator (Helping to keep things moving) <input type="checkbox"/> Harmonizer (Mediating disputes, encourage communication)	<input type="checkbox"/> Information seeker (Collecting and disseminating information in the team) <input type="checkbox"/> Gatekeeper (Facilitating participation and look for outside information) <input type="checkbox"/> Other
14. What motivate you to come to work? (Mark all that apply and rank them in order of priority) (Start with 1 as the highest priority)	<input type="checkbox"/> Payment <input type="checkbox"/> Health care/Insurance plans <input type="checkbox"/> Supervisors <input type="checkbox"/> Job by itself <input type="checkbox"/> Peers <input type="checkbox"/> Management	<input type="checkbox"/> Gift certificate <input type="checkbox"/> Company environment <input type="checkbox"/> Plaue of recognition <input type="checkbox"/> Company's renown <input type="checkbox"/> Pizza party <input type="checkbox"/> Others:
15. Which characteristics from the following list do you like the most from your work team or shift coworkers. (Mark all that apply and rank them in order of priority) (Start with 1 as the highest priority)	<input type="checkbox"/> Trust <input type="checkbox"/> Respect <input type="checkbox"/> Reliability <input type="checkbox"/> Openness <input type="checkbox"/> Collaboration	<input type="checkbox"/> Autonomy <input type="checkbox"/> Camaraderie <input type="checkbox"/> Method of work <input type="checkbox"/> Other:
16. What characteristics from the following list do you like the most from Stamping/Tool/Plating departments. (Mark all that apply and rank them in order of priority) (Start with 1 as the highest priority)	<input type="checkbox"/> Trust <input type="checkbox"/> Respect <input type="checkbox"/> Reliability <input type="checkbox"/> Openness <input type="checkbox"/> Collaboration	<input type="checkbox"/> Autonomy <input type="checkbox"/> Camaraderie <input type="checkbox"/> Method of work <input type="checkbox"/> Other:
17. What characteristics from the following list do you like the most from Stamping/Tool/Plating departments. (Mark all that apply and rank them in order of priority) (Start with 1 as the highest priority)	<input type="checkbox"/> Trust <input type="checkbox"/> Respect <input type="checkbox"/> Reliability <input type="checkbox"/> Openness <input type="checkbox"/> Collaboration	<input type="checkbox"/> Autonomy <input type="checkbox"/> Camaraderie <input type="checkbox"/> Method of work <input type="checkbox"/> Other:
18. What characteristics from the following list do you like the most from the preceding shift. (Mark all that apply in order of priority for you) (Start with 1 as the highest priority)	<input type="checkbox"/> Trust <input type="checkbox"/> Respect <input type="checkbox"/> Reliability <input type="checkbox"/> Openness <input type="checkbox"/> Collaboration	<input type="checkbox"/> Autonomy <input type="checkbox"/> Camaraderie <input type="checkbox"/> Method of work <input type="checkbox"/> Other:
19. What characteristics from the following list do you like the most from the following shift. (Mark all that apply in order of priority for you) (Start with 1 as the highest priority)	<input type="checkbox"/> Trust <input type="checkbox"/> Respect <input type="checkbox"/> Reliability <input type="checkbox"/> Openness <input type="checkbox"/> Collaboration	<input type="checkbox"/> Autonomy <input type="checkbox"/> Camaraderie <input type="checkbox"/> Method of work <input type="checkbox"/> Other:
20. In the following types of communication how often do you receive instructions from your supervisor?	Verbal ___ Written ___ E-mail ___ Posted ___ Phone ___	(N) ever (S)eldom (O)metimes (O)ften (V)ery often
21. When you have any doubt about an instruction, what you do at the first moment? (Mark the most frequent)	<input type="checkbox"/> Wait to see and talk directly to your supervisor <input type="checkbox"/> Talk to your supervisor by phone	<input type="checkbox"/> Consult with your peers <input type="checkbox"/> Consult with the leader <input type="checkbox"/> Make your own decision <input type="checkbox"/> Other
22. When you need to communicate with a peer from other shifts or departments regarding a work issue, what you do at the first moment? (Mark the most frequent)	<input type="checkbox"/> Talk to them directly <input type="checkbox"/> Talk to them by phone <input type="checkbox"/> Send a memo <input type="checkbox"/> Talk first with your supervisor <input type="checkbox"/> Talk first with your leader	<input type="checkbox"/> Talk first with their supervisor <input type="checkbox"/> Talk first with their leader <input type="checkbox"/> Talk first with the Union representative <input type="checkbox"/> Leave a note
23. What kind of decision can make on your own. Those related to: (Mark all that apply)	<input type="checkbox"/> Method of work process <input type="checkbox"/> Product quality <input type="checkbox"/> Method of work operation	<input type="checkbox"/> When processing a production order <input type="checkbox"/> When delay or stop a production order <input type="checkbox"/> None
24. If there is new information related to some issue concerning your shift or department, do you receive it at the first time from: (Mark the most frequent)	<input type="checkbox"/> Your supervisor <input type="checkbox"/> Peers from your shift <input type="checkbox"/> Peers from other shift <input type="checkbox"/> Peers from other department <input type="checkbox"/> Other	
25. When you suggest a new idea to improve process performance, do you: (Mark all that apply)	<input type="checkbox"/> See the results of your idea <input type="checkbox"/> Are rewarded for your idea	<input type="checkbox"/> Are motivated to suggest more ideas <input type="checkbox"/> None above <input type="checkbox"/> Other
26. The department lets you know how well you are doing your job	<input type="checkbox"/> Never <input type="checkbox"/> Seldom <input type="checkbox"/> Sometimes	<input type="checkbox"/> Often <input type="checkbox"/> Very often
27. Do you think that the company cares about its workers?	YES ___ NO ___	