

DETERMINING QUALIFICATION LEVEL OF BUSINESS PROCESSES OF AN ORGANISATION WORKING IN READY-MADE GARMENT SECTOR

BİR KONFEKSİYON İŞLETMESİNDE İŞ SÜREÇLERİNİN NİTELİK SEVİYESİNİN BELİRLENMESİ

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ABSTRACT

This paper presents a case study of Harrington qualification criteria in ready-made garment sector with the aim of improving the process by using the cause and effect relationship between process qualification and process performance. Harrington criteria qualifies business processes in one of six levels, examining whether they satisfy the requirements determined for eight change areas; end-customer related measurements, process measurements and/or performance, supplier partnerships, documentation, training, benchmarking, process adaptability and continuous improvement. As a result of the case study, the process, which was qualified at level 6 at the beginning of the improvement studies, is upgraded to level 5.

Key Words: Process performance criteria, Performance measurement, Harrington qualification criteria, Ready-made garment sector, Textile business process.

ÖZET

Bu çalışmada, konfeksiyon sektöründe Harrington kriterlerinin uygulanması üzerine bir alan çalışması sunulmaktadır. Çalışmanın amacı; süreç niteliği ve süreç performansı arasındaki sebep-sonuç ilişkisini kullanarak tekstil iş sürecinde iyileşme sağlamaktır. Harrington kriterleri iş süreçlerini altı seviyede sınıflandırır. Bu sınıflandırmayı yaparken sürecin, sekiz değişim alanı için belirlenmiş gereklilikleri sağlayıp sağlamadığına bakar. Sekiz değişim alanı; son müşteri ile ilgili ölçümler, süreç ölçümleri ve/veya performansı, tedarikçi ilişkileri, dokümantasyon, eğitim, kıyaslama, süreç adaptasyonu ve sürekli gelişimdir. Yapılan alan çalışmasının sonucunda; süreç iyileştirme çalışmalarının başında 6. seviyede olan tekstil iş süreci 5. seviyeye yükseltilmiştir.

Anahtar Kelimeler: Süreç performans kriterleri, Performans ölçümü, Harrington nitelendirme kriterleri, Konfeksiyon sektörü, Tekstil iş süreci.

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1. INTRODUCTION

Nowadays, business process improvement is an indispensable concept for being competitive in the market. In order to realise business process improvement, which is a difficult and time consuming process, the performance of business processes should accurately be measured, analysed, monitored and evaluated. During this improvement process, there are some milestones that process improvement teams can use for watching the progress of the process. Harrington has developed qualification criteria set for this purpose. This paper presents a process qualification case study using Harrington criteria in a textile factory.

As stated in the study, there is a cause and effect relationship between process qualification and process performance. Qualification is the cause and performance is the effect. Therefore, evaluations and audits that will be made on process qualification will give more effective results than the audits that will be made on process performance. Also, quality management system principles will be more permanent. In this manner, by making improvements in the qualification of the process, improvement on process performance will be ensured.

2. LITERATURE REVIEW

Khan, Bali & Wickramasinghe presented a planned and integrated approach for

the gradual success of world class manufacturing in medium sized enterprises by business process improvement through continuous improvement and structured training, in their study. Their study summarises the requirements of management of medium sized enterprises into business process improvement framework. Therefore, it fulfils the need for medium sized enterprises to achieve world class manufacturing status and offers a practical framework (1).

Lockamy & Cox examined the performance measurement systems of six production companies which were identified as world class companies by academic and practitioner experts. The purpose of this study was to examine

the relationship between department and factory performance measurement systems. Concluding their study, the authors found out that an effective performance measurement system provides the company with the magnitude and direction of advancement made towards accomplishing excellence (2).

Newall and Dale examined quality improvement processes of eight companies. They investigated the problems they met during quality improvement process. The stages of this process are determined as awareness, education and training, consolidation, planning, problem identification, problem solving, implementation of quality improvement plans and assessment of the progress of quality improvement process. Finally, they determined the problems encountered during introduction, development and measurement of quality improvement process as management commitment, lack of understanding, emphasis on short term profitability, the size and complexity of the company, lack of initial planning and so on (3).

Gelders, Mannaerts and Maes expresses the results of their survey conducted in Belgian industry, with the purpose of getting insight into manufacturing objectives, performance measurement systems and improvement programmes. The study shows that there is a lack of consistency between business strategy, performance measurement systems and improvement actions in many companies. The authors found out that although many companies know the strategic value of lead time, delivery reliability and time to market, many manufacturing companies did still not restructure their performance measurement systems and improvement programmes accordingly (4).

3. PROCESS APPROACH

A process is defined as a set of activities that transforms inputs into outputs or results. The processes within an organisation should be united with the organisation's purposes and should add value to the organisation (5).

The process approach is a management strategy. It is managing organisation's processes by examining the interactions between processes and inputs and outputs of the processes that link them to each other (6). Therefore, it is a powerful way of organising and managing to create

value for the customers (5). Among benefits of process approach, its most important advantage is that, it aids the organisations to comprehend what actually is happening in the organisation and discover the bottlenecks, inefficiencies and problems that could be hidden. Process management also helps the organisations to reduce lead times, decrease costs, improve efficiency, improve quality and increase customer and employee satisfaction. By modelling and analysing the business processes, the organisations can improve their effectiveness and quality of work (7). Finally, by using process approach, the performance of an organisation can be improved.

4. BUSINESS PROCESS IMPROVEMENT

4.1. Business processes and the need for process improvement

Business processes involve a group of related tasks that use organisations' resources to provide defined results in support of the organisations' objectives (8). So, success of an organisation depends on how well its business processes are. If the organisation decides to improve itself, it has to improve its business processes. For making the improvement, sources of variability should carefully be analysed and variability should be decreased, and this cannot be thought separately of statistical thinking (9).

Harrington defines business process improvement as a systematic methodology developed to help an organisation make significant advances in the way its business processes operate. The main purpose of business process improvement is to have business processes that eliminate errors, minimise delays, maximise the use of possessions, encourage understanding and provide the organisation competitive advantage (8).

4.2. Process performance

Business processes and their performance are very important for the success and continuance of the organisations. If an organisation wants to be competitive in today's marketplace, it has to measure, analyse, monitor and evaluate the performance of its business processes carefully. One of the reasons for the necessity of improving process performance is that, performance levels of

processes may decrease eventually unless it is tried to maintain it. Another reason is that, today's customers are more conscious, demanding more things and their expectations rise continuously. Finally, an organisation may not improve but its competitors will. So, if an organisation wants to at least maintain its market share, it has to improve its business processes (10).

4.3. Performance measurement

Something that can not be measured can not be managed. If an organisation wants to improve its business processes, it first has to measure them. Measuring the business processes' performance level is important. Performance measurement gives information about how well a process is being conducted and how good its results are. By measuring the performance of processes, organisations can understand what is occurring, evaluate the need for change, identify processes or areas that need improvement, get an idea of the development over time which is the trend of the performance, compare its performance level against other organisations, determine whether started or finished improvement projects have produced or will produce results, determine how effectively its resources are used and evaluate which improvement tools should be used (8, 10).

5. PROCESS QUALIFICATION

Harrington defines process qualification as milestones and recognition points for process improvement teams. The companies all have the same target; to have the best business processes. It is difficult to reach this target and it will take a long time. So, the companies need some milestones during this process to show that they are making progress, their processes are being improved. This is process qualification and it involves evaluating a complete process to determine whether it can perform at the appropriate level or not (8).

Performance criteria are actually the effect of process qualification. Process performance is created by process qualification. It is clear that there is a cause and effect relationship between

process performance and process qualification, and this relation is shown in Figure 1 (9).

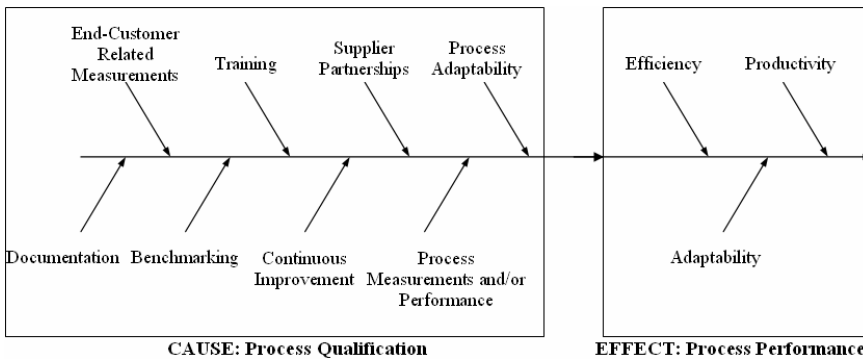


Figure 1. Cause and effect relationship between process qualification and process performance

Table 1. Six qualification levels of business processes

Level	Status	Description
6	Unknown	Process status has not been determined.
5	Understood	Process design is understood and operates according to prescribed documentation.
4	Effective	Process is systematically measured, streamlining has started, and end-customer expectations are met.
3	Efficient	Process is streamlined and is more efficient.
2	Error-free	Process is highly effective (error-free) and efficient. Rarely there is a problem in the process. Schedules are always met and stress levels are low.
1	World class	Process is world class (the process is one of the 10 best processes of its kind in the world) and continues to improve. These processes are often benchmark target processes for other organisations.

Source: Harrington, 1991:206

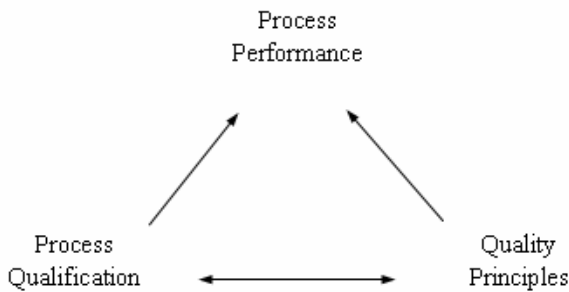


Figure 2. The relationships between process performance, process qualification and quality principles

Table 3. Relation between Harrington criteria and quality management system principles

Change Areas in Harrington Criteria	Quality Management System Principles							
	1	2	3	4	5	6	7	8
End-customer related measurements	●	△	-	-	-	●	-	●
Process measurements and/or performance	-	△	●	●	△	●	-	●
Supplier partnerships	-	-	-	-	-	●	●	●
Documentation	-	-	○	●	●	●	●	●
Training	○	●	●	○	●	●	○	-
Benchmarking	-	-	-	-	△	●	○	●
Process adaptability	●	○	○	○	-	●	●	-
Continuous improvement	●	○	○	●	●	●	●	●

5.1. Harrington qualification criteria

H.J. Harrington developed some performance measures for qualifying business processes in one of six levels as shown in Table 1.

There are eight change areas to be examined for determining performance level and process status of business processes. These change areas are; end-customer related measurements, process measurements and/or performance, supplier partnerships, documentation, training, benchmarking, process adaptability and continuous improvement, and they determine the requirements to move from one level to another. Audit checklists are prepared for each qualification level to be used in process qualification evaluations in the case study.

5.2. The relation between Harrington qualification criteria and quality management system principles

Process qualification reflects to process performance. Besides, eight quality management system principles, customer focus, leadership, involvement of people, process approach, system approach to management, continuous improvement, factual approach to decision making and supplier partnerships also reflect to process performance. So it is meaningful to draw the diagram in Figure 2 (9).

In this part of the study, the relation between Harrington criteria and quality management system principles are examined, and the results are shown in Table 3. In the table, ● shows strong relation, ○ shows intermediate relation and △ shows weak relation. The empty cells mean that there is no relation. The relations in Table 3 are evaluated by the authors and these relations can be re-evaluated in future studies by making collective studies with academicians, managers and engineers working on this field.

6. A CASE STUDY FOR BUSINESS PROCESS IMPROVEMENT THROUGH PROCESS QUALIFICATION IN A TEXTILE PLANT

The case study is realised in an organisation working in textile manufacturing sector, producing ready made garment. It is established in the Aegean region and has 450 employees, approximately 15% of which is white collared. The organisation produces shirts for men and women, which may

be printed, with embroidery or washed garment, manufactured from yarn dyed fabric or uni-colour fabric, in different patterns, style details and sizes. The organisation exports approximately 70% of its production.

The aim of this case study is to use Harrington process qualification criteria for determining improvement in production processes of the company. First of all, process improvement team is formed. This team consists of 4 members; the authors and 2 workers of the company. Member 1 is responsible for planning and organisation and member 2 is responsible for process flows, documentation, capability studies, measurements and following the production. The first thing the team did was to draw the map of the production process using Integrated Definition Function Modelling Method (IDEF0) as shown in Figure 3, with the aim of examining the process in detail and see the flow of the process clearly. IDEF0 is a methodology used for process modelling and a structured modelling technology (11, 13, 14). It is used for modelling the decisions, actions and activities of an organisation or a system (12).

Then, the team members were trained on the subject of process qualification

and Harrington qualification criteria. Following this training, the team realised the first evaluation with Harrington criteria before any improvement studies were done. Unless any business process improvement methodologies are applied, all processes are considered to be at level 6. So, the audit checklist for level 5 is used first. The results of this evaluation are shown in Table 4. In the table, "F" means that requirement is finished, realised. "P" means that requirement is in progress, is being worked on but not finished yet. The empty cells means that requirements are not met yet. As it is seen from Table 4, the process can not meet the requirements for level 5. So, the process is still qualified at level 6.

One of the improvement targets for this process determined by the organisation is to decrease the time spent for getting the production approvals. Production approval is a critical indicator in production process as it is the most important thing to catch the deadlines and make the shipments on time. So, improvement studies are realised on production approvals.

Production approvals are measured by the number of days spent until getting the approval. Between January 2006 and December 2006, measurement

times are recorded. This data is analysed with a four panel chart in Figure 4.

During the improvement studies, the second evaluation with Harrington criteria was realised. The results are shown in Table 5. From Table 5, it is seen that the process can still not meet the requirements for level 5, so it is still qualified at level 6.

The final evaluation, realised at the end of improvement studies, show that the process can now be qualified at level 5 as it meets all the necessary requirements. Related audit checklist can be seen on Table 6.

Finally, examining the performance metric; production approval waiting time, in the histogram in Figure 4, the improvement can be seen clearly. In Table 7, values that the performance metric took during improvement process can be seen. Therefore, the use of Harrington qualification criteria ensured an improvement in process performance which is the main point in our study.

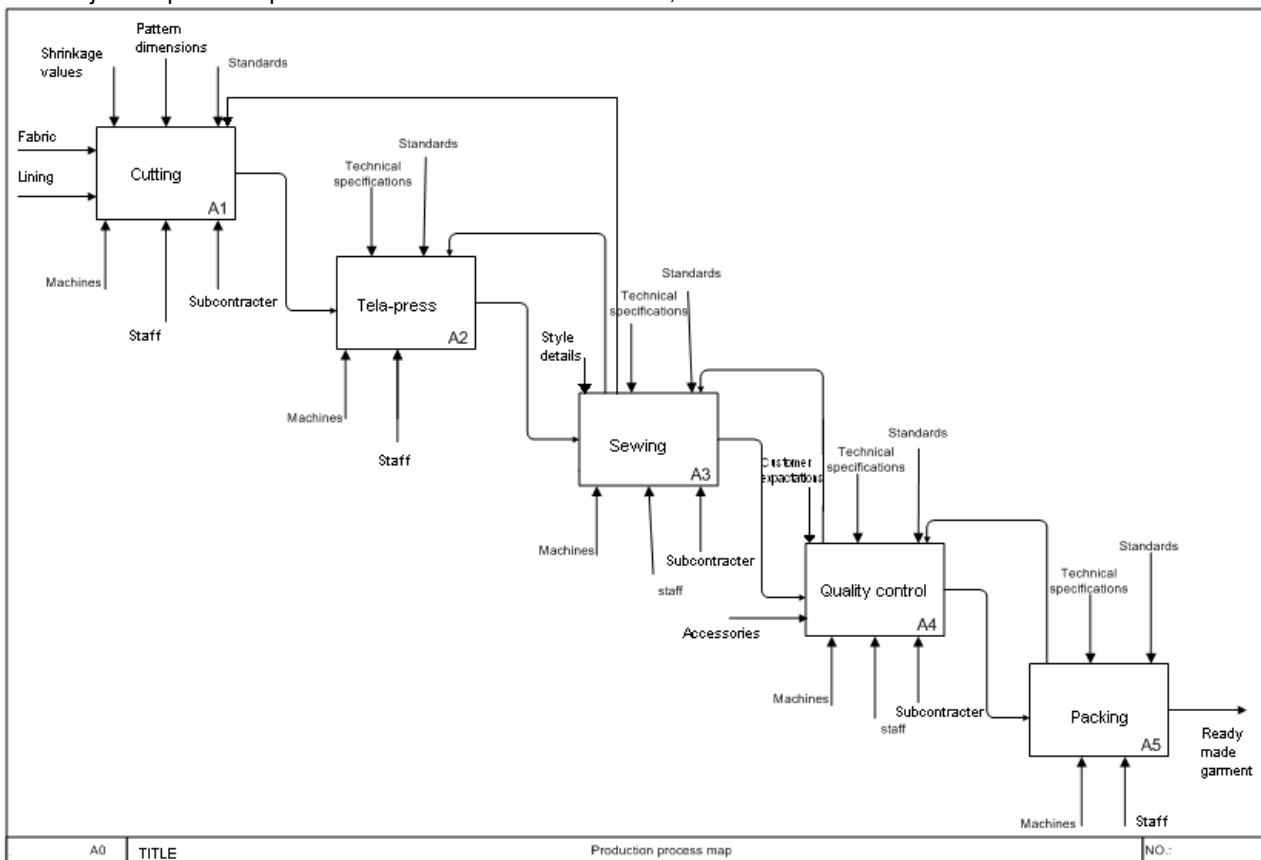


Figure 3. IDEF0 map of production process of the company

Table 4. Audit checklist for level 5 (At the beginning of improvement studies)

Change Areas	Requirements	State	Necessary Actions for Conformity
End-Customer Related Measurements	Measurements reflect the end customer's view of the process.	P	End customers' views about the process should be obtained.
	End customer requirements are documented.	F	
	End customer feedback system is established.		
	End customer effectiveness charts are posted and updated.		
Process Measurements and/or Performance	Overall effectiveness and efficiency are measured and posted where they can be seen by employees.		
	Effectiveness and efficiency targets are set.		
	Process operational and/or control weaknesses are evaluated and meet minimum requirements.	F	
Supplier Partnerships	All suppliers are identified.		
Documentation	Process is defined and flowcharted.	F	
	Flowchart accuracy is verified.	F	
	Documentation is followed.		
	PIT (Process Improvement Team) members and process owners are named.		
	PIT mission is documented.		
	Process boundaries are defined.	F	
Training	PIT is trained in the basic tools and fundamental BPI (Business Process Improvement) tools.		
	In-process training needs are evaluated and documented.		
	Resources are assigned to support training needs.		
Benchmarking			
Process Adaptability			
Continuous Improvement	Basics of BPI are in place.		
	All major exposures are identified and action plans are in place.		
	Detailed plan to improve process to level 4 is agreed to and funded.		

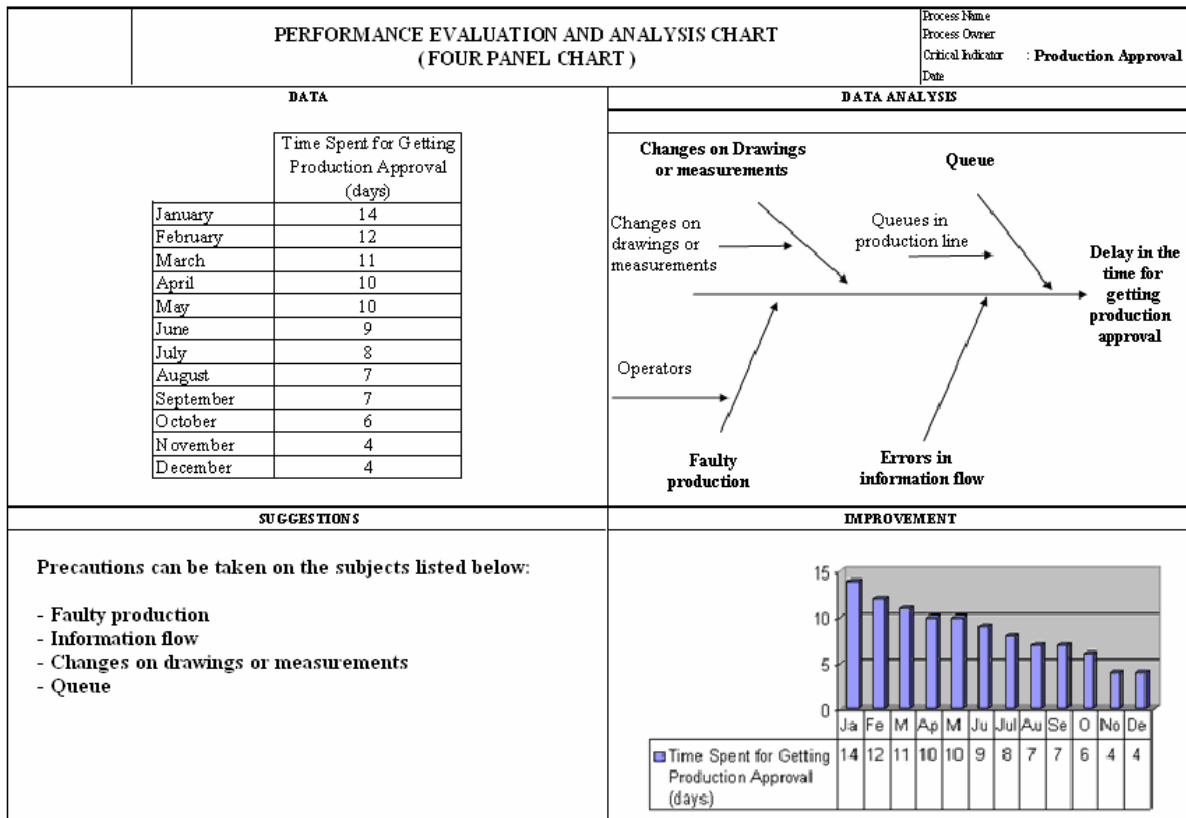


Figure 4. Four panel chart showing performance evaluation of production process

Table 5. Audit checklist for level 5 (During improvement studies)

Change Areas	Requirements	State	Necessary Actions for Conformity
End-Customer Related Measurements	Measurements reflect the end customer's view of the process.	P	
	End customer requirements are documented.	F	
	End customer feedback system is established.	P	
	End customer effectiveness charts are posted and updated.		
Process Measurements and/or Performance	Overall effectiveness and efficiency are measured and posted where they can be seen by employees.	P	
	Effectiveness and efficiency targets are set.	P	
	Process operational and/or control weaknesses are evaluated and meet minimum requirements.	F	
Supplier Partnerships	All suppliers are identified.		
Documentation	Process is defined and flowcharted.	F	
	Flowchart accuracy is verified.	F	
	Documentation is followed.		
	PIT (Process Improvement Team) members and process owners are named.	P	
	PIT mission is documented.	P	
	Process boundaries are defined.	F	
Training	PIT is trained in the basic tools and fundamental BPI (Business Process Improvement) tools.	P	
	In-process training needs are evaluated and documented.	P	In process training needs should be determined carefully.
	Resources are assigned to support training needs.	P	
Benchmarking			
Process Adaptability			
Continuous Improvement	Basics of BPI are in place.	P	
	All major exposures are identified and action plans are in place.		
	Detailed plan to improve process to level 4 is agreed to and funded.	P	

Table 6. Audit checklist for level 5 (At the end of improvement studies)

Change Areas	Requirements	State	Necessary Actions for Conformity
End-Customer Related Measurements	Measurements reflect the end customer's view of the process.	F	
	End customer requirements are documented.	F	
	End customer feedback system is established.	F	
	End customer effectiveness charts are posted and updated.	F	
Process Measurements and/or Performance	Overall effectiveness and efficiency are measured and posted where they can be seen by employees.	F	
	Effectiveness and efficiency targets are set.	F	
	Process operational and/or control weaknesses are evaluated and meet minimum requirements.	F	
Supplier Partnerships	All suppliers are identified.	F	
Documentation	Process is defined and flowcharted.	F	
	Flowchart accuracy is verified.	F	
	Documentation is followed.	F	
	PIT (Process Improvement Team) members and process owners are named.	F	
	PIT mission is documented.	F	
	Process boundaries are defined.	F	
Training	PIT is trained in the basic tools and fundamental BPI (Business Process Improvement) tools.	F	
	In-process training needs are evaluated and documented.	F	
	Resources are assigned to support training needs.	F	
Benchmarking			
Process Adaptability			
Continuous Improvement	Basics of BPI are in place.	F	
	All major exposures are identified and action plans are in place.	F	
	Detailed plan to improve process to level 4 is agreed to and funded.	F	

Table 7. Performance metric during improvement process

	Average Time Spent Before Getting Production Approval (days)
January 2006	14
February 2006	12
March 2006	11
April 2006	10
May 2006	10
June 2006	9
July 2006	8
August 2006	7
September 2006	7
October 2006	6
November 2006	4
December 2006	4

7. CONCLUSIONS

This study shows the application of Harrington qualification criteria in business process performance improvement. As it is stated, process qualification is important as it shows that the process is making progress. In the case study, by improving the production process, its qualification level upgraded from level 6 to level 5. Besides, the relationship between process qualification and process performance, and the relationship between Harrington qualification criteria and quality management system principles are examined.

The aim of this study was to improve the process by using the cause and effect relationship between process qualification and process performance. By making audits on process qualification, process performance and quality management system principles are improved. All performance metrics show the improvement in the process clearly.

As a result of upgrading qualification level of the process, and as a result of audits realised in the organisation, quality management system principles are also developed. The organisation became more customer focused as it is also a change area in Harrington

criteria. Also, process approach improved because process approach is one of the basics of Harrington criteria. The company started to realise continuous improvement. Supplier partnerships became more important for the organisation. And finally, factual approach to decision making improved in the company.

Examining the results of the case study, an improvement plan is formed for the organisation for upgrading to higher qualification levels. According to this plan, the change areas that the organisation should focus on are process measurements and/or performance, training and process adaptability. The organisation already meets most of the requirements for the other change areas for higher qualification levels. As an example, for the requirements of process measurements and/or performance change area for level 4, the organisation should develop poor quality cost measurements, internal efficiency measurements and challenge targets, define overall process cycle time and cost, and meet overall effectiveness targets. Also, internal effectiveness measurements and targets should be 50 percent complete, there should not exist any significant effectiveness, efficiency or control exposures and substantial improvement activities should be under way.

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