

# PERSONNEL FACTORS AFFECTING INTERACTION BETWEEN TEAMS LEADING TO POOR KANBAN PERFORMANCE

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## Abstract

The Manufacturing Engineering Department (ME) of a small mid-western company implemented a Kanban system with the goal of producing orders on time with a rate of 95%. Unfortunately this goal was not being met, so Management partnered with the Industrial and Management Systems Engineering Department at the University of Nebraska-Lincoln to identify the causes of poor Kanban performance. A descriptive study was developed and results showed that ineffective communication, weak reward systems, incompatibility of expectations between manager and supervisors and dissonance between values declared and values supported by the organizational systems are creating a culture focused on individualism and production rather than teamwork and quality.

## Introduction

The Manufacturing Engineering Department (ME) 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 fitting into the lean manufacturing philosophy. This location of an international organization is dedicated to manufacturing circuit breakers for residential, commercial and light industry market.

Implemented in 1996 the Kanban system was not operating at the goal level of 95% and the scrap level in stamping area was increasing. This led 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, qualitative and quantitative methods of collecting and analyzing data were used in order to identify the factors affecting poor performance in the ME department. This paper presents the qualitative results showing the perceptions of the manager and supervisors about the problem.

## Literature Review

Constantly organizations are looking for better ways to achieve performance goals. Production systems such as Lead Manufacturing, JIT and Kanban are the most popular being considered in manufacturing plants. These production systems are focused on quantity and

quality control, and respect for the worker while focusing on the processes, equipment and workforce (Monden, 1986). Organizations know that the workforce plays an important role in the success of these production systems so they are looking for ways to enhance the commitment and effort of their workers. In order to accomplish this, they establish guidelines, define policies, processes and make available the necessary resources to develop new skills and behavior patterns on the workforce (Katzenbach, 1997).

A relatively new approach that managers are using in 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 (1993), there are differences between teams that perform and other groups that don't. They mention as one of them that successful teams have a clear understanding of what it means to be a team. Clear understanding by workers, supervisors and managers. Lately, team has become a word so commonly used that managers think that just calling their workgroups "team" they are going to perform successfully.

**Team performance.** Katzenbach and Smith (1993) define team 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 this definition 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), collective outcomes that exceeds the quality of any individual endeavor (Smart and Barnum, 2000).

Another point that has been studied is team effectiveness. Studies indicate that team effectiveness is a function of the task, team composition, co-workers, environmental factors, organizational structure design (including job description), internal process (communication systems, supervision), external

process (contact with other areas of the organization); group psychological traits such as beliefs and values, reward systems and performance assessment system (motivation).

### **Worker performance, leadership and motivation.**

As mentioned before, worker performance is related to worker motivation (Martinko, 1995). There are different theories that support different points of view of motivation. Martinko (1995) offers a good review of some of these theories. He states that motivation is a complex, multifaceted 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 deals with the match between employee perceptions of the environment and those of the managers and supervisors. Employees' perceptions are developed based on 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 (Schenider, et al., 1994; Butcher, 1994).

Also, communication, in a variety of types, such as face-to-face, telephone or email, written or oral, plays an important role in the motivation process. The most important aspect of communication is making sure that employees share a common understanding of the same message (Smart and Barnum, 2000; Snavely, 1995; Cohen and Bailey, 1997; Butcher, 1994).

Another element is the reward system. More specifically, this system must be related to the organization's vision, mission, objectives, and process, desired outcomes and desired workers behavior such as teamwork (McNerney, 1995; Saunnier and Hawk, 1994; Butcher, 1994). Managers must be careful when designing and applying a reward system because they can reward some behavior that is not rewarded at all (Kerr, 1995).

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 workers 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, et al., 1994, Martinko, 1995 Butcher, 1994).

Feedback through a properly implemented and managed performance measurement system has an important impact on motivation (Findley, et al., 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. Also, it has to be flexible to accommodate business changes and show workers how they are achieving theirs and company expectations (Bulger, 1995).

In the process of teamwork leadership plays an important role in achieving successful performance. In work-unit teams, the most popular type of team, managers and supervisors as formal leaders shift their role from one of policing and controlling to one of coaching (Harrison and Conn, 1994; Edwards, 1992). They provide the team with information and resources; facilitate team meeting and coach workers in problem-solving efforts (Harrison and Conn, 1994). Their job becomes to create an environment that encourages the development of skills, learning and openness. Their own actions are the model for others to follow, reflecting consistency and stability (Levine, 2000).

Thompson (1995) mentions that there are some key factors on leaders that contribute to the success of a team. Leaders create and deploy a vision for where the team is going and inspire them to achieve higher levels of performance. Courage is another key. Courage to stand up for their workers and to do what they think is right for benefiting workers and the company. Also, leaders are introspective and philosophical. They evaluate their behaviors against their beliefs through open feedback to ensure consistency. Finally, another important factor for team leaders is that they treat people as individuals with different needs and skills. From there they can act as facilitator helping the team to become interdependent and teaching team-members to take advantage of these differences. Moreover, accordingly to Kumle and Kelly (2000), leaders operate in a trust-based environment and for them open and honest communication are standard practice.

This shift of role does not seem an easy task. Managers and supervisors need the support from the highest level of the organization in order to accomplish it. Support through training to understand the meaning of teamwork and get the technical expertise to support and manage teams. Also, they need to know how the outcomes from working in teams contribute to the organization vision, satisfy workers and their own expectations and needs (Thompson, 1995).

### **Methodology**

Having reviewed the literature on the various factors influencing team performance and from discussions with plant management, it was decided to conduct a descriptive study. This type of study allows the researcher to describe a situation by identifying

specific characteristics for a given population. In this case, a qualitative approach was used in order to obtain the perceptions of the ME manager and supervisors regarding the inability of the department to achieve on time Kanban performance. Information was gathered from the field doing interviews with the manager and each of the supervisors of each business units within the ME Department.

In addition, data was collected from via an interview with the HR representative and through observations of departmental meetings where the manager, supervisors and workers were present. Also, data from the Company Core Values video, Company-Union agreement, and departmental documents such as, the organizational chart, mission statement and production reports were analyzed.

### **Population and sample**

The population consisted of the ME department manager and four supervisors in charge of the tool room, stamping and plating departments in each shift.

The ME Department consists of five business units, the tool room, stamping, plating, and maintenance and total productive maintenance (TPM), each of them considered as a team. The focus of this study was the tool room and plating and stamping departments as required by the ME manager. The stamping and tool-room operate three shifts while plating operates two. First shift from 6:30 a.m. to 3:00 p.m., second shift from 2:45 p.m. to 11:15 p.m. and third shift from 10:15 p.m. to 6:45 a.m. As of June 2000 the ME department employed 126 employees including supervisors, workers, support and technical staff.

The tool room department's main function is making, repairing and maintaining tools, jigs, fixtures, punches, molds and dies used mainly 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 function is coating, plating, and treating manufactured parts. Most of the products of the company go through stamping and plating department. Parts are manufactured in these two areas and assembled in the automated and semi-automated production lines in the stamping area.

Supervisors are assigned to each shift. In the first shift there is a supervisor in charge of stamping and tool-room units and one supervisor in charge of the plating unit. For the second shift one supervisor is in charge of all functions for all units. Finally for the third shift one supervisor is in charge of the tool-room and stamping units. There is not plating activities during third shift.

**Results.** The ME manager indicated that workers received training, support, and the necessary resources to implement the new Kanban system successfully. However, performance results indicated they were not meeting the desired level. Therefore, he would like to know what specific attributes are preventing departmental teams from working together and doing their job effectively.

Exhibit 1 shows a summary of the responses from supervisors and the manager on factors thought to contribute to an effective Kanban performance. Upon review of the results obtained in the interview, a fish-bone diagram, shown in Exhibit 2 was developed which shows the main factors affecting Kanban performance. This diagram was useful in providing a visual representation of the results.

Supervisors reported they are responsible for more subordinates than the ME manager gives them credit. Supervisors from 2<sup>nd</sup> and 3<sup>rd</sup> shift indicated that they were also responsible for workers in areas such as: maintenance, CNC and molding. However, it seems that the ME manager doesn't feel that this extra responsibility is a burden for the supervisors.

Also, supervisors don't see each department as a different unit. They think of each shift as a whole unit. Only the first shift-plating supervisor mentioned the stamping area as a different department with which it has some relationship.

Furthermore, it seems that the planning function rely on first shift supervisor of tool room and stamping. This is who assigns work priorities for all production shifts. This situation makes the decision making process of supervisors from other shift slow and inefficient. Actually, this supervisor mentioned that frequently he received calls after hours from other supervisors asking for advice or suggestions when making decisions to solve production problems.

Looking at the communication process it seems to be weak. Supervisors don't rely equally on each other. Because of seniority, experience and higher level of authority of first shift supervisor, the others try to keep more contact with them. One of the supervisors mentioned that they had better communication with the first shift supervisor than with others. Moreover, third shift supervisor mentioned that he always meets with first shift supervisors to exchange information and some times with second shift supervisor. Also, a discrepancy in reporting outcomes was mentioned. For example, the second shift supervisor takes the initiative to produce very detailed reports while the third shift supervisor produces no reports. This inconsistency facilitates a weakness in the communication process when they do not produce the same information.

Supervisors find that workers have little regards for their work as evidenced by "the high level of

absenteeism in second and third shift.” One supervisor shared the following, “because workers know that the organization is in good standing, there are no crises, customer loyalty is good, as are benefits, salaries and wages, workers just do their job at minimum level.” Some workers come to work and do their job, well other expect workers to work as a team and some expect workers to be self-directed. Specifically, the second shift supervisor mentioned that he expects his workers to work as a team.

Furthermore, he indicated that he also expects other shifts to work as a team. While the first shift supervisor indicated he expects workers from other shifts to follow the guidelines and policies he developed. Also, it was pointed out by the second and third shift supervisors that communication needed to be improved.

Another important issue observed was the lack of formal performance measurement system. Each supervisor and manager mentioned different types of

criteria they use as performance measurement with all of them making reference to production rather than quality and teamwork. The ME manager mentioned that there is no record of the production per shift; the causes of delay when they occur or the production goal per shift. All the data is recorded in totals.

Regarding to the reward system, supervisors have little to no control over the allocation of rewards. The reward system is outlined by the union agreement making emphasis on individual accomplishments more than group achievement.

Finally, all supervisors acknowledged the presence of conflicts between shifts more so than between departments. This conflict stems from a lack of trust in the work done by a department, which is documented in the complaints that supervisors receive from other shifts, and departments. Additionally, shifts often seek to discredit the job done by other shifts and a lack of communication between them also contributes to the conflict.

**Exhibit 1. Supervisors and Manager Perceptions**

<b>Item</b>	<b>Supervisor 1<sup>st</sup> Shift</b>	<b>Supervisor 2<sup>nd</sup> Shift</b>	<b>Supervisor 3<sup>rd</sup> Shift</b>	<b>Supervisor Plating</b>	<b>Manager</b>
1. Personnel	21	36	22	7	
2. Functions	1. Tool room makers 2. Tools room stamping 3. Stamping	1. Tool room makers 2. Tools room stamping 3. Stamping 4. Maintenance 5. Plating 6. CNC 7. Molding	1. Tool room makers 2. Tools room stamping 3. Stamping 4. Maintenance	1. Plat parts 2. Maintenance 3. Customer services 4. Chemical process 5. Waste treatment 6. Tumbling 7. Heat treat 8. Clear orders	
3. Departmental Interactions	1. Finance 2. Product engineering 3. HR 4. Purchasing 5. Assembly areas 6. Safety/ healthy/ environment 7. Quality 8. Shipping and receiving 9. Maintenance	1. Molding 2. HR 3. IS 4. Accounting 5. Safety 6. Medical care 7. QA 8. Advance Mft Mgmt 9. Maintenance 10. Facilities 11. Shipping and receiving	1. HR 2. Maintenance 3. MIS 4. Molding	1. Stamping (suppliers) 2. Assembly areas 3. Quality 4. HR 5. Environmental 6. Purchasing 7. Shipping and receiving 8. Safety/ healthy 9. MIS	1. Purchase 2. Union

**Exhibit 1. Supervisors and Manager Perceptions (Cont...)**

<b>Item</b>	<b>Supervisor 1<sup>st</sup> Shift</b>	<b>Supervisor 2<sup>nd</sup> Shift</b>	<b>Supervisor 3<sup>rd</sup> Shift</b>	<b>Supervisor Plating</b>	<b>Manager</b>
4. Planning	1. Kanban system 2. Assign priorities for all shifts	1. Assign priorities in case of any inconvenience to accomplish plan received from 1 <sup>st</sup> shift.	1. Assign priorities in case of any inconvenience to accomplish plan received from 1 <sup>st</sup> shift.	1. Generated by Kanban 2. Stamping or assembly production assign priorities	
5. Communication when receiving or leaving shift	1. Talk with supervisors. 2. Leave instructions verbal, by phone or email	1. Talk with supervisors. 2. Leave information verbal, by phone or email	1. Go around the shop floor talking with workers. 2. Sometimes talk with supervisor (2S) 3. Meeting with Supervisors (1S & Plating), interchange of information. 4. Receive instruction from supervisor 1S	1. 1S meet with 2S and exchange information 2. 2S if necessary leaves a note on the board or tell supervisor who email 1S supervisor	
6. Expectation from workers	1. People ready to come to work every day 2. People work together, peacefully (discussion but fighting) 3. Productivity 4. Quality more than quantity	1. Do their job as prescribe by the company and the supervisor 2. Do well and on time 3. Report deficiencies 4. Work safety 5. Talk to their supervisor when they see opportunities to improve 6. Communication 7. Team work	1. Come to work 2. Do their job 3. Be good in their job 4. Treat good their customers 5. Accomplish production on time and with quality 6. Seniors workers supervise and train others	1. Accuracy 2. being on time 3. Show up at work 4. Do what the supervisor tell them to do 5. Have some initiative (self-direction)	1. Right part in the right time to the customer
7. Expectation from other shifts	1. Follow up guidelines 2. Follow up policies	1. Good communication 2. Cross shift support 3. Follow up 4. Turn in solution 5. Team work	1. Do their job 2. Communication: What's going on, What have to be done, highlight 3. Continuation of the process coming from the other shift	1. Follow up job from the shift 2. Self-directed 3. Accurate as 1S is	

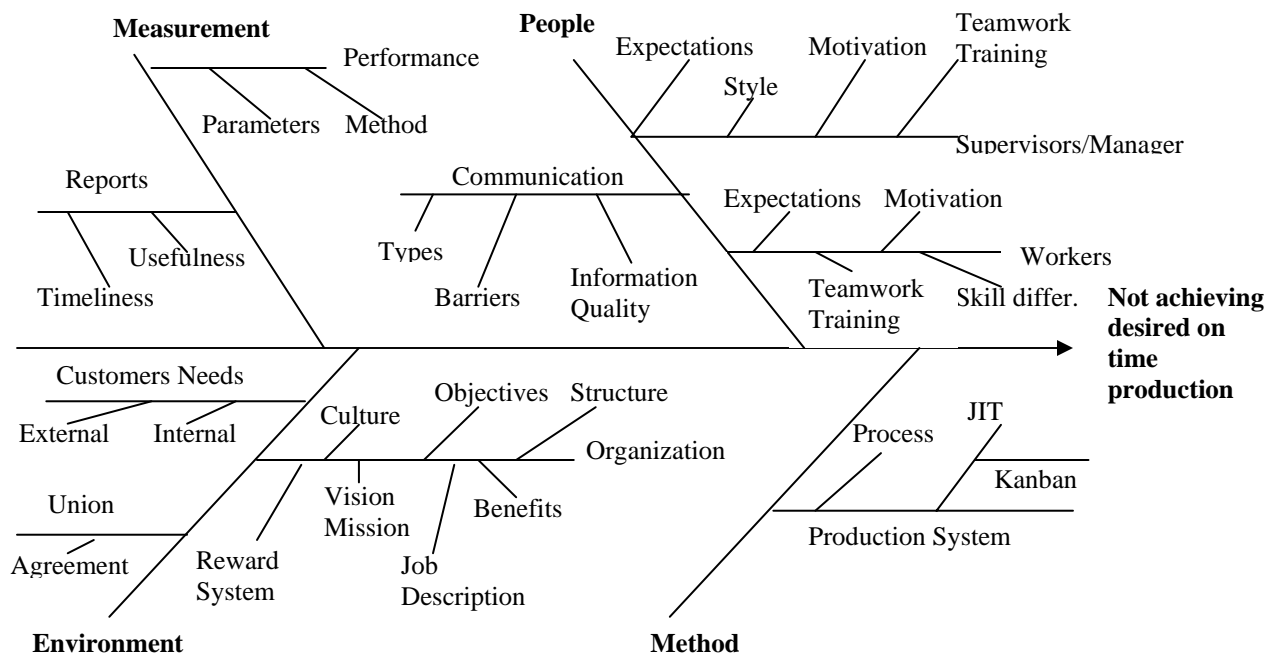
**Exhibit 1. Supervisors and Manager Perceptions (Cont...)**

<b>Item</b>	<b>Supervisor 1<sup>st</sup> Shift</b>	<b>Supervisor 2<sup>nd</sup> Shift</b>	<b>Supervisor 3<sup>rd</sup> Shift</b>	<b>Supervisor Plating</b>	<b>Manager</b>
8. Performance measurement	1. Nothing formal 2. Production done	1. Nothing formal 2. Time used to do the job 3. Job done	1. Nothing formal 2. Timeliness of the job done (TR) 3. Quantity and quality/day (ST) 4. Safety level 5. Customer satisfaction (Maintenance)	1. Ability to act with minimum instructions 2. Initiative and making good decisions 3. Accuracy 4. Attendance to work	1. Kanban on time 2. Scrap level
9. Method to gather information	1. Talking with workers 2. Seeing results on shop floor	1. Talking with workers 2. Seeing results on shop floor	1. Talking with workers 2. Seeing results on shop floor	1. Talking with workers 2. Seeing results on shop floor	Formal and informal communication
10. Reports	1. Workers record (what they did) 2. Quality data (for statistics)	1. Over time schedule 2. Daily time attendance 3. Disciplinary paper work 4. report of attendance 5. Performance maintenance sheet 6. Safety inspections 7. Keep track of parts run 8. Order of materials 9. email notification of work done and remaining problems	1. None	1. Production report (end of the month) 2. Track of purchased chemical 3. Track of chemical added 4. Cost of supplies 5. DPU (Defects per unit)	
11. Rewards	1. Job assignment 2. Verbal recognition	1. Verbal recognition 2. Pizza order 3. Dinner, plaque and gift certificate for employee of the month 4. Dinner, plaque or gift certificate for good attendance 5. Service time award	1. Verbal recognition by supervisor 2. Group recognition on weekly meeting 3. Week payment 4. Pizza order or Dinner, plaque and gift certificate when they achieve production goal	1. Listen 2. Praise in public, criticize on private 3. Pizza party 4. Gift certificate (exceptional job) 5. Verbal recognition for the management	1. Production bonus 2. Union contract benefits 3. Pride of the product 4. Pride of the company's name

**Exhibit 1.** Supervisors and Manager Perceptions (Cont...)

Item	Supervisor 1 <sup>st</sup> Shift	Supervisor 2 <sup>nd</sup> Shift	Supervisor 3 <sup>rd</sup> Shift	Supervisor Plating	Manager
12. Complaints from other shifts/ department	1. Set up at the end of the shift 2. Set up process stamping/tool makers 3. Don't solve problems on time	1. Lack of support 2. Don't communicate well 3. Don't follow work done from other shift 4. Don't think that other shifts are doing enough 5. Don't make the right things or making the right decision 6. Overload other shifts 7. Don't work hard and good	1. Don't make their job well (Stamping) 2. Inexperienced people (Maintenance)	1. Don't do their job completely	
13. Emphasis	Conflicts between shift and departments	1. Process improvement 2. Team work	Communication	Self-initiative	

**Exhibit 2.** Fish Bone Diagram



## **Discussion**

Comparing results obtained with the statement of the Company mission, which is focused on customer satisfaction through commitment to quality based on core values of trust, teamwork, intelligent risk taking, and results, it seems that supervisors and manager do not fully understand the vision. In practice, they are focused more on production than on the organization's core values.

Furthermore, supervisors and manager do not have a clear understanding of the teamwork concept. They think that workers must work as teams by nature. Although one of the supervisors made mention of teamwork, he never mentioned that he provides training or helps workers to become a real and successful team. He just expects that workers become a team by themselves. As formal leaders supervisors and manager have to be the first that behave as team and from them workers can learn and understand the meaning of teamwork via coaching.

According to Snavely (1995) communication is the process by which two or more people share meaning. The base of this definition is to view the concept or idea (communicating and receiving) in the same way. The results in this case demonstrate an unsuccessful process of communication because supervisors and manager are not "sharing meaning" with regards to information. Information related to expectations, objectives, values, needs, functions, priorities and process are different among supervisors, manager and the company. In addition, the lack of trust between supervisors allows the development of a weak communication system, which is a fundamental element in the process of teamwork.

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. At this 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. There is no possibility for supervisors and manager to match outcomes with rewards differently than those indicated by the union agreement. Supervisors and manager are losing an important resource of motivation (Edwards, 1992).

Feedback on the outcomes and process developed to achieve them are necessary in the process of teamwork. Outcomes are the basis for the performance measurement system and should be related to the vision, mission and objectives of the company. This will make decisions and actions contribute to a successful organization performance.

Based on these results, it is possible that workers are interpreting different core organizational values

from the message they receive from supervisors, union and reward systems producing outcomes different from those articulated through the company vision.

## **Conclusions**

The factors hindering performance in ME department were largely related to the workforce. From the point of view of supervisors and manager there is conflict between shifts and departments based on distrust between workers. However, it seems that this starts at the supervisor level. Communication issues between supervisors as well as the structure of reward and performance assessment systems are creating a non-favorable climate in which the department hinders the achievement of the performance.

Differences in priorities (values) between supervisors and the company create a conflict, which will affect workers who at the end of the production chain have to deliver the final product. This kind of conflict causes a drop in their levels of motivation and as consequence decreases their levels of performance (Stam and Sodano, 1991).

The ME department can't achieve good performance without a good system of communication. Communication, both giving and receiving, has to be part of the core values of the department to support cooperation and trust between supervisors and workers in order to lay foundation for real teamwork.

While this company, like many others is focusing on teamwork as a core value to improve performance, it seems to be just a declaration in the vision statement because there is not any action supporting team building. Maybe because team is a term and concept so familiar to everyone (Katzenbach and Smith, 1993), managers take for granted that teamwork is a natural function of the worker and teams don't need to be trained or supported.

In this company, supervisors are not prepared to play the team leader role. They need training on moving from a passive controller to an active coach. They need to learn to teach by modeling (Thompson, 1995) and to support the team in their decision making while providing feedback to all. Also, they need to learn how to reward, develop and discipline the team without forgetting individual differences, and finally how to empower the team by celebrating together the achievement of the team and the unit which led to the fulfillment of the company's goals.

In summary, there are many factors influencing the poor Kanban performance of the Manufacturing Engineering department. Low levels and ineffective communication, weak reward systems and incompatibility of expectations is the bases of a non-supportive climate of good performance. Moreover, dissonance between values declared and values

supported by the organizational systems are creating a culture focused on individualism and production rather than teamwork and quality.

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