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Dipartimento di Ingegneria Industriale
Dipartimento di Tecnica e Gestione dei Sistemi Industriali
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Tesi di Laurea

Strumenti e metodi per l'assessment dei progetti Lean Production.
Una revisione critica della letteratura

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SOMMARIO

In questi ultimi anni a far da “sfondo” al mercato attuale e globale è la crisi: molti hanno cercato il modo migliore per poterne uscire, cercando di non peggiorare la situazione e mantenendo la propria quota di mercato. Un modello di organizzazione aziendale proposto e utilizzato da diverse aziende con ottimi risultati è la lean production: esso punta non all’aumento di produzione ma principalmente ad una riduzione degli sprechi, cercando di focalizzare l’attenzione su ciò che vuole il cliente finale e sulla continua perfezione.

In questa tesi verrà esposto nel capitolo primo com’è nata la lean production e in cosa consiste. Il corpo della tesi sarà centrato sul modo di misurare quanto un’azienda è vicina ad essere lean, la fase di lean assessment, mostrando esempi di tools e analizzando le categorie valutate. Verranno mostrati i diversi assessment nella loro struttura e nel loro modo di operare. La misurazione, e di conseguenza la valutazione, di quanto un’azienda sia distante dall’essere lean è di fondamentale importanza.

Verrà effettuata un’analisi comparata dei vari strumenti al fine di individuare le aree e le pratiche di assessment più frequentemente utilizzate per valutare il grado di adozione dei principi e delle metodologie lean.

Si cercherà di capire come la fase di lean assessment aiuta l’azienda, o chi sta affrontando la questione, a rendersi conto della situazione in cui ci si trova per poi arrivare ad impostare un piano d’azione ai fini del miglioramento dei diversi settori produttivi o di un processo.

INDICE

INTRODUZIONE

Negli ultimi anni, per soddisfare le esigenze dei clienti e gestire al meglio l'azienda, è nata una nuova filosofia: il LEAN THINKING. Questo nuovo modo di pensare ha origine in Giappone con Toyota e solo intorno agli anni settanta si comincia a studiarne i pregi.

Questo pensiero viene divulgato a livello mondiale grazie al libro "The machine that changed the world" scritto da J. Womack, D. Jones, D. Ross, nato da un'indagine americana degli anni ottanta sugli stabilimenti di assemblaggio auto americani, europei e giapponesi, in cui vengono descritti i principi base e i vantaggi nell'applicazione di questa nuova teoria di produzione. Con la sua pubblicazione viene coniato il termine LEAN PRODUCTION, ossia "produzione snella". La ricerca fatta dagli autori mette in risalto la nuova metodologia basata sull'aumento della flessibilità, della qualità, della riduzione di costi e tempi, della partecipazione attiva dei dipendenti e manager a discapito dell'idea di produzione di massa usata da Ford.

Diversi furono i giudizi sul nuovo modo di agire nella produzione ma alla fine tutti concordarono in favore del TPS (Toyota Production System) e nel cominciare ad attuarne il metodo diventando modello strategico di successo per il miglioramento dei processi produttivi e il recupero della competitività. Oggi Toyota rappresenta il punto di riferimento per le aziende che vogliono accorciare il processo di sviluppo, fornendo prodotti affidabili e volti alle esigenze del cliente. Il concetto che sta alla base del lean è la ricerca dell'eccellenza, l'eliminazione di tutto ciò che è "spreco" e quindi la chiara comprensione di cosa è "valore", ciò che serve, che deve essere realizzato e consegnato. Perciò bisogna identificare che cos'è "valore percepito dal cliente" ovvero per cosa il cliente è disposto a pagare il prezzo richiesto.

Il processo di cambiamento in logica lean che un'azienda decide di intraprendere non è di certo semplice e veloce, per questo la prima azione da compiere è verificare lo stato dell'azienda e la sua "distanza" da un profilo ideale. Tutto questo si traduce nel LEAN ASSESSMENT, il primo passo per valutare lo stato attuale e ricavare qual è il "grado di eccellenza" dell'azienda, di ogni suo processo: un questionario che consiste in alcune domande per ciascun processo, ad ogni domanda viene data una risposta parametrizzata

su diversi livelli. I dati vengono poi elaborati e forniti all'azienda la quale potrà poi valutare nel tempo l'evoluzione del cambiamento verso la logica lean.

In questo campo sono nate diverse società di consulenza che "accompagnano" l'impresa nel suo cammino verso l'azienda snella, andando a valutare ciò che è necessario e utile ai fini del raggiungimento dell'obiettivo prefisso. La fase di lean assessment aiuta a indicare la via per la realizzazione del piano strategico da implementare nell'azienda, a riconoscere quali sono le fasi, le strutture o le competenze più carenti che la portano a non riuscire ad incrementare la propria competitività: lo scopo è sempre e comunque quello della riduzione dei costi e degli sprechi che non aiutano l'impresa al proprio successo e sviluppo.

In questa tesi si andrà ad affrontare proprio questo problema, ciò che sta alla base della lean transformation: il LEAN ASSESSMENT.

Nel primo capitolo si introduce il problema dal punto di vista storiografico per poi descrivere i principi della logica lean che possono influenzare e portare al successo lo sviluppo del prodotto e i processi produttivi in azienda, indicando quali sono gli sprechi principali da eliminare.

Nel secondo capitolo viene descritto l'approccio e la struttura dei tools, di come viene impostato solitamente il lavoro di assessment.

Nel terzo capitolo vengono presi in considerazione diversi modelli di assessment i quali vengono analizzati nella loro struttura e nel loro modo di operare nella valutazione dello stato di un'azienda.

Nel quarto capitolo verranno prese in considerazione le diverse aree analizzate nei vari assessment e si verificherà quali sono le più presenti; per ogni area verrà poi valutato quali sono le variabili su cui verranno poste le domande e per ognuna di esse si verificherà la presenza nei relativi assessment.

CAPITOLO 1

ORIGINI E CARATTERISTICHE DELLA LEAN PRODUCTION

1.1 - LA PRODUZIONE DI MASSA

Sin dalle origini come prima forza lavoro nel mondo industriale si trovava l'artigiano, figura specializzata in specifici tipi di lavoro, quale montaggio, lavorazioni meccaniche, etc.

Chi voleva "imparare il mestiere" affrontava un periodo di apprendistato per cercare di assimilare il più possibile ciò che lo poteva portare a conoscere il tipo di lavoro. Dopo l'esperienza, alcuni di loro aprivano un'attività in proprio.

All'inizio della rivoluzione industriale, molti cominciavano a diventare imprenditori, aprendo fabbriche e officine.

Per quanto riguarda la progettazione e la costruzione del veicolo, i vari componenti provenivano da diverse parti, da piccole officine decentrate anche se nella stessa città.

I diversi pezzi non erano mai uguali perché tanto dipendeva dalle "diverse mani" che producevano i componenti. In questo primo periodo la produzione era più centrata sulla bravura dell'artigiano e ci si fidava di lui: questo portava a non testare direttamente i prodotti finiti per cui la qualità e l'affidabilità del prodotto non era mai garantita al 100%. Questo era uno dei problemi all'interno del sistema di produzione.

Tra gli altri, c'era pure il fatto che i costi erano elevati e non diminuivano con l'aumento della produzione per cui pochi erano quelli che si potevano permettere di acquistare i diversi prodotti.

Nel campo automobilistico, ma anche nell'intero ramo industriale, la prima rivoluzione avvenne con Ford che nel 1908 portò sul mercato il modello T.

Ciò che è alla base della produzione di massa è l'intercambiabilità dei pezzi e la loro semplicità d'incastro. Per quanto riguarda l'intercambiabilità, Ford pensò di usare un sistema di calibratura unico per ogni pezzo in modo da ridurre i costi di montaggio. Poi, in quel periodo, i macchinari erano sempre più tecnologici, alcuni capaci di lavorare

metalli pretemprati in modo da non avere deformazioni durante e dopo la tempratura e passare direttamente alla fase di assemblaggio.
In questa maniera Ford riuscì ad avere una forte leadership nei confronti della concorrenza.
Inizialmente Ford pensò di utilizzare un banco di montaggio per costruire la vettura con un unico montatore. La sua prima idea fu quella di far arrivare i pezzi in ogni stazione di lavoro in modo tale da tener fermi i lavoratori nel proprio posto di lavoro. Raggiunta l'intercambiabilità, decise di dare al montatore un'unica mansione e di muoverlo attraverso l'assemblaggio. Ciò portò ad una riduzione del tempo di ciclo di un montatore medio, da 5 minuti e 14 secondi a 2 minuti e 3 secondi. Si ebbe così un aumento progressivo della produttività, grazie all'esperienza ormai consolidata dei montatori e ai pezzi che non dovevano essere più adattati prima di essere assemblati.
Ford poi vide che spostare gli operai da una parte all'altra comportava delle perdite di tempo. Nel 1913, nello stabilimento di Higland Park (Detroit), pensò ad una nuova linea di assemblaggio, ossia la linea d'assemblaggio in movimento: far passare l'auto davanti agli operai tramite un nastro trasportatore. Nel 1914 ne fu installato il primo e questo fu una grande innovazione che portò ad una ulteriore riduzione di tempo, 1 minuto e 19 secondi. La sua introduzione nella fabbrica portò a ridurre anche la quantità di lavoro per assemblare la macchina e quindi più automobili si producevano, minore era il costo.
Ford pensò al suo modello di automobile come facile da usare e con poca manutenzione (corredato di un libretto d'istruzioni): questo lo portò ad essere leader ancora più affermato nella costruzione di automobili e la sua idea di produzione di massa fu esempio per altri per oltre mezzo secolo.
Negli anni Ford arrivò a perfezionare il suo sistema, agendo non solo sull'intercambiabilità dei pezzi ma anche sugli operai. Egli adottò un nuovo modo di divisione del lavoro: l'operaio doveva lavorare ad un unico compito nella linea d'assemblaggio e non era tenuto sapere cosa facessero i suoi colleghi o andare a risolvere problemi non di sua competenza o al di fuori della sua postazione di lavoro.
In questa maniera all'operaio bastava poco tempo per apprendere il proprio compito e doveva mantenere il ritmo dettato dalla linea d'assemblaggio.
Il modo in cui Ford mise i suoi operai al lavoro lo portò a considerare il fatto che essi non fossero tanto propensi a dare suggerimenti per il miglioramento. Così pensò a nuove figure professionali: l'ispettore della qualità, l'adetto alle pulizie, etc.

Tutto ciò si rifletteva anche nell'ambito della progettazione, tecnici che si specializzavano nel progettare pezzi o fasi d'assemblaggio. Messo in questa maniera all'operaio non restava granchè, se non diventare caporeparto.
La nuova idea della linea d'assemblaggio continua portò Ford a realizzare gran parte della componentistica internamente alla fabbrica, cominciando dalle materie prime.
Tutto ciò avvenne all'interno dello stabilimento di Rouge nel 1931: così si ottennero tempi di consegna minori (i fornitori in quel periodo erano diffidenti nei confronti di Ford).
Ford cominciò in principio ad esportare il modello T in altri paesi per poi creare nuovi impianti produttivi nei diversi stati che lo portarono ad avere meno problemi in termini di costi, richieste dei clienti, barriere all'entrata.
Il nuovo sistema cominciò a rivelarsi alquanto economico per via delle nuove macchine utensili in grado di lavorare in quantità elevate e costruendo dei nuovi macchinari che eseguivano una sola operazione, riducendo così il tempo di messa a punto mantenendo fermo il pezzo. Ciò comportava un addestramento dell'operaio in breve tempo. Inoltre, producendo un solo pezzo, potevano essere disposte in successione. Il difetto stava nella non flessibilità perché qualsiasi modifica richiedeva tempo e denaro.
Il modello T venne prodotto in diversi modelli (berlina,spider) ma il telaio era sempre lo stesso. Quello che portava al successo il modello T era il basso prezzo che scendeva inesorabilmente. Uno dei motivi principali di questo stava nel fatto che se ne producevano in grandi quantità andando ad abbattere il costo unitario di produzione.
Quando un modello T usciva dalla fabbrica non subiva alcun test o controllo, cioè nessuno si adoperava nel provare ad accendere il motore o a testarlo su strada comprovandone il vero funzionamento.
Ford, dall'ambito automobilistico, cominciò a spostare la sua idea di produzione di massa in altri campi (ad esempio alimentari, aereo) pensando di ridurre il costo dei prodotti e renderli accessibili a più persone. Ma non ebbe grande successo.
Negli anni venti Alfred Sloan divenne direttore generale della General Motors.
La sua prima intuizione fu quella di istituire una piccola sede centrale che amministrava le diverse divisioni; poi creò capitali disponibili nel caso fossero necessari grazie ai suoi legami con le banche. Inoltre trovò un compromesso tra standardizzazione e necessità di diversità dei modelli: i pezzi erano standardizzati ma l'esterno veniva modificato ogni anno e introdotti nuovi accessori.

Nonostante tutto, gli stabilimenti di produzione di massa non godevano di buone condizioni sia per via della consapevolezza della situazione in cui si trovavano gli operai (nascita dei primi sindacati) sia per il ciclo del mercato che portava al licenziamento dei dipendenti.
La produzione di massa, tra gli anni venti e trenta, cominciò ad espandersi tanto che Volkswagen e Fiat cominciarono ad attuarne le novità, ma ci fu la seconda guerra mondiale che incrementò la produzione militare a discapito di quella civile.
Solo negli anni cinquanta, dopo la fine della guerra, il concetto di produzione di massa si instaurò anche oltre i confini americani. Molti si specializzarono su diversi prodotti aprendo i mercati mondiali ai produttori europei, ottenendo diversi successi. Tutto ciò andò avanti fino agli anni settanta, portando delle migliorie tecniche (freni a disco, cambio a cinque marce) mentre nel confort gli americani erano ancora i leader.
Tuttavia anche in Europa cominciarono a sorgere diversi problemi, legati soprattutto alle condizioni lavorative degli operai che furono ammorbidite tramite aumenti del salario e riduzione delle ore di lavoro.
Nel frattempo in Giappone si stava consolidando un nuovo modo di produrre: la produzione snella.

1.2 - TPS (TOYOTA PRODUCTION SYSTEM): L'INNOVAZIONE DELLA PRODUZIONE SNELLA

Il nuovo sistema produttivo cominciò a nascere all'interno dell'industria automobilistica giapponese Toyota, fondata nel 1937 dalla famiglia Toyoda.
Fino agli inizi degli anni trenta si era distinta nella costruzione di macchine tessili e, sotto la pressione del governo, entrò nel campo automobilistico, inizialmente con la costruzione di autocarri militari. Poi come in Europa, a causa del conflitto mondiale, si interruppe la produzione di automobili.
Alla fine della guerra, la produzione di auto ricominciò ma ci si trovava di fronte a diversi ostacoli come la domanda del mercato interno e la consapevolezza delle condizioni di lavoro. A questo andava a sommarsi il fatto che nel dopoguerra l'economia giapponese non disponeva di grandi capitali con i quali poter acquistare le nuove tecnologie occidentali. Inoltre le industrie occidentali cercavano di penetrare nel mercato giapponese e, allo stesso tempo, di tenere lontane le importazioni.

Questo portò il governo giapponese a vietare investimenti esteri nell'industria automobilistica del proprio paese e impose un aumento delle tariffe nell'importazione. Propose anche di fondere diverse aziende in due o tre grandi case costruttrici in modo da scontrarsi con le "Tre Grandi" occidentali, ma non scontrandosi tra di loro.

Toyota, Nissan e altre sfidarono il governo e cominciarono a produrre automobili di modelli diversi. Ma emersero diversi problemi: le attrezzature della produzione di massa, osservate da Eiji Toyoda nella sua visita allo stabilimento Rouge, non potevano essere inserite nel contesto giapponese, come pure i metodi. Si poteva pensare all'artigianato ma non era adatto per una produzione di massa. Taiichi Ohno trovò un diverso approccio a tutto questo.

Ciò che portò al cambiamento fu la profonda crisi che affrontò l'azienda nel 1950.

Toyota aveva già cominciato a sperimentare alcune logiche produttive come il *just in time* e la riduzione di tempi di *set up*. Le idee di Ohno cominciarono a funzionare nel momento in cui divenne direttore generale, inserendole nella linea di assemblaggio finale.

Inizialmente l'intera Toyota, a partire dagli operai, era scettica al cambiamento. La situazione andò peggiorando nel momento in cui, per problemi economici del paese, la Toyota stava entrando in profonda crisi ed esaurendo i prestiti. Kiichiro Toyoda, presidente in quel periodo, propose di licenziare un parte dell'organico.

Questo portò ad una rivolta con conseguente occupazione della fabbrica. Sindacati e azienda riuscirono a trovare un compromesso, ancora oggi in uso. Un quarto dell'organico venne licenziato ma Kiichiro dovette dimettersi. I dipendenti rimasti ottennero il posto di lavoro a vita e la retribuzione con scatti basati sull'anzianità più premi in basi alla produzione.

In questo modo i dipendenti si sentivano parte della comunità Toyota, con diversi diritti tra cui l'accesso a diverse strutture (stabilimenti ricreativi, mensa, etc.). In cambio l'azienda si aspettava che la sua forza lavoro restasse in Toyota a vita e richiedeva a loro di essere flessibili e attivi, favorendo il miglioramento della produzione. Col passare degli anni questo risultò un costo fisso per l'azienda che non poteva essere ammortizzato, soprattutto per gli aumenti d'anzianità.

Toyota allora cominciò a concepire il lavoratore in modo diverso: non più come parte intercambiabile ma, accrescendo la sua capacità e la sua esperienza, approffitarne della competenza, oltre che della forza fisica.

Un primo problema rispetto all'approccio fordista era la scala minima richiesta per l'economia delle diverse operazioni.
Per quanto riguarda la produzione iniziale di Toyota, di poche migliaia di veicoli, era inferiore a ciò che potevano produrre le grandi e costose linee di stampaggio occidentali (producevano più di un milione di pezzi all'anno). In un primo momento si pensò di alternare stampi e configurazioni di macchinari per produrre pezzi diversi, ma comportava alti costi e problemi. Poi si arrivò a dedicare alcuni macchinari per la produzione di un unico pezzo per diversi mesi o anni, senza cambiare gli stampi.
Però anche questa soluzione non era soddisfacente perché Ohno non possedeva un gran capitale tale da potersi permettere un gran numero di macchinari.
La rivoluzione avvenne con l'idea di adottare delle procedure più semplici per il cambio degli stampi, effettuandole frequentemente grazie a rulli per spostare e posizionare il pezzo e meccanismi di regolazione. Ciò portò ad una riduzione del tempo per il cambio degli stampi ed eliminò il problema di avere degli operatori specializzati in questo.
Ohno intuì anche che il costo unitario di piccoli lotti era inferiore rispetto a quelli grandi per due motivi: 1) con piccoli lotti si eliminavano le spese di deposito per i pezzi finiti; 2) si potevano individuare subito gli errori prima dell'assemblaggio.
I lavoratori si resero conto quindi del fattore qualità della lavorazione e furono sempre meno i pezzi con difetti. Tutto questo poteva funzionare solo se si disponeva di personale altamente qualificato e motivato in ciò che doveva compiere.
Nella sua visita a Detroit, Ohno si era accorto che la produzione di massa era carica di *muda*, ossia di sprechi in termini di tempo, fatica, materiale e gli esperti che lavoravano sull'automobile non contribuivano a migliorarla, ma si rese conto addirittura che un operaio sarebbe riuscito a far meglio dell'esperto. Quindi Ohno, dopo questa visita, cominciò a sperimentare diverse soluzioni.
Mise a capo del gruppo di operai un caposquadra: al team venne affidata una parte della linea d'assemblaggio, facendogli capire di arrivare a migliorare il modo di eseguire le operazioni. Alla squadra diede poi il compito di pulire il posto di lavoro, effettuare delle riparazioni, controllare la qualità.
Quando il tutto cominciò a funzionare, venne chiesto loro di suggerire alcuni consigli per migliorare l'azienda nel suo complesso. In questo modo il personale entrava a far parte dell'azienda, come parte attiva. Questo processo di miglioramento (*kaizen*) fu realizzato con i vari tecnici presenti nell'azienda (anche se ancora pochi).

Ohno poi osservò, nella sua visita a Detroit, che la produzione di massa manteneva la linea in movimento nonostante ci fossero difetti, moltiplicando gli errori: un errore iniziale lungo la linea tendeva ad ingigantirsi. Se un pezzo difettoso veniva assemblato nell'automobile, la sua riparazione ne richiedeva poi tempo e lavoro.

Ohno ebbe l'intuizione di porre un interruttore in ogni posto di lavoro che servisse a fermare la linea nel momento in cui ci si trovava di fronte ad un problema non risolubile all'istante. Oltre a questo, insegnò agli operai a determinare la causa dell'errore, a ricercarla in modo tale che non accadesse una seconda volta. Certo non era una cosa semplice: la linea molto spesso si fermava, ma con la pratica gli errori furono sempre meno tanto da raggiungere negli anni novanta un rendimento del quasi 100% per operaio. Così i ritocchi ad errori o all'assemblaggio finale furono sempre meno, accrescendo la qualità delle automobili.

L'assemblaggio rappresentava comunque solo una piccola parte della fabbricazione: c'era la progettazione, la costruzione dei pezzi e l'assemblaggio dei diversi componenti in sedili, motori, etc.

Ohno intuì che, a differenza della produzione di massa che si basava sul "make or buy", bisognava raggiungere gli obiettivi di riduzione dei costi e del miglioramento della qualità facendo collaborare a ciò assemblatore e fornitori insieme.

Il modo in cui la produzione di massa si riforniva presentava dei grossi problemi: i fornitori, basandosi su disegni consegnategli, non erano incentivati nel dare suggerimenti o consigli per migliorare i prodotti; non erano poi informati su come era strutturata la vettura da poter dare all'impresa assemblatrice idee per ottimizzare il lavoro; andando a mettere i fornitori uno contro l'altro per avere il costo più basso di certo non migliorava la qualità e la fabbricazione della macchina.

Toyota si inventò un nuovo metodo della fornitura di componenti. Organizzò i fornitori in diverse fasce: alla prima fascia appartenevano i fornitori che venivano a far parte della squadra di sviluppo di un prodotto; alla seconda fascia si trovavano i fornitori che fornivano quelli della prima non interagendo con l'azienda assemblatrice e così via.

Toyota cercava di mettere in comunicazione tra loro quelli della prima fascia in modo da arrivare a dei miglioramenti sulla progettazione.

L'intuizione era molto proficua non solo per Toyota ma anche per i fornitori stessi, essendo ognuno specializzato in un componente e quindi non in concorrenza con gli altri. Toyota si trovò così a gestire la fornitura di componenti da ditte fornitrici semi-

indipendenti di prime fascia (con detenzione di pacchetti d'azioni) e mantenendo rapporti con fornitori indipendenti.
Infine Toyota condivise il suo personale con i fornitori: prestava loro parte dei dipendenti in momenti di aumento lavoro e posizionava i dirigenti anziani in posti importanti nelle ditte fornitrici. Così i fornitori, pur lavorando anche per altre case costruttrici d'auto o altro, condividevano lo stesso destino di Toyota.
Ohno arrivò a sviluppare un nuovo modo di coordinare il flusso giornaliero dei pezzi di rifornimento, detto *kanban*. Convertì un gran numero di fornitori in un unico sistema, facendo in modo che i pezzi venissero prodotti nella fase precedente il momento in cui ne era inoltrata la richiesta. Enormi container contenevano i pezzi e venivano trasportati al momento giusto. Una volta svuotati venivano mandati indietro e questo era il segnale per far partire la produzione di nuovi pezzi. Ciò non era facile da attuare in quanto eliminava i magazzini ma poteva portare al blocco il sistema qualora si verificava uno stop in un anello della catena. Però comportava un'attenzione maggiore del lavoratore affinché anticipasse il problema prima di diventare così grande da fermare il tutto.
Non solo a questo si arrivò ad un miglioramento, ma anche nella fase di progettazione si cercò di ideare qualcosa di nuovo. In un primo momento la progettazione era strutturata in squadre con un leader e in più si era portati a premiare chi lavorava meglio in gruppo piuttosto chi aveva più talento.
Con l'incremento dell'industria nel dopoguerra, macchine e camion erano sempre più presenti nelle strade. Cominciò ad esserci una richiesta di prodotti sempre più diversificati e affidabili. Toyota, grazie alle sue intuizioni di miglioramento della qualità e dell'affidabilità, non aveva più bisogno di avere prezzi pari a quelli dei concorrenti a produzione di massa. Il nuovo sistema Toyota portava l'industria stessa a poter diversificare i propri prodotti, con un modesto incremento dei costi. Però la diversificazione non sarebbe stata utile se poi non si produceva ciò che richiedeva il cliente.
Nel frattempo nacque la Toyota Motor Sales Company: fece istituire una rete di distributori che dovevano mantenere un rapporto di fiducia tra produttore, concessionario e compratore finale facendo in modo che il concessionario facesse parte del sistema di produzione e il cliente parte del sistema di sviluppo di nuovi prodotti.
Il concessionario divenne il primo step del *kanban*, spedendo gli ordini delle automobili vendute che dovevano poi essere consegnate entro due o tre settimane.

Non era semplice però rispondere ad aumenti o crolli della domanda del mercato. Si arrivò ad avere una giusta direzione quando i venditori Toyota cominciarono a visitare i clienti a domicilio. Questo fu possibile grazie all'esistenza di un archivio sulle famiglie e sulle loro preferenze d'acquisto che Toyota aveva creato negli anni: in questo modo i venditori sapevano come orientarsi.

Così facendo Toyota riuscì a inserire nel processo di sviluppo i clienti. In quegli anni i controlli statali sui veicoli (*shoken*) obbligavano a demolire l'auto dopo sei anni. Toyota non voleva perdere alcun cliente e per fare ciò si serviva dei dati esistenti sui diversi clienti coinvolgendo i più fedeli: li trattava come se facessero parte della famiglia e questo fu una caratteristica fondamentale del sistema di produzione snella.

Le prime aziende occidentali che si misero a introdurre alcuni elementi di questo nuvo metodo di produzione furono quelle americane. Spostando alcuni stabilimenti giapponesi negli USA, i fornitori locali dovettero adattarsi ai nuovi metodi e le partecipazioni finanziarie di alcune grandi case automobilistiche americane (GM, FORD) portarono queste ad assimilare alcune delle esperienze giapponesi.

Anche in Italia Fiat, alla fine degli anni ottanta, si mise alla via alla riorganizzazione nei diversi campi (tecnico, progettuale, manageriale) alla fine di non rischiare di essere "fatta fuori".

Ai giorni nostri la filosofia di Toyota è ancora un concetto in evoluzione. Molte aziende si sono basate su questo nuovo modo di pensare e molte sono riuscite a rimanere sul mercato, mantenendone una buona quota. Toyota da sola riesce ancora oggi a crescere e guadagnare più dei suoi diretti concorrenti come General Motors.

Classifica	1950	1970	2002	2004	2008
1	GM	GM	GM	GM	Toyota
2	Ford	Ford	Ford	Toyota	GM
3	Chrysler	Chrysler	Toyota	Ford	Gruppo Volkswagen
4	Studebaker	VW	VW	VW	Ford
5	Nash	Fiat	Daimler Chrysler	Daimler Chrysler	Honda
6	Kaiser-Fazer	Toyota	PSA (Peugeot- Citroen)	PSA	Nissan
7	Morris	Nissan	Hyundai	Hyundai	PSA
8	Hudson	Renault	Honda	Nissan	Hyundai
9	Austin	BL	Nissan	Honda	Suzuki
10	Renault	Peugeot	Renault	Renault	FIAT
...	Toyota				

Tab 1.1: L'ascesa di Toyota nella produzione mondiale di automobili

(Fonte: www.quadrantefuturo.it)

1.3 – IL LEAN THINKING: I CINQUE PRINCIPI

Nel 1996 viene pubblicato il libro "Lean Thinking" di James P. Womack e Daniel T. Jones: in esso viene teorizzato l'approccio al nuovo sistema produttivo, la Lean Production.

Il pensiero base, fondamentale del Lean Thinking può essere racchiuso in questa frase: "a way to do more and more with less and less - less human effort, less equipment, less time and less space – while coming closer and closer to providing customers with exactly what they want" (Womack and Jones, 2003)

Un sistema produttivo può essere considerato snello nel momento in cui i diversi componenti si muovono in un flusso continuo, accrescendo il proprio valore attraverso i vari processi coinvolti. I risultati che ha portato la Lean Production in Toyota sono stati sorprendenti non solo nel sistema produttivo ma anche nell'azienda stessa in tutti i suoi aspetti.

I due autori hanno individuato cinque principi che stanno alla base del pensiero snello:

1. definire il valore del prodotto;
2. identificare il flusso di valore del prodotto;
3. far scorrere il flusso senza interruzioni;
4. adottare una logica di tipo "*pull*" (logica del flusso "tirato"dalla domanda del cliente);
5. la ricerca della perfezione.

Fig 1.1: I cinque principi (Fonte: www.leanproduction.it)

I cinque principi sono i pilastri fondamentali per una lotta allo spreco. In giapponese spreco viene tradotto come "*muda*" che ha un significato non solo economico ma anche etico: esso fa riferimento a ciò che non crea valore e allo stesso tempo assorbe troppe risorse. Per qualsiasi azienda avere sprechi è un aspetto negativo che è sempre bene cercare di eliminare.
Taiichi Ohno è stato uno dei grandi promotori dell'eliminazione degli sprechi e ne ha individuati ben sette tipi di *muda*:

1. prodotti difettosi;
2. sovrapproduzione;
3. magazzini con beni da lavorare o in attesa di essere lavorati;
4. lavorazioni non necessarie;
5. spostamenti non necessari;
6. trasporti non necessari;
7. dipendenti in attesa che la macchina abbia compiuto il lavoro o che vengano concluse delle attività a monte.

Gli autori del libro ne identificano un ottavo, realizzazione di beni che non soddisfano il cliente. Quindi l'applicazione dei cinque principi non porta nient'altro che alla ricerca dell'eliminazione degli sprechi con la conseguenza di produrre con minor risorse cercando di avvicinarsi a ciò che vuole il cliente.

1.3.1 – IDENTIFICARE IL VALORE

Il punto di partenza per la lotta allo spreco è identificare ciò che crea valore per il cliente, avere la chiara comprensione di che cosa è questo valore.
Il valore assume significato se lo si esprime in termini di bene/servizio in grado di soddisfare le esigenze del cliente ad un dato prezzo e momento. Il valore è creato dal produttore ma per vari motivi riesce difficile definirlo: tecnologie e impianti preesistenti non adatti, ragionamenti su economie di scala. Non è facile anche per il fatto che da una parte i produttori vogliono continuare a fare ciò che fanno, dall'altra i clienti chiedono varianti a ciò che c'è già. Per cui, ripensando al valore, ci si focalizza più su semplici modi di attrazione del cliente (minor costo,consegna immediata, etc) piuttosto che ridefinire il concetto e capire ciò di cui ci sia bisogno.

Altro inconveniente nel creare valore sta nel fatto che, nel cercarlo, ci si affida a diverse imprese ognuna delle quali lo definisce a proprio modo per soddisfare le proprie esigenze senza guardare nel complesso il prodotto. Quindi un primo passo è quello di ridefinire i rapporti tra produttore – cliente e i rapporti tra le varie aziende. Una volta terminato il ripensamento sul concetto di valore (*kaikaku*[1]) le imprese snelle devono continuare a porsi il problema del valore per attestare che ne sia stata raggiunta la risposta migliore (*kaizen*[2]).

Una volta identificato il valore al prodotto, bisogna determinare un costo basato sull'ammontare di risorse, lavoro e tempo. Un'impresa qualunque, pensando a ciò che può sopportare il mercato, fissa un prezzo di vendita lavorando su questo per arrivare ad un livello accettabile per assicurarsi un certo profitto. Invece, un'azienda snella guarda nel complesso il prezzo e le caratteristiche di un prodotto di un'azienda tradizionale pensando ai costi che si potrebbero eliminare agendo con la logica Lean.

Così facendo si arriva a determinare il target cost per lo sviluppo del prodotto, la gestione degli ordini e le varie attività richieste. L'impresa snella potrà così scegliere diverse alternative: ridurre i prezzi, aggiungere caratteristiche al prodotto, utilizzare i profitti per migliorarne le potenzialità.

Quindi il primo passo essenziale del pensiero snello è definire il valore, perchè dare un servizio o prodotto sbagliato è *muda.*

1.3.2 – IDENTIFICARE IL FLUSSO DI VALORE

Il flusso di valore consiste nell'insieme delle azioni richieste affinché un prodotto attraversi nel modo più efficace le tre fasi fondamentali di qualsiasi settore:

1. focalizzare il prodotto (dall'ideazione al suo lancio nel mercato, attraversando progettazione e ingegnerizzazione);
2. la gestione delle informazioni (organizzarsi dal ricevimento dell'ordine alla consegna);
3. la produzione del bene o servizio.

[1] *Kaikaku* indica un miglioramento dell'attività che porta ad eliminare il *muda.*

[2] *Kaizen* indica un miglioramento graduale ma continuo per creare valore.

Quindi definito ciò che crea valore, bisogna individuare le attività richieste per lo sviluppo del prodotto affinché il processo di produzione sia focalizzato esclusivamente alla creazione di valore per il cliente.
Identificare il valore all'interno del flusso per ciascun prodotto porta alla luce quantità notevoli di sprechi. L'analisi del flusso di valore evidenzia tre tipi di attività:

1. attività che creano valore (quelle il cui costo può gravare sul cliente);
2. attività che non creano valore ma necessarie (non sono eliminabili a causa delle attuali tecnologie e impianti);
3. attività che non creano valore e possono essere subito eliminate.

Rimosse le attività che non creano valore, si può agire sulle restanti utilizzando tecniche di flussi, del *pull* e della perfezione che verranno descritte in seguito.

1.3.3 – FAR SCORRERE IL FLUSSO

Definito il valore e identificate le varie fasi che compongono il flusso di valore per un dato prodotto, eliminando le attività inutili tramite la mappatura dei flussi, bisogna fare in modo che le restanti attività che creano valore fluiscano senza ostacoli o barriere nel processo.
La produzione di massa aveva raggruppato le attività per tipologia. Poi i compiti o lavori, all'interno di uffici o reparti, per eseguirli nel modo migliore venivano suddivisi in lotti. Questo però comportava lunghi tempi di attesa nei quali il prodotto aspettava che il reparto deputato ad esso si attrezzasse. Tutto ciò viene definito *Batch and Queue*: si lavora a tempo pieno, i diversi collaboratori sono occupati nel loro tempo lavorativo e di conseguenza si ha l'esigenza di grandi impianti.
Ohno intuì invece che per far funzionare bene le cose bisognava focalizzarsi sul prodotto e su ciò che è necessario per esso in modo da realizzare un flusso continuo delle diverse attività (progettazione, ordini, etc). Una prima conseguenza positiva del passaggio ad un sistema a flusso continuo è che il tempo dall'ideazione al lancio del prodotto, dalla vendita alla consegna si riduce di molto. Questo perché il manager cerca di trovare il modo per allineare i diversi passi per la realizzazione del prodotto secondo un flusso continuo e stabile: organizzazione del lavoro, stabilire le attrezzature necessarie, come creare la struttura affinché avvenga il flusso.

Il primo passo è, una volta identificato il valore e il flusso, quello di focalizzarsi sul prodotto senza perderlo di vista. Poi bisogna cercare di rimuovere gli ostacoli dovuti che si possono trovare nella generazione del flusso.
Ultimo passo è il ripensamento di tutto ciò che serve per il specifico lavoro cercando di eliminare scarti, fermate in modo che progettazione e produzione procedano con continuità. Questi tre passi devono compiersi contemporaneamente.
Si parte dalla progettazione. Solitamente il progetto di un prodotto si spostava da ufficio ad ufficio e a volte ripercorreva il cammino fatto all'indietro per sistemare problemi o incompatibilità con le esigenze dei diversi specialisti.
Ma ciò non rappresentava un flusso. Alcune aziende cominciavano, intorno agli anni novanta, a considerare un team di persone che si dedicava alla progettazione del prodotto. Ma la cosa non cambiava più di tanto rispetto a prima poiché una buona parte del lavoro era affidata ai singoli uffici, mettendo il progetto in coda.
Inoltre non esisteva qualcuno che fosse responsabile del sviluppo e del risultato finale causa il sistema di ricompense che non legava il successo del prodotto allo sforzo del team. Invece, con l'approccio snello, si creano dei team di prodotto dedicati, con specialisti aventi le abilità adatte alla definizione del valore, al progetto, all'ingegnerizzazione, all'ideazione di attrezzature e pianificazione della produzione in un solo ufficio. Inoltre il team deve cercare di standardizzare il lavoro in modo da poter misurare il processo di lavorazione e nello stesso tempo migliorarlo (*Quality Function Deployment, QFD*). In questa maniera il team elimina i percorsi a ritroso e il progetto arriva alla produzione in larga scala senza mai fermarsi.
L'altro passo è quello di gestire gli ordini sempre con la tecnica dei flussi. Nel passato, una volta ottenuti gli ordini li si inoltrava all'ufficio programmazione della produzione per inserirli nella catena di gestione della produzione. Se la consegna cominciava a ritardare e magari il cliente minacciava la cancellazione stessa, si spostava l'ordine all'inizio della coda della produzione. Negli anni novanta gli uffici di programmazione e vendita diventarono una cosa unica, riducendo così il tempo di processo per ogni ordine.
Tramite il pensiero snello invece, il team di prodotto deve essere in grado di pianificare la campagna di vendita una volta completato il progetto, di venderlo avendo la più totale consapevolezza del proprio sistema produttivo e di non aver bisogno di sollecitare in caso di ritardi. La tecnica usata è quella del concetto di tempo *takt* (tempo di produzione

disponibile diviso il tasso di domanda dei clienti). Quindi il concetto di *takt* definisce il ritmo di produzione che deve avere la produzione per soddisfare la richiesta del cliente.

I ritmi di produzione definiti dal *takt* vengono dichiarati e visualizzati tramite display elettronici (lavagne *andon*) visibili nell'area produttiva e collegati ad altri display presso il fornitore. Tutto ciò porta alla comprensione di un concetto fondamentale nel pensiero snello: la trasparenza di ciò che si sta producendo e la visione della situazione della produzione.

Per rendere ancora più scorrevole il flusso ci si affida ai concetti del *Just in Time* (indicato con *JIT*) e della programmazione a livelli.

Il *JIT* è un'idea di Toyota, utilizzata poi da altre aziende, consistente nella produzione e nella consegna del prodotto giusto, al momento giusto e nella giusta quantità. Gli elementi chiave sono: flusso, logica *pull*, operazioni standard, tempo *takt*.

Ohno considerava questa tecnica fondamentale per rendere il flusso continuo, ma per applicarla al meglio i tempi per organizzare le attrezzature devono essere ridotti, in modo che, producendo a monte piccole quantità di ogni parte, si arrivi alla produzione di altre non appena quelle prima prodotte sono passate all'altra fase.

Inoltre il *JIT* non funzionerebbe se a valle le fasi produttive non utilizzano la produzione a livelli (*heijunka*[3]) andando così ad eliminare i problemi che si possono creare nel flusso giornaliero degli ordini collegati alle richieste dei clienti.

Procedendo per flussi, la produzione viene organizzata in sequenza, magari all'interno di un unico reparto, spostando il prodotto da una fase all'altra senza avere accumuli intermedi utilizzando tecniche dette di "*flusso unitario*", contrapponendosi al concetto di *Batch and Queue*.

Se un prodotto comprende molte varianti si rende necessaria la flessibilità della macchina, cioè che sia possibile convertirla da una specifica di prodotto all'altra e, inoltre, che possa essere adattata al processo e dimensionata su misura (eliminando così il *muda* della compressibilità).

I sistemi a flusso sono sistemi in cui o tutto funziona o niente funziona. Quindi il team di prodotto deve avere competenze e abilità in qualunque compito e possedere degli impianti attivi e precisi al 100% tramite le tecniche di *Total Productive Maintenance (TPM).* Ciò vuol dire che il lavoro deve essere standardizzato e che lavoratori e macchine siano in sincronia e capaci di controllare il proprio lavoro con tecniche dette

[3] *Heijunka:* indica la creazione di un livellamento della produzione mettendo gli ordini in sequenza, facendo in modo che si ripeta e non si abbiano variazioni.

di *poka yoke*[4] (a prova di errore) in modo da non inviare parti difettose alla fase successiva.

Altra tecnica è quella del *jidoka* che consiste nel trasferimento dell'intelligenza umana alla lavorazione meccanica automatizzata in modo da essere in grado di rilevare parti difettose, fermarsi e attendere un operatore che sistemi il problema.

Questo deve essere affiancato a tecniche visive come le *5S*[5] (cinque esse), dove ogni utensile o attrezzo ha una sua collocazione e deve essere pulito e in ordine, sistemato nel proprio posto; lavagne *andon* o display. Tutto ciò porta nuovamente al concetto di trasparenza della produzione: ognuno deve sapere e comprendere lo stato delle attività.

1.3.4 – LOGICA PULL

Un altro aspetto fondamentale del pensiero snello è quello di adottare una logica *pull*: permettere ai clienti di "tirare" il prodotto invece di spingere i clienti verso prodotti non desiderati (logica *push*).

Adottare una logica *pull* significa che la produzione a monte non deve partire fino a che il cliente a valle non richieda un certo prodotto. Invece i passati sistemi di produzione (*push*) comportavano la presenza di magazzini con enormi scorte per soddisfare il cliente in qualsiasi momento. Però, per via della gran varietà di prodotti, non sempre era disponibile in magazzino quel tipo di prodotto richiesto per cui il distributore doveva richiederlo al deposito generale o alla casa produttrice con enormi tempi di attesa (produzione a lotti e code).

Il pensiero snello, al contrario, una volta definito il valore, il flusso di valore e delle attività, attiva il flusso di produzione nel momento in cui il cliente manifesta delle esigenze. Il ritmo viene imposto solo dalla programmazione delle consegne e dal tempo *takt*. Un modo per gestire una pianificazione *pull* è il controllo *kanban*[6].

Kanban significa cartellino, segnale o anche trasportatore invisibile che permette di controllare il trasferimento di materiale tra le diverse fasi della produzione.

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[4] *Poka yoke:* indica una procedura a prova di errore, una tecnica volta alla non creazione di difetti nella gestione o nella produzione, rendendo difficile l'errore anche al meno esperto.

[5] *5S*: tecnica così definita dalle iniziali delle parole giapponesi che indicano i cinque passi per un'area di lavoro pulita: *seiri* (organizzazione), *seiton* (ordine), *seiso* (purezza), *seiketsu* (pulizia), *shitsuke* (disciplina)

[6] *Kanban*: piccolo cartello attaccato a contenitori di componenti che regolano la logica *pull* all'interno del sistema produttivo di Toyota, indicandone momento di produzione o consegna.

Più semplicemente è un cartellino usato dalle fasi a valle per avvisare a monte se si necessita di altro materiale. Ma si trovano anche altre diverse forme di *kanban*: indicatori di plastica, palline colorate.

Esistono diverse forme di *kanban*:

1. *kanban di movimento*: segnala alla fase a monte che il materiale può essere prelevato e trasferito nella postazione di lavoro, contiene informazioni su tipo e quantità di materiale richiesto, in quale sito deve essere prelevato e spedito;
2. *kanban di produzione*: seganala l'attivazione della produzione del componente che verrà poi posto in un magazzino. Contiene nome e quantità del componente, il modo di procedere nella produzione, il materiale richiesto e la destinazione del componente;
3. *kanban di vendita*: segnala al fornitore l'invio di materiale. Simile al primo ma rivolto ai fornitori.

Il concetto che sta alla base di qualsiasi *kanban* è lo stesso: spostamento, produzione o fornitura di una certa quantità di prodotti o materiali ed è l'unico segnale che permette all'azienda di partire con certe azioni.

Quindi adottando una logica di tipo *pull* ci si concentra sempre sul cliente finale: così facendo l'azienda andrà a produrre ciò che vuole realmente il cliente in ogni momento della sua vita, non ritrovandosi più ad avere scorte che deve liquidare in magazzino.

1.3.5 – RICERCARE LA PERFEZIONE

Una volta che l'azienda comincia ad applicare le tecniche *Lean* all'intero flusso di valore, ci si accorge che non c'è fine al processo di riduzione degli sforzi, dei tempi, degli spazi, dei costi e degli errori se ci si vuole avvicinare il più possibile a ciò che vuole il cliente. Infatti l'applicazione dei primi quattro principi porta l'azienda o chi esso sia a trovarsi all'interno di un circolo: far fluire il valore più velocemente fa emergere il *muda* e adottare la logica *pull* mette in evidenza gli ostacoli al flusso che devono essere rimossi.

Bisogna partire dal fatto che non esiste una rappresentazione precisa della perfezione. Per un manager è difficile pensare e raggiungere la perfezione, ma il fatto di provarci ne può aprire la strada. Un primo passo è sicuramente quello di adottare tecnologie

produttive di cui si avranno bisogno lungo il cammino. Per cui di fondamentale importanza deve essere una definizione ben chiara dell'obiettivo da raggiungere e del percorso che si vuole intraprendere. Quindi chi è responsabile deve accordarsi su pochi e semplici obiettivi per passare dalla produzione di massa a quella snella, selezionando progetti che portano a questo, identificando risorse e personale necessarie al raggiungimento dell'obiettivo, definendo il target di miglioramento entro una certa data. In questa maniera il team è interamente responsabile dell'esecuzione della produzione e deve avere subito a disposizione autorità e risorse.

Probabilmente ciò che più può portare verso la perfezione è il concetto di trasparenza: tutti possono vedere tutto.

Sebbene l'applicazione del pensiero snello non sia facile e faccia presupporre il raggiungimento della perfezione nel lungo periodo, non sono comunque pochi i buoni risultati che si possono avere anche nel breve periodo. Infatti dal passaggio al sistema a flusso continuo e logica *pull* si hanno diversi risultati (*Fonte: www.leanproduction.it*):

- aumenti della produttività dal 20% al 60%;
- riduzione del work in progress dal 30% al 70%;
- taglio dei tempi di set up dal 50% all'80%;
- riduzione dei difetti dal 20% al 40%;
- riduzione dei metri percorsi dal 40% all'80%;
- miglioramento della qualità e affidabilità delle informazioni.

1.4 – MUDA: I 7 SPRECHI

In giapponese il concetto di spreco viene tradotto in *muda*: esso fa riferimento a qualsiasi tipo di attività che assorbe risorse ma non crea valore.

La presenza degli sprechi è qualcosa di negativo che è meglio eliminare.

Per una società povera, come quella giapponese di qualche decennio fa, lo spreco non era un inconveniente ma un qualcosa che era ormai penetrato nella società stessa che andava eliminato.

Taiichi Ohno (1912 – 1990), dirigente Toyota, sostenitore della lotta agli sprechi, ne individuò ben sette:

1. difetti nei prodotti;
2. sovrapproduzione di beni;
3. magazzini di beni in attesa;
4. lavorazioni non necessarie;
5. spostamenti non necessari (di persone);
6. trasporti non necessari (di beni);
7. attese sei dipendenti.

Concetto chiave della Lean Production è l'eliminazione degli sprechi allo scopo di produrre con minor consumo di risorse avvicinandosi alle richieste del cliente.

Fig 1.2: I sette sprechi (Fonte: www.festo.it)

1.4.1 – SOVRAPPRODUZIONE (OVERPRODUCTION)

La sovrapproduzione è tipica della produzione a lotti dove viene pianificata la quantità di pezzi da produrre senza aspettare gli ordini ricevuti dai clienti e ciò comporta rimanenze di prodotti o semilavorati (al netto del venduto).

Si intende quindi una produzione superiore alle richieste per sopperire a difetti, fermi macchina, assenza personale.

La rimanenza porta ad avere dei costi: deposito del materiale o prodotto con conseguente spreco di spazio. Oltretutto, produrre troppo porta altri costi: consumo anticipato di materie prime, aggiunta di forza lavoro, macchinari, spazi e magazzini.
Per cui bisogna cercare di produrre il necessario senza avere deposito. Per raggiungere questo obiettivo si richiede un ripensamento dell'organizzazione aziendale, in tutti i suoi aspetti, dalla linea produttiva ai massimi vertici.
Tutto ciò non è facile ma i principali fondamenti sono:

- pianificazione della produzione: calcolare nel modo più preciso la quantità di prodotti, da produrre in funzione degli ordini ricevuti;
- flessibilità dei processi: i processi devono essere il più flessibile possibile per quanto riguarda impianti, operai, etc;
- controllo e stabilità dei processi: conoscere e rendere stabili nel tempo i risultati delle varie fasi di processo;
- efficienza d'organizzazione: rendere efficiente al massimo la gestione delle risorse e dei processi.

Di certo è lo spreco più difficile da eliminare o ottimizzare, ma in qualche modo lo si deve fare perché il cliente finale non è disposto ad accollarsi costi dovuti alla sovrapproduzione.

1.4.2 – TRASPORTI (TRASPORTING)

Ogni volta che un prodotto viene trasportato da un posto ad un altro, da un reparto all'altro, può venire perso, danneggiato e ciò può rappresentare un costo.
Il trasporto deve essere ridotto il più possibile perché genera valore aggiunto per il cliente. Ci si può concentrare su due aspetti:

- individuare perché è necessario il trasporto;
- migliorare il trasporto, se è strettamente utile farlo, agendo sulla distanza da percorrere, tempo, attrezzatura necessaria.

L'eliminazione del trasporto è la cosa migliore, ma a volte non se ne può fare a meno quindi bisogna cercare di ottimizzarlo.

1.4.3 – ATTESE (WAITING)

Questo aspetto fa riferimento a tutti i tempi di attesa non necessari alla fabbricazione del prodotto. In pratica ci si riferisce alla differenza fra il tempo di attraversamento (*Lead Time*) del flusso produttivo e il tempo di fabbricazione.
Ci sono molteplici fattori che producono attese tra cui:

- ritardo d'arrivo del materiale;
- code;
- ritardi per guasti agli impianti;
- assenza operatore;
- attese per preparare la macchina all'operazione da eseguire.

Tutto ciò è dovuto al fatto che non si pensa anticipatamente a definire in modo chiaro la progettazione delle linee di processo o del prodotto, anche per una mancanza di controllo. Quindi bisogna ben valutare quali sono i tempi di attesa, traducendoli in costi in modo da fissare un obiettivo e una strategia per raggiungerlo.

1.4.4 – SCORTE (INVENTORY)

Per scorte si intendono materie prime, prodotti semilavorati o finiti che non hanno ancora prodotto un guadagno.
La presenza di pezzi nel processo produce una sorta di "capitale fermo" (*Working Capital*) proporzionale alla quantità di pezzi e alla sua posizione nel flusso.
Obiettivo fondamentale è quello di ridurre le scorte in modo da minimizzare il capitale fermo. Anche in questo caso si deve pensare ad una riorganizzazione dell'azienda, soprattutto per quanto riguarda la fornitura di materiale.

1.4.5 – MOVIMENTO (MOTION)

Si fa riferimento alla movimentazione all'interno del ciclo di produzione. A differenza del trasferimento, si parla di movimentazione quando avviene all'interno del ciclo di produzione in una postazione ben definita. Un esempio è lo spostamento eseguito

dall'operatore nel ciclo di lavorazione. Se si raggiunge l'obiettivo di portare al minimo i movimenti all'interno del ciclo si può avere come conseguenza un miglioramento della produttività.

1.4.6 – DIFETTI (REWORK)

Nella logica Lean si intende come spreco la rilavorazione di un prodotto, la realizzazione di un prodotto con difetti o addirittura uno scarto (prodotto non conforme alle specifiche).
Essere in presenza di uno spreco di questo genere comporta notevoli costi che vanno a carico del cliente finale. Il cliente poi, ricevendo pezzi difettosi, farebbe tornare indietro il prodotto con conseguente aggiunta di costi per l'azienda (sarebbe costretta a riprodurlo).
Quindi nelle fasi processuali il prodotto deve essere controllato scrupolosamente e, non appena ci si accorge di un difetto, fermare la produzione e cercare nel minor tempo possibile di risolvere il problema.

1.4.7 – PROCESSI INUTILMENTE COSTOSI (PROCESS WASTES)

Andare ad aggiungere funzionalità in più a ciò che richiede il cliente o usare risorse più costose porta a produrre solo spreco.
Altro motivo riguarda gli operatori: utilizzare personale altamente qualificato per realizzare operazioni non alla sua altezza può generare dei costi.
Altri sprechi in questo contesto sono: non buona prestazione degli impianti, eccessiva variabilità dei materiali e delle attrezzature. Per cui bisogna mantenere sempre sotto controllo il processo per garantire stabilità e il ripetersi delle azioni nel tempo.

Nella sua lunga direzione in Toyota, Taiichi Ohno individuò altri due tipi di spreco:

- *Muri* (*sovraccarico*): sta ad indicare un sovraccarico di risorse o persone. Il sovraccarico per le persone può portare ad infortuni o malattie per l'eccessivo lavoro. La conseguenza di ciò è l'assenza dei lavoratori per uno

o più giorni e insoddisfazione del personale. Per quanto riguarda i macchinari, il sovraccarico può comportare guasti, rotture o usura velocizzata e quindi fermi per manutenzione anticipata o riparazioni. Tutto questo assieme (sovraccarico di persone e risorse) non fa altro che trasformarsi in spreco di tempo e denaro. Perciò nella logica Lean si cerca di organizzare la produzione in modo da ridurre il carico di valore ma non diminuendo la produttività;

- *Mura (irregolarità)*: sta ad indicare le variazioni o fluttuazioni del carico di lavoro, o meglio della domanda di produzione. Questo porta ad avere momenti di sovraccarico di lavoro, altri momenti in cui il lavoro diminuisce e le macchine si trovano ad essere ferme o a produrre meno. Tutto ciò porta ad un *muda*, ad uno spreco perché si creano delle pause che vanno a disturbare il flusso di processo. Per non avere questo, e non pagarne poi le conseguenze in termini di costi, si deve cercare di appiattire i picchi e le valli di produzione.

CAPITOLO 2

IL LEAN ASSESSMENT

2.1 – L'APPROCCIO LEAN

I concetti lean sono oggi molto utilizzati da diverse aziende che vogliono migliorare la propria produzione o che si trovano in un momento di crisi (operativa o economica), magari anche solo in un settore, e cercano la maniera per poterla affrontare nel migliore dei modi e superarla.

Certo non è semplice l'applicazione della logica lean ad un processo di produzione o all'intera azienda: ci vuole tempo, esperienza ma soprattutto la volontà e la determinazione di tutti. Il primo passo, forse il più difficile, è vincere appunto l'inerzia nell'affrontare questo nuovo concetto. Ci vuole un agente di cambiamento, una persona che abbia la voglia di cambiare le cose: principalmente deve essere chi è a capo dell'azienda.

Ma chi è a capo di un'azienda non ha il tempo o l'opportunità di guidare in prima persona il cambiamento, per cui dovrà fare affidamento a persone di fiducia (responsabile di produzione, delle attività operative, dirigenti). Poi difficilmente all'interno dell'azienda esistono persone che possiedano già le conoscenze lean e, in questo senso, ci si affiderà ad un consulente esterno. Negli ultimi anni, in cui il pensiero snello si sta diffondendo in varie imprese di molti paesi, sono nate diverse società di consulenza: queste aiutano le aziende ad approntare un percorso che le porterà ad essere snelle.

Un'azienda che comincia un percorso di lean transformation deve comprendere che non potrà mai smettere di continuare ad applicare i diversi concetti che sono basilari per arrivare ad un livello al top, deve pensare sempre che non esiste mai la perfezione ma bisogna continuare a migliorarsi. Quindi bisogna affidarsi a consulenti validi che mostrano l'interesse a lavorare con l'azienda per creare un'organizzazione che sia in grado di sostenere i concetti lean nel lungo termine.

Un dirigente, o comunque chi è a capo di un'azienda, probabilmente vorrebbe vedere subito i risultati provenienti dall'applicazione del lean. Questo richiede grossi

investimenti e un buon know how dei concetti fondamentali. Non sempre questo è possibile: bisogna pensare che Toyota ha impiegato circa cinquant'anni per arrivare ai livelli in cui si trova ora. Toyota ha ideato il pensiero snello, l'ha applicato ed evoluto nello stesso tempo in tutta la sua azienda e ha coinvolto qualsiasi settore e tutti i suoi dipendenti e questo ha richiesto parecchio tempo e volontà.

Certamente i concetti lean ormai sono sempre più conosciuti e approfonditi da diverse persone e sono in continua evoluzione. Quindi un'impresa non attenderà di certo cinquant'anni per vedere i primi risultati, ma ci deve essere una continua enfasi sulla lean production. I miglioramenti di tipo lean sono lenti e non finiscono mai. L'entusiasmo iniziale potrebbe affievolirsi nel tempo e per questo bisogna avere molta pazienza nell'affrontare il cammino.

Un concetto fondamentale nell'approccio lean è il "due passi avanti e uno indietro": bisogna prepararsi ad una strada in salita, il miglioramento che dura nel tempo non si compra, si coltiva. Comunque ciò che sta alla base dell'applicazione della logica lean è orientare tutte le risorse, le politiche e gli obiettivi verso la creazione del valore ed eliminare ogni costo che non può essere portato a ricavo. L'azienda può raggiungere questo adottando un programma di lean transformation. Uno di questi è rappresentato dalla figura 2.1, nella quale viene mostrato come un'azienda attraverso le varie fasi può raggiungere una situazione d'eccellenza.

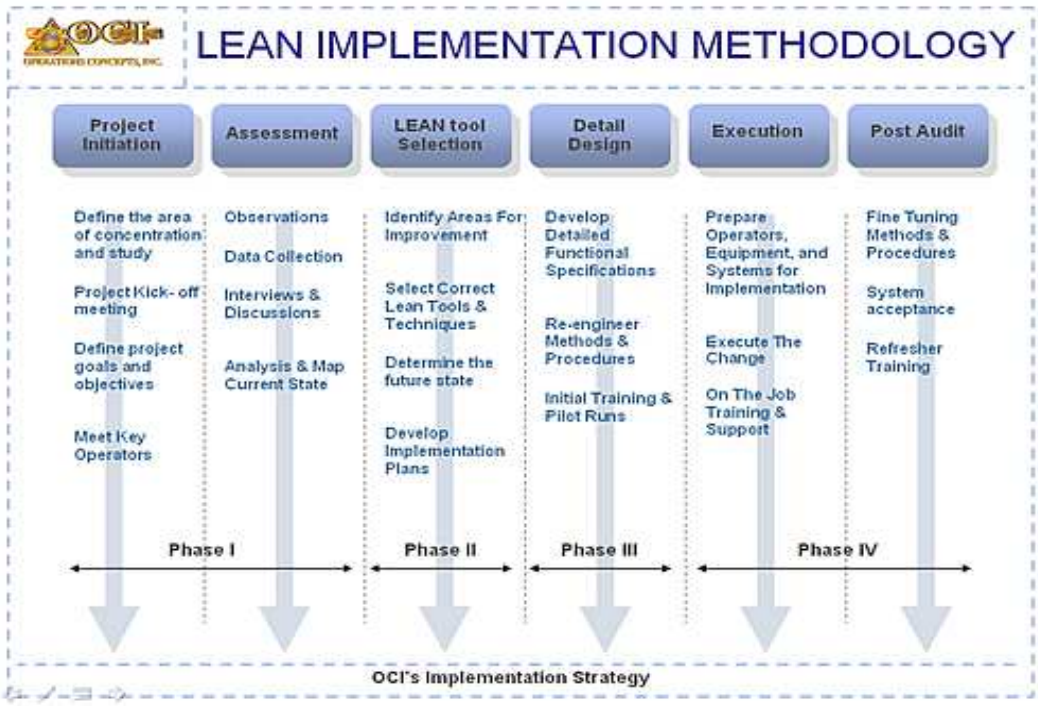


Fig 2.1: Esempio di piano di lean transformation (Fonte: oci.wwwcomm.com)

Ciò di cui tratteremo nel proseguo della tesi sarà la fase iniziale che solitamente avviene prima di cominciare intensamente un percorso lean, cioè quella di Lean Assessment.

2.2 – IL LEAN ASSESSMENT

"Qualsiasi miglioramento deve basarsi sulla valutazione dello stato attuale e sulla misurazione della distanza dagli obiettivi dichiarati" (www.leancompany.it)
In questa frase è racchiuso ciò in cui consiste il Lean Assessment. L'azienda che voglia intraprendere la strada dell'eccellenza deve potersi confrontare con "l'azienda eccellente ideale", verificare le aree critiche e pensare come e dove agire per migliorarle. Il Lean Assessment consiste proprio in questo: permette di rendersi conto quanto distanti si è dall'essere lean e come proseguire per diventare al meglio una società Lean Top Class.
Esso è un'insieme di procedure e strumenti mediante i quali un'impresa è valutata rispetto al raggiungimento di un profilo ideale. In effetti ciò su cui ci si concentra nell'applicazione dell'assessment è la valutazione del grado di diffusione di una certa pratica lean e il livello prestazionale. In pratica il Lean Assessment non è nient'altro un questionario che va ad esplorare i diversi settori chiave di un'impresa. Come agire per pianificare un Lean Assessment?

2.2.1 – PIANIFICAZIONE DI UN ASSESSMENT

Con l'evoluzione della logica lean sono stati ideati diversi assessment prodotti da varie società di consulenza a cui si affidano le aziende che vogliano cominciare un percorso lean.
Il punto di partenza per un qualsiasi progetto lean da applicare in un'azienda, soprattutto per quanto riguarda il primo passo del piano d'azione, è quello di valutare l'impresa nel suo complesso. La si studia in tutti i suoi settori a tutti i livelli gerarchici, a partire dal livello più basso (fornitori, dipendenti) al livello più alto (vertici manageriali, dirigenti) passando attraverso i processi di produzione. In questa maniera si cerca di capire quali

sono le categorie da considerare e inserire nel progetto dell'assessment o pensare a quale tool già esistente possa andare bene affinché si realizzi il processo lean.
Quindi importante è capire la struttura dell'azienda, la sua storia e la situazione esistente al momento. Una volta conosciuto il modo di operare dell'azienda, il suo rapporto con la clientela, i rapporti con i dipendenti e le persone coinvolte nel progetto lean si costruisce l'intervento di miglioramento.
Quando si costruisce l'assessment bisogna cercare di focalizzare i parametri su elementi oggettivi misurabili e rappresentativi di porzioni di processo dai quali poi rilevare il grado di performance aziendale. Nel condurre il Lean Assessment all'interno dell'azienda è fondamentale che siano ben spiegati gli obiettivi insieme al metro di valutazione. Solitamente insieme alle domande inserite nel questionario per ogni categoria vengono indicati dei punteggi, risposte a scelta multipla oppure sì o no.
Nel momento in cui viene praticato l'assessment deve essere coinvolta la maggior parte del personale dell'impresa, meglio se tutti, addirittura divisi in gruppi od ognuno per conto proprio.
Una volta ottenute le risposte, vengono raccolti tutti i dati. A chiusura dell'assessment si ricava la mappa dello "stato di eccellenza" di ogni singola categoria, andando ad ottenere il grado di eccellenza dell'azienda nel suo complesso e la sua capacità di poter generare ottimi risultati. Ottenuti i risultati derivati dall'assessment si potrà cominciare a considerare come procedere col piano d'azione. Inoltre, i dati derivanti possono essere archiviati e consentire così all'azienda di valutare l'evoluzione nel tempo: potrà verificare se si è migliorati o se si sta peggiorando, magari attuando un nuovo assessment dopo diversi mesi o anni.
Quindi durante il lean assessment si possono distinguere tre fasi:

1. Scoring (Punteggio): è la fase in cui vengono dati i punteggi o altro alle diverse domande o situazioni che vengono poste e si raccolgono i diversi dati;
2. Evaluation (Valutazione): viene calcolato il punteggio medio per ogni categoria e confrontato con quello massimo, visualizzati i diversi punteggi nel radar chart e confrontati i diversi risultati con il livello massimo che rappresenta il World-Class Status;
3. Planning and Executing (Pianificazione e Attuazione): trovare le risorse per programmare un piano d'azione per poi cominciare un percorso lean.

2.2.2 – LA STRUTTURA

Analizzata l'azienda nel suo complesso e individuate le aree, si passa a costruire l'assessment. Solitamente si considerano diverse categorie lean sulle quali lavorare: su queste si vanno ad approntare un certo numero di domande per misurare il grado di diffusione della pratica. Le domande vengono raggruppate in tabelle o numerate in sequenza e a queste viene attribuito un punteggio o una percentuale, oppure una risposta descrittiva o a volte più semplicemente sì o no. Un esempio di assessment di una pratica (nello specifico "Lavoro di gruppo") è mostrato nella figura 2.1: come si può vedere vengono poste delle domande riguardanti la categoria considerata e le risposte vengono date segnando con una x quella relativa alla situazione attuale.

2.0	The Team Approach	Response	X
2.1	What is the organization type?	Exploitive	X
		Bureaucratic	
		Consultive	
		Participative	
		Highly Participative	
2.2	How are workers on the factory floor compensated?	Individual Incentive	
		Hourly Wage	X
		Group Incentive	
		Salary	
		Salary+Annual Bonus	
2.3	To what extent do people have job security?	Layoffs Every Year	X
		Layoffs	
		Layoffs Are Rare	
2.4	What is the annual personnel turnover	31%+	X
		14%-30%	
		7%-11%	
		3%-6%	
		0%-2%	
2.5	What percentage of personnel (ALL Personnel) have received at least eight hours of teambuilding training?	<5%	X
		6%-10%	
		11%-30%	
		31%-90%	
		91%-100%	
2.6	What percentage of personnel are active members of formal work teams, quality teams, or problem-solving teams?	<5%	X
		6%-10%	
		11%-30%	
		31%-90%	
		91%-100%	

Tab 2.1: Esempio di assessment (Fonte: www.strategosinc.com)

La metodologia più comunemente usata è quella di attribuire un punteggio alla domanda che può andare, per esempio, da zero a cinque così da valutare quanto si è lean. Le domande poste devono essere ben chiare per chi si appresta ad affrontarlo e concepite in modo da rendere oggettive le risposte: possono variare su diversi aspetti della categoria lean che si considera.

Il questionario viene poi somministrato ai dipendenti o ai gruppi di dipendenti, ma soprattutto ai dirigenti. Fondamentale è che sia ben spiegato come è stato strutturato l'assessment e in cosa consistono le risposte, come verrà valutato e analizzato.

Esistono anche assessment individuali, detti self – assessment: consistono in domande inerenti diversi aspetti dell'azienda o per capire come si affronta il proprio lavoro nell'impresa e possono essere fatti in assenza di un soggetto esterno che di solito guida l'assessment. Si trovano pure assessment che riguardano direttamente il posto di lavoro: un esempio è il 5S, strumento utilizzato per la pulizia della propria postazione di lavoro (Tab 2.2).

Tab 2.2: Esempio di lean assessment basato sulle 5S

(Fonte: www.theleanassessment.co.uk)

Step 1 SORT Sort out necessary & unnecessary items. The items deemed unnecessary and not being used should be removed from the area (incl. General area, workstations, personal storage areas, desk drawers, filing cabinets, PC electronic files, safe)	**Very Poor**	**Poor**	**Good**	**Very Good**	**Excellent**
1. Is the area clear of unnecessary PC's, laptops, printers & equipment?	**1**	**2**	**3**	**4**	**5**
	Details:				
2. Is the area clear of unnecessary inventory/WIP?	**1**	**2**	**3**	**4**	**5**
	Details:				
3. Is the area clear of any unnecessary/personal stationery materials?	**1**	**2**	**3**	**4**	**5**
	Details:				
4. Is the area clear of documents that are not essential, duplicate and or out of date documents?	**1**	**2**	**3**	**4**	**5**
	Details:				
5. Is the general area clear of personal items?	**1**	**2**	**3**	**4**	**5**
	Details:				
6. Are the aisles & adjacent floor areas clear of non-essential items?	**1**	**2**	**3**	**4**	**5**
	Details:				

Step 2 SET LIMITS AND LOCATIONS A place for everything and everything in it's place so it should be easy to find	**Very Poor**	**Poor**	**Good**	**Very Good**	**Excellent**
7. Necessary PC's, laptops, printers & equipment identified, location defined, & stored in correct place?	**1**	**2**	**3**	**4**	**5**
	Details:				
8. Necessary inventory / WIP (electronic and hard copy) identified, location defined, & stored in correct place?	**1**	**2**	**3**	**4**	**5**
	Details:				
9. Necessary stationery materials identified, location defined, & stored in correct place?	**1**	**2**	**3**	**4**	**5**
	Details:				

10. Necessary documentation identified (electronic and hard copy), locations defined & stored in correct place?	**1**	**2**	**3**	**4**	**5**
	Details:				
11. Aisles & all aspects of work areas are clearly defined?	**1**	**2**	**3**	**4**	**5**
	Details:				
12. No employees are hidden from view or boxed in with cabinets, inventory, or equipment?	**1**	**2**	**3**	**4**	**5**
	Details:				
13. Poor quality work is clearly identified & held away from the general area?	**1**	**2**	**3**	**4**	**5**
	Details:				
14. Area is well lit, all light fittings are working, and lighting is positioned to ensure maximum benefit?	**1**	**2**	**3**	**4**	**5**
	Details:				
15. There are no trailing leads, other trip hazards in the area?	**1**	**2**	**3**	**4**	**5**
	Details:				

Step 3 SHINE Eliminate rubbish and dirt in the office.	**Very Poor**	**Poor**	**Good**	**Very Good**	**Excellent**
16. Adjacent aisles & floors in the area are clean, free of unnecessary items and rubbish?	**1**	**2**	**3**	**4**	**5**
	Details:				
17. Is the equipment (phones, photocopiers, pc's, etc.) clean & free of dust and grime?	**1**	**2**	**3**	**4**	**5**
	Details:				
18. Are there an adequate number of containers for rubbish and confidential waste that are clean & maintained?	**1**	**2**	**3**	**4**	**5**
	Details:				
19. Are the cabinets, PC documents clean, orderly, & up to date?	**1**	**2**	**3**	**4**	**5**
	Details:				
20. Windows & walls do not contain posters that except in designated areas, no out of date/ irrelevant material?	**1**	**2**	**3**	**4**	**5**
	Details:				

Step 4 STANDARDISE Maintain the first three S's and have an awareness of improving neatness.	**Very Poor**	**Poor**	**Good**	**Very Good**	**Excellent**
21. Is there evidence of the understanding of the importance of 5S principles?	**1**	**2**	**3**	**4**	**5**
	Details:				
22. Can the area management explain why 5S is important?	**1**	**2**	**3**	**4**	**5**
	Details:				
23. Can all the employees explain the importance of 5S?	**1**	**2**	**3**	**4**	**5**
	Details:				
24. Are checklists utilised to identify ongoing maintenance /duties and the status of these sheets up-to-date?	**1**	**2**	**3**	**4**	**5**
	Details:				
25. Can all employees detail overall responsibilities of others to the 5S activity?	**1**	**2**	**3**	**4**	**5**
	Details:				

Step 5 SUSTAIN The 5S Discipline is embedded so that it becomes a way of life. 5S is no longer an event but routine.	**Very Poor**	**Poor**	**Good**	**Very Good**	**Excellent**
26. Are 5S plans and action updates clearly displayed & current?	**1**	**2**	**3**	**4**	**5**
	Details:				
27. Are success stories displayed and confirmed for improvement?	**1**	**2**	**3**	**4**	**5**
	Details:				
28. Are employees 5S roles clearly identified?	**1**	**2**	**3**	**4**	**5**
	Details:				
29. Are department audits and subsequent improvement plans displayed and current?	**1**	**2**	**3**	**4**	**5**
	Details:				

30. Are work instructions and procedures available in the workplace regularly reviewed/kept up to date?	**1**	**2**	**3**	**4**	**5**
	Details:				
31. Are display boards, activity charts, notice boards etc, up to date and regularly checked?	**1**	**2**	**3**	**4**	**5**
	Details:				
Total Score					

Ad ogni categoria valutata nel Lean Assessment verrà poi attribuito un punteggio totale dato dal confronto dei punteggi dati alle diverse domande.

Durante il Lean Assessment viene valutato ciò che sta alla base del pensiero snello:

- si analizza il valore nella sua reale attuazione aziendale: come viene realmente applicato il principio della creazione del valore;
- la modalità del flusso: quanto il processo è tirato dal cliente, in logica *pull*, e fino a che punto lo si mantiene "vivo";
- la cultura: quanto è diffusa e condivisa in azienda la conoscenza degli obiettvi

L'elenco precedente rappresenta un esempio di ciò che un assessment può mostrare con la sua implementazione.

L'obiettivo finale è quello di ottenere una rappresentazione grafica che consenta di mostrare visivamente i risultati della valutazione e le aree di miglioramento.

Quindi, una volta raccolti i dati, vengono elaborati, riassunti in una tabella e inseriti in un diagramma: questo può essere un istogramma, ma molto usato nei Lean Assessment è il diagramma a tela di ragnatela o più comunemente chiamato *radar chart*. Il diagramma a ragnatela è così strutturato:

Fig 2.2: Esempio di diagramma a ragnatela o radar chart
(Fonte: www.qeoconsulting.com)

I raggi della ragnatela corrispondono alla categoria o all'attributo considerato sui quali si inserisce una scala (come, prendendo come esempio la figura 2.2, da zero a dieci).
Il contorno più esterno, che corrisponde al giudizio massimo, rappresenta il livello lean ottimale al quale l'azienda deve cercare di avvicinarsi il più possibile.
I punteggi ottenuti nelle varie categorie vengono segnati su ogni raggio e poi collegati tra di loro in modo da avere un andamento visivo della situazione esistente.
Più i risultati si avvicinano verso l'esterno della ragnatela, più facile e veloce sarà per l'impresa ottenere ottimi risultati in chiave lean.
A volte i diversi punteggi sui raggi vengono suddivisi in livelli in modo da capire come agire nelle diverse aree considerate. Ad esempio, se la scala va da uno a dieci si potrebbe suddividerla in tre livelli:

- livello 1 (giudizi tra 0 e 5): corrisponde ad una situazione critica sulla quale implementare immediatamente i progetti di miglioramento e ripetere l'assessment dopo un certo intervallo di tempo;
- livello 2 (giudizi tra 5 e 8): la situazione è più che passabile, ma è migliorabile;
- livello 3 (giudizi tra 8 e 10): la situazione è accettabile e deve essere mantenuta nel tempo.

Non sempre viene fatta questa suddivisione a livelli, non è del tutto necessaria ai fini della visione nel diagramma della situazione esistente. Ciò che interessa è la rappresentazione della distanza, del divario che esiste tra la propria società e quella snella.

Sullo stesso diagramma possono venire poi riportati i risultati dello stesso assessment riproposto dopo diversi mesi o dopo un anno, due. In questo modo l'azienda può valutare come sta proseguendo l'implementazione delle tecniche lean, verificare se c'è stato qualche miglioramento nelle diverse aree (Fig 2.3).

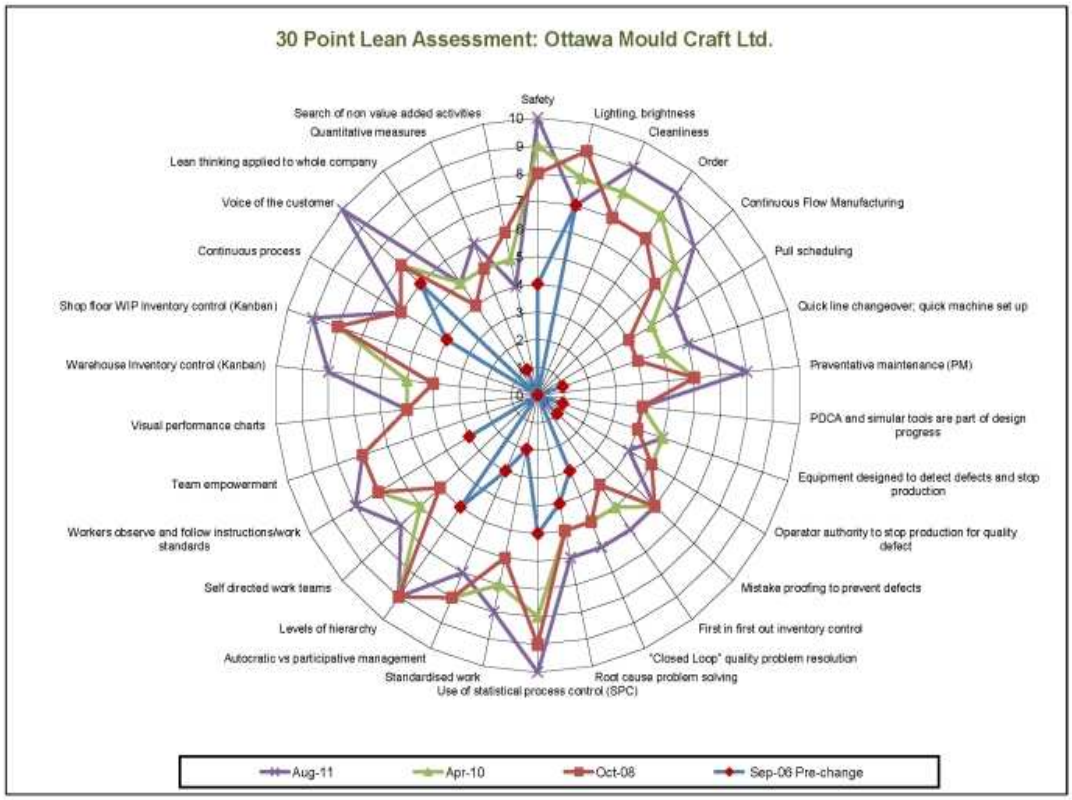


Fig 2.3: Esempio di radar chart su cui sono riportati i risultati di diversi assessment. (Fonte: www.5sbestpractices.ning.com)

Nel Lean Assessment possiamo quindi individuare tre possibili funzioni d'uso:

1. come strumento iniziale per valutare il proseguimento nel piano di lean transformation;
2. come strumento per identificare lo stato attuale dell'azienda;

3. come strumento per monitorare i progressi fatti nel tempo.

Quindi l'assessment risulta essere fondamentale per diversi usi. Soprattutto per quanto riguarda l'inizio del processo di trasformazione lean è uno strumento alquanto valido per avere un'idea del livello qualitativo aziendale.

Da un assessment si può beneficiare di quattro risultati che possono aiutare chi di dovere ad impostare un percorso lean:

1. acquistare una chiara comprensione di ciò che deve essere migliorato o corretto;
2. avere un'idea delle condizioni attuali;
3. conoscere quali sono le priorità per essere lean e provvedere ad un piano di miglioramento;
4. avere una direzione lean che permetta la riduzione dei costi.

Comunque il Lean Assessment non fornisce una garanzia di sostenibilità, di estensione e di miglioramento. I primi risultati derivanti dalla sua applicazione non garantiscono che l'impresa possa essere e diventare lean.

Il fattore chiave per fare in modo che l'assessment possa funzionare, ma soprattutto perché il processo di trasformazione sia sostenibile e che fornisca maggior valore ai clienti è la figura del top manager e del management. Il manager deve avere una visione del tool implementato non solo come attrezzo/metodo per ottenere risultati, ma anche come strumento per modificare il proprio modo di operare, imparare e pensare.

L'utilizzo costante dei lean tools porta il manager a trasformare il proprio pensiero, ciò che J.P. Womack chiama "lean mind". In questo modo il tool aiuta la gestione dell'azienda e la sostiene nel suo cammino al miglioramento.

Quindi è di fondamentale importanza la fase di lean assessment perché permette di misurare le capacità dell'azienda, avere un'idea del gap che esiste e aiuta tutte le persone coinvolte a cambiare la propria visione del valore per il cliente.

CAPITOLO 3

ANALISI DI MODELLI DI ASSESSMENT

In questo capitolo verranno considerati diversi tool realizzati da diverse società di consulenza. Per ognuno di questi verranno elencate le diverse categorie all'interno considerate e visualizzati la struttura e i relativi diagrammi dei risultati. Qui di seguito viene dato l'elenco degli assessment analizzati nei loro aspetti e nella loro struttura:

1. BOK (Body OF Knowledge);
2. ISI: LEAN VALUE STREAM ASSESSMENT TOOL;
3. ASSEMBLY ASSESSMENT TOOL (LMR);
4. LEAN ASSESSMENT (Strategosinc);
5. THE CIP ASSESSMENT;
6. AME LEAN ASSESSMENT;
7. LEAN MANUFACTURING ASSESSMENT (Gap Analysis);
8. THE POWER LEAN ASSESSMENT (AME);
9. LEAN ASSESSMENT TOOL (Process Coaching Incorporated);
10. LEAN ENTERPRISE SELF-ASSESSMENT TOOL (LESAT).

3.1 – BOK (LEAN CERTIFICATION, BODY OF KNOWLEDGE)

Gli assessment vengono solitamente usati per certificare quanto un'azienda nelle diverse categorie ha implementato la logica lean.

Nel Bok la tecnica adottata è quella di assegnare "virtualmente" delle medaglie: bronzo, argento, oro. Ad ogni medaglia viene dato un significato: assegnare la medaglia di bronzo significa che si sta sviluppando una "tattica", un piano; attribuire la medaglia d'argento sta ad indicare che si sta integrando la logica lean; per la medaglia d'oro significa che ormai la lean fa parte della strategia d'azienda.

Per ogni categoria e medaglia esistono dei valori percentuali da raggiungere per ottenere le diverse certificazioni. L'azienda comincerà con la valutazione per ottenere la certificazione per il bronzo. Questo assessment potrà poi venire sottoposto di nuovo, dopo un certo periodo, per verificare se l'azienda è pronta per la certificazione per l'argento.

Il BOK considera dodici categorie lean suddivise in quattro moduli distinti. Ad ogni categoria corrispondono diverse sottocategorie. I quattro moduli sono così suddivisi:

- modulo 1: cultural enablers;
- modulo 2: continuous process improvement;
- modulo 3: consistent lean enterprise culture;
- modulo 4: business results.

I moduli rappresentano le aree lean. In ogni modulo si trovano le principali categorie considerate e, per ognuna di esse, si analizzano diverse sottocategorie. Di seguito sono elencate le principali categorie per ogni modulo:

1) modulo 1: - principles of cultural enablers;
- processes for cultural enablers;
- cultural enabler techniques and practices.

2) modulo 2: - principles of continuous process improvement;
- continuous process improvement systems;
- continuous process improvement techniques and practices.

3) modulo 3: - principles of consistent Lean Enterprise culture;
- processes for developing consistent Lean Enterprise culture;
- consistent enterprise culture techniques and practices.

4) modulo 4: - principles of business results;
- measurement systems;
- key lean related measures.

Qui di seguito viene mostrato l'assessment nella sua struttura (Fig 3.1). Per ogni area viene dato un valore percentuale a seconda della certificazione che si vuole ottenere. Lo stesso vale per le principali categorie. Ad esempio, per ottenere nel primo modulo (Cultural Enablers) il bronzo bisogna raggiungere un totale percentuale del 15% suddiviso in 3%, 4%, 8% per le principali categorie considerate. Il medesimo metodo vale per gli altri moduli in base alla certificazione che si vuole ottenere.

Fig 3.1: BOK (BODY OF KNOWLEDGE) (Fonte: www.sme.org)

	WEIGHTINGS PER EXAM		
	Lean Bronze (tactical)	Lean Silver (integrative)	Lean Gold (strategic)
MODULE 1			
1. Cultural Enablers	**15%**	**20%**	**25%**
1.1. Principles of Cultural Enablers	**3%**	**4%**	**5%**
1.1.1. Respect for the individual			
1.1.2. Humility			
1.2. Processes for Cultural Enablers	**4%**	**8%**	**12%**
1.2.1. Planning & Deployment			
1.2.2. Create a sense of urgency			
1.2.3. Modeling the lean principles, values, philosophies			
1.2.4. Message Deployment - Establishing vision and direction			
1.2.5. Integrating Learning and Coaching			
1.2.6. People development - Education, training & coaching			
1.2.7. Motivation, Empowerment & Involvement			
1.2.8. Environmental Systems			
1.2.9. Safety Systems			
1.3. Cultural Enabler Techniques and Practices	**8%**	**8%**	**8%**
1.3.1. Cross Training			
1.3.2. Skills Assessment			
1.3.3. Instructional Goals			
1.3.4. On-the-Job Training			
1.3.5. Coaching & Mentoring			
1.3.6. Leadership Development			
1.3.7. Teamwork			
1.3.8. Information Sharing (Yokoten)			
1.3.9. Suggestion Systems			
MODULE 2			
2. Continuous Process Improvement	**60%**	**30%**	**15%**
2.1. Principles of Continuous Process Improvement	**15%**	**10%**	**6%**
2.1.1. Process Focus			
2.1.2. Identification & Elimination of Barriers to flow			
2.1.2.1. Flow & the Economies of Flow			
2.1.2.2. 7 Wastes (Muda), Fluctuation (Mura), and Overburden (Muri)			
2.1.2.3. Connect & Align Value added work fragments			
2.1.2.4. Organize around flow			
2.1.2.5. Make end-to-end flow visible			
2.1.2.6. Manage the flow visually			
2.1.3. Match rate of production to level of customer demand - Just-in-Time			
2.1.4. Scientific thinking			
2.1.4.1. Stability			
2.1.4.2. Standardization			
2.1.4.3. Recognize Abnormality			
2.1.4.4. Go and See			
2.1.5. Jidoka			
2.1.5.1. Quality at the source			
2.1.5.2. No defects passed forward			

	WEIGHTINGS PER EXAM		
	Lean Bronze (tactical)	Lean Silver (integrative)	Lean Gold (strategic)
2.1.5.3. Separate man from machine			
2.1.5.4. Multi-process handling			
2.1.5.5. Self detection of errors to prevent defects			
2.1.5.6. Stop and Fix			
2.1.6. Integrate Improvement with Work			
2.1.7. Seek Perfection			
2.1.7.1. Incremental continuous improvement (Kaizen)			
2.1.7.2. Breakthrough continuous improvement (Kaikaku)			
2.2. Continuous Process Improvement Systems	**20%**	**10%**	**7%**
2.2.1. Visual Workplace			
2.2.1.1. 5S standards and discipline			
2.2.2. Lot size reduction			
2.2.3. Load leveling			
2.2.4. 3P Production Process Preparation			
2.2.5. Total Productive Maintenance (including predictive)			
2.2.6. Standard Work			
2.2.7. Built-in feedback			
2.2.8. Strategic Business Assessment			
2.2.9. Continuous Improvement Process Methodology			
2.2.9.1. PDCA			
2.2.9.2. DMAIC			
2.2.9.3 Problems Solving Storyboards			
2.2.10 Quality Systems			
2.2.10.1 ISO and Other standards			
2.2.11 Corrective Action System			
2.2.11.1. Root Cause analysis			
2.2.12. Project Management			
2.2.13 Process design			
2.2.14 Pull System			
2.2.15 Knowledge Transfer			
2.3. Continuous Process Improvement Techniques & Practices	**25%**	**10%**	**2%**
2.3.1. Work Flow Analysis			
2.3.1.1. Flowcharting			
2.3.1.2. Flow Analysis Charts			
2.3.1.3. Value Stream Mapping			
2.3.1.4. Takt Time Analysis			
2.3.2. Data Collection and Presentation			
2.3.2.1. Histograms			
2.3.2.2. Pareto Charts			
2.3.2.3. Check Sheets			
2.3.3. Identify Root Cause			
2.3.3.1. Cause & Effect diagrams (Fishbone)			
2.3.3.2. 5-Whys			
2.3.3.3. Failure Mode and Effects Analysis			
2.3.4. Presenting Variation Data			
2.3.4.1. Statistical Process Control Charts			
2.3.4.2. Scatter and Concentration Diagrams			
2.3.5. Product and Service Design (make sure to include engineering changes re: capabilities)			
2.3.5.1. Concurrent Engineering			

	WEIGHTINGS PER EXAM		
	Lean Bronze (tactical)	Lean Silver (integrative)	Lean Gold (strategic)
2.3.5.2. Quality Function Deployment			
2.3.5.3. Product or Process Benchmarking			
2.3.5.4. Design for Product Life Cycle (DFx) - cradle to cradle			
2.3.5.5. Variety Reduction - product and component			
2.3.5.6. Design for Manufacturability			
2.3.6. Organizing for Improvement			
2.3.6.1. Kaizen Blitz Events			
2.3.7. Countermeasure Activities			
2.3.7.1. Mistake and Error Proofing (Poka Yoke)			
2.3.7.2. Quick Changeover/Setup Reduction (SMED)			
2.3.7.3. One Piece Flow			
2.3.7.4. Right sized equipment			
2.3.7.5. Cellular Flow			
2.3.7.6. Sensible Automation			
2.3.7.7. Material Signals (Kanban)			
2.3.7.8. Source Inspection			
2.3.8. Supply Processes External			
2.3.8.1. Supplier managed inventory			
2.3.8.2. Cross-docking			
2.3.8.3. Supplier Assessment and Feedback			
2.3.8.4. Supplier Development			
2.3.8.5. Supplier Benchmarking			
2.3.8.6. Logistics			
2.3.9. Supply Processes Internal			
2.3.9.1. Material Handling			
2.3.9.2. Warehousing			
2.3.9.3. Planning and Scheduling			
MODULE 3			
3. Consistent Lean Enterprise Culture	**10%**	**20%**	**30%**
3.1. Principles of Consistent Lean Enterprise Culture	**5%**	**7%**	**11%**
3.1.1. Systemic Thinking			
3.1.1.1. Part-whole relationships are clear and explicit through holistic thinking			
3.1.1.2. The organization evolves as necessary to accommodate future conditions through dynamic thinking			
3.1.1.3. Closed-loop thinking to assure effective feedback of organizational learning			
3.1.2. Constancy of Purpose			
3.1.2.1. Focus on Results			
3.1.2.2. Focus on Waste Elimination			
3.1.2.3 Focus on Value to customer			
3.1.3. Social Responsibility			
3.2. Processes for Developing Consistent Lean Enterprise Culture	**3%**	**6%**	**11%**
3.2.1. Enterprise Thinking			
3.2.1.1. Organize around flow			
3.2.1.2. Integrated business system and improvement system			
3.2.1.3. Reconcile reporting systems			
3.2.1.4. Information management			
3.2.2. Policy Deployment / Strategy Deployment			

	WEIGHTINGS PER EXAM		
	Lean Bronze (tactical)	Lean Silver (integrative)	Lean Gold (strategic)
3.2.2.1. Scientific thinking as a strategy process			
3.2.2.2. Series of nested experiments			
3.2.2.3. Dynamic give and take			
3.2.2.4. Forming consensus			
3.2.2.5. Align strategies and execution			
3.2.2.6. Standard work for strategy communication - how we think and talk			
3.2.2.7. Resource deployment and allocation			
3.3. Consistent Enterprise Culture Techniques & Practices	**2%**	**7%**	**8%**
3.3.1. A3			
3.3.2. Catchball			
3.3.3. Redeployment of Resources			
MODULE 4			
4. Business Results	**15%**	**30%**	**30%**
4.1. Principles of Business Results	**4%**	**10%**	**12%**
4.1.1. Create Value first to drive performance			
4.1.1.1. Measure what matters to the customer			
4.1.1.2. Measure normal versus abnormal conditions - (triggers response)			
4.1.1.3. Guidelines for Measurement Categories			
* Customer demand and characteristics			
* Customer retention			
* Waste			
* People Development Measures			
* Quality			
* Cost and Productivity			
* Competitive Impact			
4.2. Measurement Systems	**3%**	**10%**	**12%**
4.2.1. Measurement			
4.2.1.1 Understand interdependencies between measures and measurement categories			
4.2.1.2 Align internal measures with what matters to customers			
4.2.1.3 Measure the results from the 'whole' system			
4.2.1.4 Measure flow and waste			
4.2.1.5 Lean Accounting			
4.2.1.6. Voice of the Customer			
4.2.2. Goal and Objective Setting			
4.2.2.1. SMART (Specific, Measurable, Achievable, Realistic, Timely)			
4.2.2.2. Tied to the customer			
4.2.3. Analysis - Understand what moves the dial on measures			
4.2.4. Reporting			
4.2.4.1. Visible feedback real-time			
4.3. Key Lean Related Measures	**8%**	**10%**	**6%**
4.3.1. Quality			
4.3.1.1. Rework			
4.3.1.2. First Pass Yield			
4.3.2. Delivery			
4.3.2.1 Takt Time			
4.3.2.2 Cycle Time			

3.2 – ISI: LEAN VALUE STREAM ASSESSMENT TOOL

In questo tool vengono considerate sedici categorie lean:

1. Communication within the organization;
2. Visual systems and workplace organization;
3. Operator flexibility;
4. Continuous improvement;
5. Mistake proofing (POKA YOKE);
6. Quick changeover (SMED)
7. Quality;
8. Supply chain;
9. Balanced production;
10. Total productive maintenance (TPM);
11. Pull systems (KANBAN);
12. Standard work;
13. Lean accounting systems;
14. Engineering;
15. Performance measurement;
16. Reserved/client specific.

Per ogni categoria si trovano diverse sottocategorie. Per ogni sottocategoria, letta attentamente la domanda, si assegna un punteggio che va da 0 a 5 al quale viene dato un significato:

- 0: la pratica non si trova da nessuna parte;
- 1: la pratica è vista in poche aree, con incompatibilità;
- 2: la pratica è comunemente trovata ma con incompatibilità;
- 3: la pratica è nella maggioranza delle aree con nessuna incompatibilità;
- 4: la pratica si trova ovunque con esecuzione costante;
- 5: la pratica è ovunque, con miglioramento negli ultimi dodici mesi.

Se alla domanda non è possibile rispondere perché quella data pratica non è applicabile si inserisce n/a.

A seconda del punteggio ottenuto nel totale per ogni categoria risulta una percentuale che viene visualizzata in una tabella e in un istogramma. Di seguito la struttura dell’assessment (Fig 3.2)

Fig 3.2: Lean Value Stream Assessment Tool (Fonte: www.isiworld.net)

Communication

		Points	Score
1	Plant Management communicates with *all* levels of the organization on topics regarding organization goals and objectives at least twice per year.	0 1 2 3 4 5	2
2	Employees are able to accurately describe the organization's goals and how their job contributes to the achievement of those goals.	0 1 2 3 4 5	1
3	Employees receive feedback through a formal process concerning problems found in downstream processes or from the customer.	0 1 2 3 4 5	3
4	Management encourages production employees to work in groups to address performance, quality or safety issues.	0 1 2 3 4 5	4
5	Employees at the shop floor level understand and use common performance metrics to monitor and improve the production processes.	0 1 2 3 4 5	3
6	Problems in the production process are detected and investigated within ten (10) minutes of the first occurrence.	0 1 2 3 4 5	5
7	The concept of Value Stream Mapping is understood and all product famalies have been mapped and are physically segregated into the like process streams.	0 1 2 3 4 5	3
		Total Score	21
		Communication Category Score = Total/35	**60%**

Visual Systems and Workplace Organization

		Points	Score
1	The Manufacturing plant and support areas are generally clear of unnecessary materials, items or scrap. Isles are clear of obstructions.	0 1 2 3 4 5	2
2	The plant floor has lines that distinguish work areas, paths and material handling isles.	0 1 2 3 4 5	3
3	All employees are aware of good housekeeping practices and operators consider daily clean up and put away activities as part of their job.	0 1 2 3 4 5	3
4	There is a place for everything and is everything in its place. Every needed item, tool, material container or part rack is labeled and easy to find.	0 1 2 3 4 5	2
5	Display boards containing job training, safety, operation measurables, production data, quality problems and countermeasure information are readily visible at each production line or process and are updated continuously.	0 1 2 3 4 5	4
6	Check sheets describing and tracking the top quality defects are posted and are up to date at each work station.	0 1 2 3 4 5	4
			2
		Total Score	20
		Visual Systems Category Score = Total/30	**67%**

Operator Flexibility

		Points	Score
1	Operators are given formal training before doing a job on their own. Few defects or production slowdowns are attributable to new or inexperienced operators.	0 1 2 3 4 5	2
2	Product/Component travel distances have been measured, analyzed and reduced by moving equipment and work stations closed together.	0 1 2 3 4 5	3
3	Machines are "right sized" for the operation/process. They have the ability to change speed to match the TAKT time. No "monuments" are present in the process.	0 1 2 3 4 5	1
4	Operators are cross trained to perform other job functions and operators work in at least 2 different jobs each day.	0 1 2 3 4 5	3
5	Processes and equipment are arranged to facilitate continuous flow of work through production. Machines are NOT arranged by department, type or process group.	0 1 2 3 4 5	1
6	U-shaped cells have been designed and implemented to promote one piece flow through production.	0 1 2 3 4 5	3
		Total Score	13
		Operator Flexability Category Score = Total/30	**43%**

Continuous Improvement

		Points	Score
1	There is a designated champion and a clearly communicated strategy for continuous improvement in the plant with the necessary resources, organization and infrastructure in place to support the process.	0 1 2 3 4 5	1
2	There is a formal suggestion process in place to solicit ideas for improvements from all employees and to recognize their participation.	0 1 2 3 4 5	3
3	Employees have been trained in continuous improvement methods and have been affected by or participated in continuous improvement events.	0 1 2 3 4 5	2
4	Employees know the eight wastes, are actively involved in identifying wastes in their processes/areas and are empowered to work to reduce and eliminate the waste.	0 1 2 3 4 5	4
5	Continuous improvement, Kaizen projects/events are structured, planned and implemented. Successes are recognized and expanded throughout the facility.	0 1 2 3 4 5	5
6	Most improvements made throughout the plant are made daily and involve little or no expense to implement.	0 1 2 3 4 5	2
7	Product/Process Value streams undergo examination for continuous improvement on a regularly scheduled basis.	0 1 2 3 4 5	3
		Total Score	20
		Continuous Improvement Category Score = Total/35	**57%**

Mistake Proofing (Poka Yoke)

		Points	Score
1	Employees have been trained in the basis of mistake proofing and there is a team responsible for analyzing production defects and identifying mistake proofing opportunities.	0 1 2 3 4 5	3
2	Mistake proofing devices and methods have been implemented or are being developed to eliminate the top production defects for each work area in the plant.	0 1 2 3 4 5	2
3	Parts, products and components have been analysed to identify design opportunities to eliminate waste and improve productivity.	0 1 2 3 4 5	1
4	Operators are empowered to stop the line when a defective unit is found or when they cannot complete their process according to the SOP.	0 1 2 3 4 5	3
5	Manual processes or tasks have been equipped with mechanical checks to aid human judgement whenever possible.	0 1 2 3 4 5	4
6	Equipment and processes are equipped with call(andon) lights or signals that bring attention to situations requiring assistance with a problem or the replenishment of supplies.	0 1 2 3 4 5	3
		Total Score	16
		Mistake Proofing Category Score = Total/30	**53%**

SMED/Quick Changeover

		Points	Score
1	Changeovers are scheduled in advance and communicated to inform all workers that these events are on that day's schedule.	0 1 2 3 4 5	2
2	Changeover teams are in place and have received training on changeover time reduction procedures and are actively improving change over methods.	0 1 2 3 4 5	2
3	Changeovers are done frequently and typically take less than 10 minutes from last good part of the last run to first good part of the next run.	0 1 2 3 4 5	3
4	Changeover time is visibly tracked and posted at each work station where changeovers are performed.	0 1 2 3 4 5	3
5	Changeover procedures are standardized and repeated in other areas of the plant. Standard procedures and checklists are visible and followed	0 1 2 3 4 5	2
6	Special tools and equipment have been developed and implemented to reduce the time and labor involved in the changeover process.	0 1 2 3 4 5	4
		Total Score	16
		SMED Category Score = Total/30	**53%**

Quality

		Points	Score
1	Zero defects from suppliers is a policy	0 1 2 3 4 5	3
2	The company quality system is effectively implemented and compliant with a national standard such as ISO-9000	0 1 2 3 4 5	3
3	FMEA is in place(Feedback, rootcause, etc.)	0 1 2 3 4 5	3
4	Material Review Board/Discrepant material disposition is in place	0 1 2 3 4 5	3
5	Supplier quality systems are in place	0 1 2 3 4 5	4
6	Internal scrap loss is less than 1% of cost of goods sold	0 1 2 3 4 5	2
7	Returned material to vendors is less than .1% of sales	0 1 2 3 4 5	3
		Total Score	21
		Quality Category Score = Total/35	**60%**

Supply Chain

		Points	Score
1	Suppliers are involved in continuous improvement efforts with the company	0 1 2 3 4 5	4
2	Performance to delivery policy (on-time) is better than 98%	0 1 2 3 4 5	3
3	Quality performance of the suppliers exceeds 98%	0 1 2 3 4 5	2
4	Electronic communications with suppliers is used to trigger release of supplies under a kanban system	0 1 2 3 4 5	3
5	The company has regular input to the suppliers to improve design and performance characteristics of the supplied parts	0 1 2 3 4 5	3
6	Cost reduction goals with suppliers are documented and tracked	0 1 2 3 4 5	2
7	Sevice complaints with suppliers are resolved within 24 hours	0 1 2 3 4 5	3
		Total Score	20
		Supply Chain Category Score = Total/35	**57%**

Balanced Production

1	There is an effort to level production schedules by requiring suppliers to schedule frequent, smaller deliveries, over the period.	0 1 2 3 4 5	3
2	Changeovers in production are made to support the concept of running to demand for all products, and not to support long production runs, WIP inventory buffers, or daily short ship emergencies, etc.	0 1 2 3 4 5	2
3	Takt time is known by all associates and determines the pace of production in the plant.	0 1 2 3 4 5	2
4	Production is facilitated through Value Stream Managers	0 1 2 3 4 5	3
5	Processes on production lines or in cells are balanced or leveled so the difference between cycle times of linked processes is negligible.	0 1 2 3 4 5	3
6	When demand volume changes, production processes are re-balanced or redesigned to flex up or down the process cycle times to correspond to the new Takt time.	0 1 2 3 4 5	3
7	When demand volume changes long term, supermarket and POUS levels are adjusted to meet the new Takt time.	0 1 2 3 4 5	3

Total Score **19**

Balanced Production Category Score = Total/35 **54%**

Total Productive Maintenance

1	Maintenance team managers and workers have been trained in the basics of TPM	0 1 2 3 4 5	4
2	Machines have all necessary safety guards in place. Safety devices are in working order and equipment is locked out immediately when broken down or when otherwise appropriate.	0 1 2 3 4 5	3
3	Preventive maintenance activity lists are posted in work areas and item completions are tracked over time.	0 1 2 3 4 5	3
4	Accurate and visible maintenance records are kept up to date and posted nearby for all production and support equipment.	0 1 2 3 4 5	2
5	Preventive maintenance activities are focused on increasing process utilization and minimizing cycle time variation.	0 1 2 3 4 5	3
6	Preventive maintenance responsibilities are defined for both maintenance and production workers.	0 1 2 3 4 5	4
7	Time is allowed in the daily production schedule for workers to perform their preventive maintenance and cleaning duties.	0 1 2 3 4 5	3

Total Score **22**

Total Productive Maintenance Score = Total/35 **63%**

Pull Systems

1	Each Manufacturing cell, line or process has displayed, visually, the target and actual hourly output as well as the shifts production requirements and timing.	0 1 2 3 4 5	3
2	All production managers and supervisors have been trained in the principles and implementation of shop floor material pull systems.	0 1 2 3 4 5	3
3	Material flow or movement in the plant is based on the make one move one concept, or is dependent on individual pull signals, via Kanban, etc. from downstream work stations as parts or materials are consumed.	0 1 2 3 4 5	2
4	Downstream processes are pulling material from upstream processes. Upstream production schedules are dependent on downstream use.	0 1 2 3 4 5	4
5	Production lines/cells are capable of adapting to changes in customer demand by changing only one production schedule at the pacemaker process.	0 1 2 3 4 5	3
6	Production supervisors are not motivated to produce more parts than the subsequent process require.	0 1 2 3 4 5	3

Total Score **18**

Pull Systems Category Score = Total/30 **60%**

Standard Work

1	Standard operating procedures have been developed for each process or cell and are used to train operators.	0 1 2 3 4 5	2
2	Every production process has its SOP posted within view of the worker performing the process.	0 1 2 3 4 5	2
3	The TAKT time for each product was used as the basis for the production process time for each operation and the process manning requirements.	0 1 2 3 4 5	3
4	The process of job design and standardization involves operators as well as support personnel.	0 1 2 3 4 5	3
5	Frequently repeated, non-value adding operations in the plant, such as changeover, quality checks, preventative maintenance, clean up, etc. are visually standardized and updated.	0 1 2 3 4 5	3
6	Operators individually perform their processes according to the process sheets or SOP'S and make few method or technique errors. Any errors are recorded and tracked.	0 1 2 3 4 5	4

Total Score **17**

Standard Work Category Score = Total/30 **57%**

Accounting Systems

1	Accounting personnel are fully aware and trained in lean manufacturing principles	0 1 2 3 4 5	3
2	Accounting personnel are actively involved in waste elimination efforts throughout the company and participate in process improvement activities at least 50% of the time	0 1 2 3 4 5	2
3	Accounting is organized along value streams and reports results along value streams	0 1 2 3 4 5	2
4	Accounting processes are organized visually and the workplace shows evidence of visual indicators to control the status of work flow	0 1 2 3 4 5	2
5	Accounting delivers information and performance reports that support the lean conversion and do not cause managers to make the wrong decisions	0 1 2 3 4 5	2
6	Performance measures such as leadt time and velocity are used to measure the department and establish goals for continuous improvement	0 1 2 3 4 5	4
7			

Total Score **15**

Accounting Systems Category Score = Total/30 **50%**

Engineering

1	Engineering personnel are aware, involved and trained in lean principles	0 1 2 3 4 5	3
2	Systematic efforts are in place to reduce product variation and the number of items (part numbers) in the system	0 1 2 3 4 5	2
3	Engineering has organized its activities along value streams	0 1 2 3 4 5	2
4	Engineering processes are organized visually and the workplace shows evidence of visual indicators to show status of work	0 1 2 3 4 5	2
5	Engineering processes have been balanced to create flow and reduce lead time within the Engineering department	0 1 2 3 4 5	3
6	Engineers routinely go to the location of a problem in production to assess the actual situation and communicate with the production operators to obtain their input.	0 1 2 3 4 5	4
7	Performance measures such as lead time and velocity are used to measure the department and establish goals for continuous improvement	0 1 2 3 4 5	3

Total Score **19**

Engineering Category Score = Total/35 **54%**

Performance Measurement/Internal

1	Numerous and detailed financial reports have been replaced by a few key measures of enterprise performance	0 1 2 3 4 5	3
2	Traditional cost accounting measures and individual/department efficiency measures have been replaced by value stream performance measures	0 1 2 3 4 5	2
3	Performance results are communicated openly to all employees and are visually posted to show status and progress	0 1 2 3 4 5	2
4	Employees understand how their individual efforts contribute to the overall results of the enterprise	0 1 2 3 4 5	3
5	Individuals are rewarded for team-based performance rather than individual performance	0 1 2 3 4 5	2

Total Score **12**

Performance Measurement Category Score = Total/25 **48%**

Customer Communication

1	There is a standard system in place for collecting customer satisfaction information and data	0 1 2 3 4 5	3
2	Customer requirements are identified and communicated throughout the supply chain	0 1 2 3 4 5	3
3	Customer complaints are handled the same day they are received in under 2 hours	0 1 2 3 4 5	3
4	Customers have regular and systematic input into the design and functionality of the products they buy.	0 1 2 3 4 5	4
5			
6			

Total Score **13**

Reserved Category Score = Total/20 **65%**

All’interno di ogni tabella, per ogni categoria, è dato un punteggio massimo che varia in base al numero delle domande (se ci sono 4 domande il punteggio massimo è di 20). Rispondendo alle questioni viene calcolato un punteggio totale e rapportato con quello massimo, ottenendo un valore percentuale (punteggio ottenuto/punteggio massimo).
Una volta che si ha risposto alle domande, i risultati ottenuti vengono visualizzati nella tabella riassuntiva (Tab 3.1) e nell’istogramma seguente (Fig 3.3).

Category	Score
Communication	60%
Visual Systems and Workplace Organization	67%
Operator Flexibility	43%
Continuous Improvement	57%
Mistake Proofing (Poka Yoke)	53%
SMED/Quick Changeover	53%
Quality	60%
Supply Chain	57%
Balanced Production	54%
Total Productive Maintenance	63%
Pull Systems	60%
Standard Work	57%
Accounting Systems	50%
Engineering	54%
Performance Measurement	48%
Customer Communication	65%

Tab 3.1: Tabella riassuntiva dei risultati

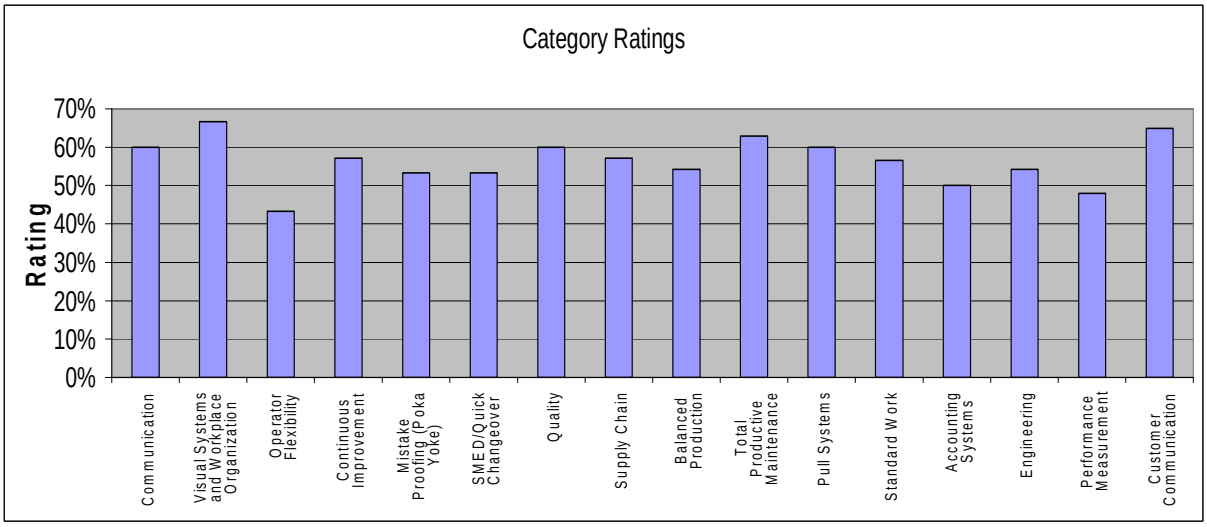


Fig 3.3: Istogramma relativo ai risultati ottenuti

3.3 – ASSEMBLY LEAN ASSESSMENT (LMR)

Il seguente assessment considera sette categorie lean:

1. 5s Workplace Organization;
2. Standardized Work;
3. Quick Changeover;
4. Total Productive Maintenance;
5. Just in Time;
6. Jidoka;
7. People.

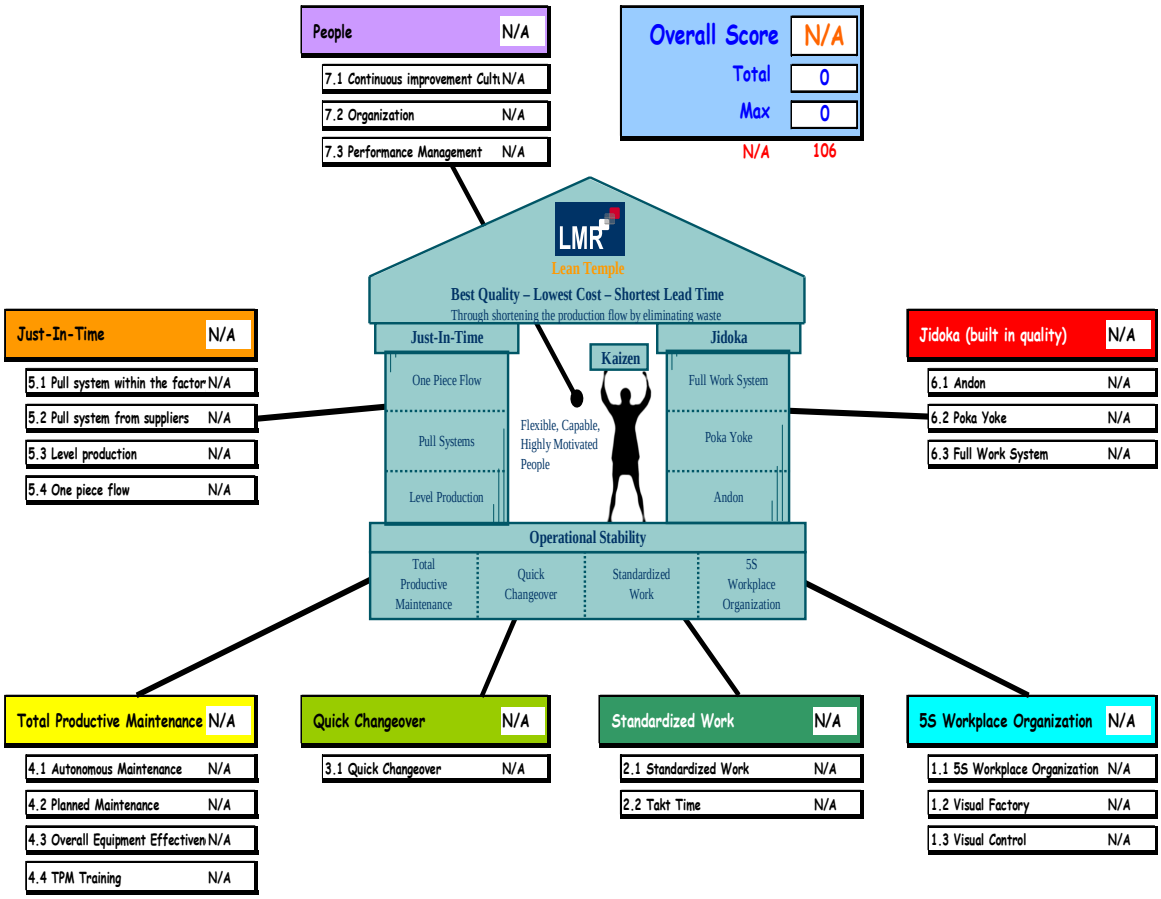


Fig 3.4: Rappresentazione della struttura dell'assessment

(Fonte: www.goinglean.co.uk)

A queste sette categorie corrispondono delle sottocategorie sulle quali vengono poste delle domande. In questo tool come risposta alle questioni poste viene indicata una lettera:

- R: sta a significare una pratica non ancora partita o incompleta;
- G: indica una pratica ormai completa;
- N/A: sta ad indicare una pratica non applicabile.

Nel momento in cui si va a porre una croce all'interno della casella indicata con R, G, N/A a lato viene raccolta la risposta in una tabella (Results). A seconda della risposta viene dato un punteggio: 1 se si risponde con G, 0 con R. Se viene risposto N/A il tool non considera la pratica e non la considera ai fini del conteggio in percentuale dell'implementazione della pratica. Una volta che si è risposto a tutte le domande viene dato un punteggio in percentuale della categoria principale considerata nel tool. La percentuale viene calcolata rapportando il punteggio ottenuto con quello massimo.

Alla fine dell'assessment si trova un work-sheet (Tab 3.2) nel quale possono venire riportati i risultati di ogni sottocategoria (in questo caso le risposte vengono indicate con Y se completa, N se incompleta, O se non applicabile) per ogni area o dipartimento. In questa maniera si ha un riassunto finale immediato dei risultati ottenuti e una percentuale totale di tutte le aree che sta ad indicare quanto vicini si è ad essere lean con l'azienda o in ogni area. Il work-sheet può essere utilizzato in sostituzione all'intero assessment. Se viene inserito O nelle questioni, la risposta non viene considerata ai fini del calcolo del punteggio. Questo è calcolato dividendo il 100% con la somma delle risposte date con Y e N, il numero ottenuto lo si moltiplica per le risposte contrassegnate da Y. Nella fig 3.5 la struttura dell'assessment.

Fig 3.5: Struttura del Lean Assembly Assessment (Fonte: www.goinglean.co.uk)

Plant/ Cell: 00
Assessment No: 00
Date: 00
Assessor: 00

R -- Not started/incomplete
G -- Complete
B -- Not Applicable

5S Workplace Organization | **Section: 1** | LMR

5s and Visual Factory are the keystone of Lean Manufacturing. The concept is simple but can prove difficult to implement and maintain. However, unless 5s and Visual Factory are in place the fundamental building blocks of lean (TPM and Standardised Work) cannot be maintained. 5s will ultimately provide a platform for the culture of kaizen.

Subject		Question	R	G	N/A	Result
1.1 5S Workplace Organization Sort, Set, Shine, Standardise, Sustain	1.1.1	Are only the relevant tools, equipment, parts and documentation available in the area.			X	5S, if performed correctly, will have the following result: * An environment that will sustain small incremental improvements. * A clean working area where people are happy to work.
	1.1.2	Are there 5S quarantine areas available and functioning in line with the agreed process.			X	
	1.1.3	All tooling, equipment, gauges, documentation and parts kept in specified addressed locations. All footprints respected.			X	
	1.1.4	Is there a cleaning schedule operated in the area			X	
	1.1.5	Are Cleaning standards which are visual and descriptive, displayed in the work area			X	
	1.1.6	Do supervisors and managers undertake regular 5s audits, with action plans evident for non-conforming items			X	
	1.1.7	Have all employees had awareness training and understand the purpose of 5s			X	

Score : 1.1 5S Workplace Organization

1.1.1 Relevant tools, parts, in specified locations	0
1.1.2 5S quarantine area functioning	0
1.1.3 Walkways cleared of obstructions	0
1.1.4 Cleaning schedule available	0
1.1.5 Cleaning standards visible and descriptive	0
1.1.6 Audits and action plans evident	0
1.1.7 All employees had awareness training	0
Total	0
Max	0
%	N/A

Subject		Question	R	G	N/A	Result
1.2 Visual Factory All the answers to any questions can be found in the relevant area within 3 minutes.	1.2.1	Are there team boards in the team production area showing agreed metrics e.g safety, quality, production,cost			X	Visual Factory, if used correctly will have the following result: * All the answers to any questions can be found in the relevant area within 3 minutes
	1.2.2	Are visual one point Lessons displayed in the production areas showing quality and safety concerns			X	
	1.2.3	Are audit sheets clearly displayed and up to date			X	
	1.2.4	Is there a central information area showing up to date KPIs that can be used to drive continuous improvement and manage production operations.			X	
1.3 Visual Control The adherence to visual standards that support the concept of management by exception	1.3.1	Are visual markings evident, e.g. start, stop lines, kanban squares, 70% line/mark linked to Standardized Work to maintain productivity and improve quality			X	Visual Control, if used correctly will have the following result: * The teams will be managing their production using management by exception. Abnormalities clear to all.
	1.3.2	Are deviations to established standards quickly and visually identified			X	
	1.3.3	Are all non standard frequent tasks tracked and audited using a visual control board			X	

Score : 1.2 Visual Factory

1.2.1 Team boards with KPI	0
1.2.2 Visual one point lessons	0
1.2.3 Audit sheets up to date	0
1.2.4 Central information area with KPI	0
Total	0
Max	0
%	N/A

Score : 1.3 Visual Control

1.3.1 Visual markings	0
1.3.2 Deviations to established standards	0
1.3.3 Visual control (Kamishibai) system	0
Total	0
Max	0
%	N/A

5S Workplace organization section	
Total	0
Max	0
%	N/A

Plant/ Cell: 00 Assessment No: 00 Date: 00 Assessor: 00	R -- Not started/incomplete G -- Complete B -- Not Applicable	**Standardized Work**	**Section: 2**	LMR

Standardized Work is a method for teams to document their processes giving them more control in the day-to-day running of their operations. It incorporates all the safety and quality aspects required to support employees and customers whilst identifying waste which can be eliminated to reduce cost and improve productivity. Standardised Work is seen as a foundation tool for kaizen improvements centered around the activities of people.

Subject		Question	R	G	N/A	Result
2.1 Standardized Work A written document identifying each step in the work process allowing adherence to the agreed standard and a baseline for improvement.	2.1.1	Are all production and non production processes documented using Standardized Work, and available at the work place			X	Correct application of Standardized Work will have the following result: * A robust knowledge management system retained and owned by production which assures the continuous adherence to quality and productivity standards.
	2.1.2	Is the Standardized Work supported by work element sheets to provide detail for safety,quality and technique where required			X	
	2.1.3	All Standardised Work documentation is created by the team members with the guidance and support of the team leader. Each element of work has an agreed time established by the team.			X	
	2.1.4	Value Added / Non Value Added steps are identified in the Standardised Work documentation and wherever possible is displayed visually using a Yamazumi Board for continuous improvement purposes.			X	
	2.1.5	Audit criteria for Team Leader, Supervisor, and Management established based upon frequency of check, competency.			X	
	2.1.6	Training of all newcomers is performed by the Team Leader using the appropriate Standardised Work Chart and Work Step Sheets until required level of competence in productivity and quality is achieved.			X	
	2.1.7	Initial Standardised Work is created as part of the Production Development process. All production trials based upon Standardised Work developed by experienced production operators.			X	

Score : 2.1 Standardized Work

2.1.1 All production & non production processes	0
2.1.2 Work element sheets	0
2.1.3 Created by the team members	0
2.1.4 Value Added / Non Value Added	0
2.1.5 Work balance board	0
2.1.6 Regular audits	0
2.1.7 Train with standard work	0
Total	0
Max	0
%	N/A

Subject		Question	R	G	N/A	Result
2.2 Takt Time Building to customer demand derived by dividing (Work Time x Operating Rate) by Customer Demand.	2.2.1	Is the takt Time / target cycle time and process cycle time identified on Standardized Work Sheets			X	Takt Time, if performed correctly, will have the following '* Processes are flexed in line with customer demand with spare capacity consolidated for continuous improvement activities.
	2.2.2	Is the takt time reviewed periodically (by month, or production period) by production control and communicated to all production and non production areas			X	
	2.2.3	When the takt time changes, is the standardized work reviewed and work rebalanced			X	
	2.2.4	Are the min-max levels and standard in process stocks reviewed and adjusted in line with takt changes			X	
	2.2.5	Operating Rate Criteria understood. Operating Rate tracked and used to manage production volume.			X	
	2.2.6	Operating Rate used by management to ensure that problems are being identified and resolved without affecting customer demand.			X	

Score : 2.2 Takt Time

2.2.1 Identified on Standardised Work Charts	0
2.2.2 Takt Time is reviewed periodically	0
2.2.3 Std Work and balance charts are reviewed	0
2.2.4 Min-Max levels reviewed with takt	0
2.2.5 Production performance monitored	0
2.2.6 Production performance data used	0
Total	0
Max	0
%	N/A

Standardized work section		
	Total	0
	Max	0
	%	N/A

Plant/ Cell: 00 Assessment No: 00 Date: 00 Assessor: 00	R -- Not started/incomplete G -- Complete B -- Not Applicable	Quick Changeover	Section: 3	LMR

Quick changeover can be seen as the pacemaker of lean implementation. In an **assembly** environment, the change-over times on equipment will **effect the process velocity**. The more the change-over time is reduced **within cycle** the more stock can be eliminated from the system. This has the added advantage of reducing lead time and increasing flexibility in meeting customer demand.

Subject		Question	R	G	N/A	Result
3.1 Quick Changeover Performing a change over from good product to good product in the least time possible. **In order to minimise the effect on material flow and line**	3.1.1	Are changeover times being tracked for key equipment where volume is dependent		x		QCO, if performed correctly will have the following result: * A progressive reduction in inventory levels in relation to the change-over time.
	3.1.2	Is Shingo's 5 step methodology and wallchart used to systematically reduce change-over times. This activity is run by the team with the support of the team leader	x			
	3.1.3	Are multi-disciplined teams involved to kaizen the change-over time, with maintenance playing an active role in trials and modifications			x	
	3.1.4	Is post changeover quality unaffected by changeover activity.		x		
	3.1.5	Are all gauges and tools stored adjacent to the equipment in line with 5s methodology.	x x			
	3.1.6	Is the changeover process documented using standard work sheets and visual Displays.	x			
	3.1.7	Are QCO improvements deployed across the facility.		x		
	3.1.8	Does management review change-over improvements and use the opportunity to increase material velocity			x	

Score : 3.1 Quick Changeover	
3.1.1 Change-over times are being tracked	1
3.1.2 Shingo's 5 step methodology & wallchart	0
3.1.3 Multi-disciplined teams	0
3.1.4 **post changeover quality unaffected**	1
3.1.5 All gauges and tools are stored adjacent	0
3.1.6 Standard Work Sheets	0
3.1.7 **Are QCO improvements deployed**	1
3.1.8 Management review change-over	0
Total	3
Max	6
%	50%

Quick changeover section		
	Total	3
	Max	6
	%	50%

Nella tabella precedente è stato presentato un esempio di come viene dato il punteggio all'interno di una categoria. Si inserisce una x all'interno della casella e nella tabella dei results viene automaticamente inserito il punteggio e poi calcolata la percentuale.

Plant/ Cell: 00 Assessment No: 00 Date: 00 Assessor: 00	R -- Not started/incomplete G -- Complete B -- Not Applicable	**Total Productive Maintenance**	**Section: 4**	LMR

TPM is a vital ingredient of the foundation of Lean Manufacturing. It provides the necessary level of equipment performance (85% OEE) to take advantage of the more advanced tools and techniques found in the lean toolbox. A stable level of performance is vital to the successful operation of the whole Lean Production System. A varying level of equipment performance will jeopardise attempts to build to customer demand and minimising the inventory and work in progress held within the factory walls. Poor TPM means, inevitably, high levels of unnecessary safety stock and equipment that deteriorates before its time. Autonomous Maintenance is the cornerstone of any TPM initiative. Success or failure of TPM will be decided by a factory's commitment to Autonomous Maintenance.

Subject		Question	R	G	N/A	Result
4.1 Autonomous Maintenance Teams performing frequent maintenance activities to minimise equipment breakdowns.	4.1.1	Is the systematic application of Autonomous Maintenance applied?			X	Autonomous Maintenance, if performed correctly, will have the following result: * Self motivated, autonomous teams performing kaizen activities on a daily basis to improve the condition of their equipment, and the OEE performance of the cell/manufacturing zone.
	4.1.2	Is there a Tag Management System in place to identify abnormalities discovered on equipment in the team area. Abnormalities are tracked and acted upon by the team and maintenance			X	
	4.1.3	Is a Visual control (Kamishibai) system in place to track daily, weekly, monthly maintenance activities for the team. These tasks are scheduled, tracked and audited by the team leader or equivalent supervision in the area			X	
	4.1.4	Are key maintenance activities (including life expectancy of working parts) visually monitored and, if possible, linked to the andon system to prevent defective parts being produced			X	
	4.1.5	Is a skills matrix available to track competence in cleaning, checking and replacing worn parts and performing basic repairs (electrical, hydraulic, mechanical)			X	
	4.1.6	Are quality parameters fully understood by the team and how these are affected by machine performance and capability			X	
	4.1.7	Are volume losses associated with equipment problems asslysed and acted upon by the team members. High level of autonomous problem resolution related to equipment issues. Single Point Lessons developed by the team			X	

Score : 4.1 Autonomous Maintenance	
4.1.1 5 Steps of Autonomous Maintenance	0
4.1.2 Tag Management System	0
4.1.3 Visual control (Kamishibai) system	0
4.1.4 Key maintenance linked to andon	0
4.1.5 Skills Matrix	0
4.1.6 Quality parameters understood	0
4.1.7 OEE owned by teams	0
Total	0
Max	0
%	N/A

Planned Maintenance, in many factories, is a programme run by an elite crew who retain the knowledge and technical know-how to fix chronic breakdowns. Their position of importance is maintained by not sharing or training operating teams in how to fix or avoid breakdowns from occurring. The measure of a good Planned Maintenance programme is how integrated and supportive of the operating teams they are. Their goal should be to disseminate as many of their activities as possible to the operating teams with the view to making them as self sufficient as possible.

Subject		Question	R	G	N/A	Result
4.2 Planned Maintenance A comprehensive plan for the scheduled maintenance of all equipment to eliminate breakdowns and poor performance.	4.2.1	Is a Central Master Schedule for all maintenance activities held, monitored and updated by the maintenance team			X	Planned Maintenance, if performed correctly will have the following result: * A Planned Maintenance team that is motivated towards helping the operating teams maintain world class * A trend towards fewer breakdowns
	4.2.2	Is Mean Time Between Failures monitored on all critical equipment			X	
	4.2.3	Is Mean Time To Repair monitored on PM activities			X	
	4.2.4	Do PM activities include operating teams to promote understanding of equipment			X	
	4.2.5	Is planned maintenance scheduled for all equipment in the area in line with production needs			X	
	4.2.6	Does the PM team assist the operating teams with problem resolution and continuous improvement activities to improve capacity			X	
	4.2.7	Cronic breakdowns known, monitored and resolved by the PM team			X	

Score : 4.2 Planned Maintenance	
4.2.1 Central Master Schedule	0
4.2.2 Mean Time between Failures	0
4.2.3 Mean Time to Repair	0
4.2.4 PM Activities include operating teams	0
4.2.5 Preventative Maintenance	0
4.2.6 PM team assist in problem solving	0
4.2.7 Frequent and long downtime breakdowns kno	0
Total	0
Max	0
%	N/A

This section may only be applicable to an equipment based assembly operation.

Subject		Question	R	G	N/A	Result
4.3 Overall Equipment Effectiveness The calculation of OEE is used to help drive equipment and team performance to ensure the achievement of production goals and provide a stable platform for the application of lean tools.	4.3.1	Is the OEE calculation being used to measure Availability, Performance Efficiency and Quality Rate.			X	OEE, if used correctly will have the following result: * Focused teams with an in-depth knowledge of machine maintenance to counteract the Six Big Losses. * Effective problem solving teams.
	4.3.2	Is OEE used by the teams to measure the performance of their constraint machine.			X	
	4.3.3	Is the performance speed of equipment determined by the supplier manuals, or if having since been improved with no affect on quality, the new performance speed is shown as the norm			X	
	4.3.4	Are weekly meetings held by the teams to improve OEE			X	
4.4 TPM Training Providing the teams with sufficient knowledge and capability to run their own equipment / line as autonomously as possible.	4.4.1	Are training requirements for TPM based upon the type of equipment used, failure modes and the existing teams' skills matrices (including PM team)			X	Effective Training will provide the teams with the ability to be truly autonomous in their efforts to improve OEE and implement a robust Productive Maintenance programme.
	4.4.2	Does the training program include practical problem solving in a team based environment			X	
	4.4.3	Is TPM awareness training provided for all employees			X	

Score : 4.3 Overall Equipment Effectiveness	
4.3.1 OEE calculated	0
4.3.2 Constraint machine	0
4.3.3 Performance speed of equipment	0
4.3.4 Weekly meetings are held by the teams	0
Total	0
Max	0
%	N/A

Score : 4.4 TPM Training	
4.4.1 Equipment training	0
4.4.2 Team based problem solving	0
4.4.3 TPM awareness training	0
Total	0
Max	0
%	N/A

Total productive maintenance section		
	Total	0
	Max	0
	%	N/A

Plant/ Cell: 00 Assessment No: 00 Date: 00 Assessor: 00	R -- Not started/incomplete G -- Complete B -- Not Applicable	**Just-In-Time**	**Section: 5**	LMR

Once a level of stability has been achieved in the production processes the organisation can begin reducing inventory of in process and raw materials. The aim is to have the "right quantity" of the "right part" in the "right place" at the "right time".

Subject		Question	R	G	N/A	Result
5.1 Pull system within the factory Focuses on the material flow from the point of receipt to the point of dispatch.	5.1.1	Are min-max levels clearly identified for all material at point of use			X	Material Flow within the factory, if performed correctly will have the following result: '* A robust material replenishment system managed by exception and operated with the minimum of inventory
	5.1.2	Are card and call systems (rack and floor parts) in place to cover material requirements			X	**Score : 5.1 Pull system within the factory**
	5.1.3	Are the point of use min-max levels based on delivery interval and safety stock calculation			X	5.1.1 Point of use min-max levels: 0 5.1.2 Card and call systems: 0 5.1.3 Delivery interval and safety stock: 0
	5.1.4	Is process production signal received from following process or production sequence based on customer demand			X	5.1.4 In process production/ production sequence: 0
	5.1.5	Are exception processes in place to cover deviations from min-max at point of use			X	5.1.5 Exception processes: 0 5.1.6 Location change process: 0
	5.1.6	Is the point of use location change process managed by the line or cell			X	5.1.7 Material fed by fork lift truck: 0 5.1.8 Covered by standardized work: 0
	5.1.7	Is Less than 20% of material fed by fork lift trucks			X	
	5.1.8	Are all material flow processes covered by standardized work.			X	Total: 0 Max: 0 %: N/A
5.2 Pull system from suppliers Focuses on the material flow prior to the point of receipt.	5.2.1	Is material collection time slotted and in place throughout supplier base			X	Material Flow into the factory, if used correctly will have the following result: * A synchronised flow of material from the supplier to the point of use.
	5.2.2	Are receiving processes time slotted and in place			X	**Score : 5.2 Pull system from suppliers**
	5.2.3	Is the marketplace size based on the delivery interval from supplier, with exception processes in place to manage min/max variance			X	5.2.1 Time slotted material collection: 0 5.2.2 Time slotted receiving processes: 0 5.2.3 Marketplace sized with exceptions: 0
	5.2.4	Are all supplier shipping and carrier processes covered by standardized work			X	5.2.4 Standardized work: 0 Total: 0 Max: 0 %: N/A
5.3 Level production Production Control manage the synchronised material flow throughout the supply chain. Packaging support the material flow strategy and link to new products.	5.3.1	Are load leveling (Heijunka) principles applied in line with agreed manufacturing constraints and customer demand			X	Support Functions, if used correctly will have the following result: * Demand will be smoothed allowing abnormalities to be managed within safety stock levels.
	5.3.2	Is production scheduled and monitored in line with customer demand			X	**Score : 5.3 Level production**
	5.3.3	Is there a packaging policy for internal and external material supply			X	5.3.1 Load leveling (Heijunka) principles: 0 5.3.2 Production scheduled by customer demand: 0 5.3.3 Packaging policy: 0 Total: 0 Max: 0 %: N/A

Layout of a production cell is a prime opportunity to eliminate waste from the production system once and for all. By focusing on developing a layout that promotes flexibility, and the exclusion of the 7 wastes, an engineer or production supervisor can achieve two important things: 1. The optimum layout for achieving production targets. 2. Improvement of morale in the team.

Subject		Question	R	G	N/A	Result
5.4 One piece flow A lean layout can eliminate waste and prevent re-occurrence by default.	5.4.1	Does the layout promote product flow or small lot production			X	Layout, if performed correctly, will have the following result: '* A production line/cell which prevents waste from occurring. I.e. no room for overproduction
	5.4.2	Is the layout of equipment and machinery capable of moving to accommodate changes in demand			X	**Score : 5.4 One piece flow**
	5.4.3	Are machines organised in cell layout, promoting flexible manning			X	5.4.1 Layout promotes product flow: 0 5.4.2 Equipment/machinery capable of moving: 0 5.4.3 Machines organised in cell layout: 0
	5.4.4	Is the layout designed around peoples movements and ergonomics			X	5.4.4 Layout designed around people: 0 5.4.5 Layout allows for ease of maintenance: 0
	5.4.5	Does the layout allow for ease of maintenance, and replenishment of parts			X	5.4.6 Layout ensures geographical full work system: 0 5.4.7 layout enforces FIFO: 0
	5.4.6	Does the layout ensure a geographical full work system, promoting problem identification and escalation			X	Total: 0 Max: 0 %: N/A
	5.4.7	Are all manufacturing buffers sequential with the layout enforcing FIFO			X	**Just-In-Time Section** Total: 0 Max: 0 %: N/A

Plant/ Cell: 00 Assessment No: 00 Date: 00 Assessor: 00	R – Not started/incomplete G – Complete B – Not Applicable	**Jidoka (built in quality)**	**Section: 6**	LMR

Jidoka (built in quality) is the application of the quality principle "Don't Receive Don't Make and Don't Pass Defects". It applies equally to equipment and automated processes as it does to manual production processes. The quality principle is supported in the manufacturing processes by allowing time within the Takt Time calculation for problems to be resolved.

Subject		Question	R	G	N/A	Result
6.1 Andon Japanese for Lantern, the andon system allows problems to be raised and responded to within the production cycle.	6.1.1	Are Andon call buttons or cords in place adjacent to production operators. Automatic detection and alert system for production equipment			X	Andon, if applied correctly will have the following result: * It will visually demonstrate the commitment highlighting and resolving problem whilst maintaining production volumes and satisfying customer demand.
	6.1.2	Are visual and audible signals assigned to each group/machine			X	
	6.1.3	Is a problem and countermeasure process in place to track and resolve issues raised			X	
	6.1.4	What mechanisms do operators have to recognise that they are behind with their work cycle			X	
	6.1.5	Is an Andon escalation procedure evident in the work area			X	
	6.1.6	Are the dedicated support members able to respond and assess problems in a timely manner (% of target cycle time)			X	
	6.1.7	Is fixed position stop functionallity built into the production system.			X	
	6.1.8	Are management using Andon data to identify bottlenecks and to improve them			X	

Score : 6.1 Andon	
6.1.1 Andon call buttons or cords	0
6.1.2 Visual and audible signals	0
6.1.3 Problem and Countermeasure	0
6.1.4 Work cycle indicator	0
6.1.5 Andon escalation procedure	0
6.1.6 Respond and assess	0
6.1.7 Fixed Position Stop	0
6.1.8 Management reviewing Andon	0
Total	0
Max	0
%	N/A

Subject		Question	R	G	N/A	Result
6.2 Poka Yoke Poka yoke (mistake proofing) is a methodology for achieving zero defects.	6.2.1	Can teams show live examples of Poka Yoke devices that they have implemented on equipment, tooling and assembly processes			X	Poka Yoke, if used correctly will have the following result: * Production with zero defects
	6.2.2	Are Poka Yoke devices checked at the start and end of shift			X	
	6.2.3	Do teams strive to implement changes that eliminate defects rather than prevent or detect			X	
	6.2.4	Do manufacturing and design engineers encourage feedback from production, and build devices or changes into future programmes			X	
6.3 Full Work System Designated buffers to support the operation of Andon.	6.3.1	Are buffers de-coupled and independent			X	Full Work System, if used correctly will have the following * Allow the maufacturing process to smooth problems between sequential production operations. * Prevent Over-production
	6.3.2	Are all designated buffers operated on a FIFO basis throughout the sequence			X	
	6.3.3	What methods are used to calculate buffer sizes, including min/max			X	

Score : 6.2 Poka Yoke	
6.2.1 Teams can show live examples of P. Yoke	0
6.2.2 Poka Yoke devices are checked	0
6.2.3 Teams strive to implement changes	0
6.2.4 Manufacturing and design engineers	0
Total	0
Max	0
%	N/A

Score : 6.3 Full Work System	
6.3.1 Buffers de-coupled and independent	0
6.3.2 Operated on a FIFO basis	0
6.3.3 Buffer sizes calculated	0
Total	0
Max	0
%	N/A

Jidoka Section		
	Total	0
	Max	0
	%	N/A

Plant/ Cell: oo Assessment No: oo Date: oo Assessor: oo	R -- Not started/incomplete G -- Complete B -- Not Applicable	**People**	**Section: 7**

Lean Manufacturing is a collection of tools, techniques and philosophies, all of which require people to ensure their success within a company. None of the tools assessed so far can operate in isolation and need the constant vigilance and support of the management team and operating teams to gain the benefits. The Lean Manufacturing system is there for a purpose: the elimination of waste to reduce cost. For the system to work effectively, each of these tools and concepts will have been designed and implemented with the full support of the management team, the sponsors of Lean.

Subject		Question	R	G	N/A	Result
7.1 Continuous improvement Culture An environment which allows ideas, directly linked to the elimination of waste, to become reality and implemented by the teams.	7.1.1	Do all managers actively support continuous improvement activities, with a focus on improvements that can be done by the groups			X	A lean Culture will have the following result: * A direct impact on product cost year-on-year through the elimination of waste * Empowered operating teams, willing to contribute to the success of the company
	7.1.2	Do all managers support structured problem solving			X	
	7.1.3	Do people take ownership of concerns and lead improvement activities			X	
	7.1.4	How does the company recognise and promote people that contribute to the continuous improvement culture			X	
	7.1.5	What means are used to stimulate and sustain a continous improvement culture			X	
7.2 Organization The company has a structure in place which promotes the service of value adding and the elimination of waste.	7.2.1	What multi-skilled support teams are in place to support improvement activities			X	A lean organisation will: * Provide the teams with the level of support required to maintain production volumes and assure quality.
	7.2.2	Does the production area have dedicated support members to ensure built in quality and maintenance of the production performance			X	
7.3 Performance Management Achieving the vision through the measured deployment of objectives.	7.3.1	Does the company have a short and long term vision based on clear measurables (yearly plan, 5 yearly plan)			X	Performance Management, if performed correctly, will have the following result: * Achieve goals through measured deployment of
	7.3.2	Key Performance Indicators (KPIs) are defined by the management team with clear targets. These are then cascaded thoughout the organisation			X	
	7.3.3	Is there a direct link between results achieved using KPIs and personal performance of the management team			X	
	7.3.4	Are management appraised using the 360 degree assessment criteria			X	
	7.3.5	Does the management team have a full understanding of the KPI, including: background, targets, measurement criteria, timing..			X	
	7.3.6	Is the progression policy (remuneration/promotion) based on the performance result from the KPIs			X	

Score : 7.1 Continuous improvement Culture

7.1.1 Managers actively support Continuous improvement activities	0
7.1.2 All managers support problem solving	0
7.1.3 Operating teams empowered	0
7.1.4 Continuous improvement progression policy	0
7.1.5 Continuous improvement culture sustained	0
Total	0
Max	0
%	N/A

Score : 7.2 Organization

7.2.1 Multi-skilled teams	0
7.2. Dedicated support	0
Total	0
Max	0
%	N/A

Score : 7.3 Performance Management

7.3.1 Short and long term vision	0
7.3. Key Performance Indicators (KPIs) defined	0
7.3. KPIs vs personal performance	0
7.3. 360 degree assessment	0
7.3. Training in performance management	0
7.3. KPI based progression	0
Total	0
Max	0
%	N/A

People Section	
Total	0
Max	0
%	N/A

Tab 3.2: Tabella dei risultati per ogni dipartimento sottoposto ad assessment

Plant: 00
Cell: 00
Date: 00
Assessor: 00

Department Detail

N = Not started/incomplete Y = Complete O = Not applicable

LMR

Wall to wall score

#DIV/0!

Item			a	b	c	Department #4	Department #5	Department #6	Department #7	Department #8	Department #9	Department #10	Department #11	Department #12	Department #13	Department #14	Department #15	Department #16	Department #17	Department #18	Department #19	Department #20	Department #21	Department #22	Department #23	Department #24	
1. 5S Workplace Organization	1.1 5S Workplace Organization	1.1.1 Relevant tools, parts, equipment, in specified locations																									n/a
		1.1.2 5S quarantine area functioning																									n/a
		1.1.3 Walkways cleared of obstructions																									n/a
		1.1.4 Cleaning schedule available																									n/a
		1.1.5 Cleaning standards visible and descriptive																									n/a
		1.1.6 Audits and action plans evident																									n/a
		1.1.7 All employees had awareness training																									n/a
	1.2 Visual factory	1.2.1 Team boards with KPI																									n/a
		1.2.2 Visual one point lessons																									n/a
		1.2.3 Audit sheets up to date																									n/a
		1.2.4 Central information area with KPI																									n/a
	1.3 Visual Control	1.3.1 Visual markings																									n/a
		1.3.2 Deviations to established standards																									n/a
		1.3.3 Visual control (Kamishibai) system																									n/a
2. Standardized Work	2.1 Standardized Work	2.1.1 All production & non production processes																									n/a
		2.1.2 Work element sheets																									n/a
		2.1.3 Created by the team members																									n/a
		2.1.4 Value added / non value added																									n/a
		2.1.5 Work balance board																									n/a
		2.1.6 Regular audits																									n/a
		2.1.7 Train with standard work																									n/a
	2.2 Takt Time	2.2.1 Identified on standardized work charts																									n/a
		2.2.2 Takt time is reviewed periodically																									n/a
		2.2.3 Std work and balance charts are reviewed																									n/a
		2.2.4 Min-max levels reviewed with takt																									n/a
		2.2.5 Production performance monitored																									n/a
		2.2.6 Production performance data used																									n/a
3. Quick Changeover	3.1 Quick Changeover	3.1.1 Changeover times are being tracked																									n/a
		3.1.2 Shingo's 5 step methodology and wall chart																									n/a
		3.1.3 Multi-disciplined teams																									n/a
		3.1.4 1st off inspection capability																									n/a
		3.1.5 All gauges and tools are stored adjacent																									n/a
		3.1.6 Standard work sheets																									n/a
		3.1.7 Management sponsor ideas and deployment																									n/a
		3.1.8 Management review changeover																									n/a
4. Total Productive Maintenance	4.1 Autonomous Maintenance	4.1.1 5 Steps of automomous maintenance																									n/a
		4.1.2 Tag management system																									n/a
		4.1.3 Visual control (Kamishibai) system																									n/a
		4.1.4 Key maintenance linked to andon																									n/a
		4.1.5 Skills matrix																									n/a
		4.1.6 Quality parameters understood																									n/a
		4.1.7 OEE owned by teams																									n/a
	4.2 Planned Maintenance	4.2.1 Central master schedule																									n/a
		4.2.2 Mean time between failures																									n/a
		4.2.3 Mean time to repair																									n/a
		4.2.4 PM activities include operating teams																									n/a
		4.2.5 Preventive maintenance																									n/a
		4.2.6 PM team assist in problem solving																									n/a
		4.2.7 Frequent and long downtime breakdowns known																									n/a
	4.3 OEE	4.3.1 OEE calculated																									n/a
		4.3.2 Constraint machine																									n/a
		4.3.3 Performance speed of equipment																									n/a
		4.3.4 Weekly meetings are held by teams																									n/a
	4.4 TPM Training	4.4.1 Equipment training																									n/a
		4.4.2 Team based problem solving																									n/a
		4.4.3 TPM Awareness training																									n/a
5. Just-In-Time	5.1 Material within the factory	5.1.1 Point of use min-max levels																									n/a
		5.1.2 Card and call systems																									n/a
		5.1.3 Delivery interval and safety stock																									n/a
		5.1.4 In process production/ production sequence																									n/a
		5.1.5 Exception processes																									n/a
		5.1.6 Location change processes																									n/a
		5.1.7 Material fed by fork lift truck																									n/a
		5.1.8 Covered by standardized work																									n/a
	5.2 Material Perception	5.2.1 Time slotted material collection																									n/a
		5.2.2 Time slotted receiving processes																									n/a
		5.2.3 Marketplace sized with exceptions																									n/a
		5.2.4 Standardized work																									n/a
	5.3 Support Activities	5.3.1 Load leveling (Heijunka) principles																									n/a
		5.3.2 Production scheduled by customer demand																									n/a
		5.3.3 Packaging policy																									n/a
	5.4 Layout for 1 piece flow	5.4.1 Layout promotes product flow																									n/a
		5.4.2 Equipment/machinery capable of moving																									n/a
		5.4.3 Machines organized in cell layout																									n/a
		5.4.4 Layout designed around people																									n/a
		5.4.5 Layout allows for ease of maintenance																									n/a
		5.4.6 Layout ensures geographical full work system																									n/a
		5.4.7 layout enforces FIFO																									n/a
6. Jidoka	6.1 Andon	6.1.1 Andon call buttons or cords																									n/a
		6.1.2 Visual and audible signals																									n/a
		6.1.3 Problem and countermeasure																									n/a
		6.1.4 Work cycle indicator																									n/a
		6.1.5 Andon escalation procedure																									n/a
		6.1.6 Respond and assess																									n/a
		6.1.7 Fixed position stop																									n/a
		6.1.8 Management reviewing Andon																									n/a
	6.2 Poka Yoke	6.2.1 Teams can show live examples of Poka Yoke																									n/a
		6.2.2 Poka Yoke devices are checked																									n/a
		6.2.3 Teams strive to implement changes																									n/a
		6.2.4 Manufacturing and design engineers																									n/a
	6.3 Work System	6.3.1 Buffers de-coupled and independent																									n/a
		6.3.2 Operated on a FIFO basis																									n/a
		6.3.3 Buffer sizes calculated																									n/a
7. People	7.1 Continuous improvement culture	7.1.1 Managers actively support continuous improvement activities																									n/a
		7.1.2 All managers support problem solving																									n/a
		7.1.3 Operating teams empowered																									n/a
		7.1.4 Continuous improvement progression policy																									n/a
		7.1.5 Continuous improvement culture sustained																									n/a
	7.2 Organizational Support	7.2.1 Multi-skilled teams																									n/a
		7.2.2 Dedicated support																									n/a
	7.3 Performance Management	7.3.1 Short and long term vision																									n/a
		7.3.2 Key Performance Indicators (KPIs) defined																									n/a
		7.3.3 KPIs vs personal performance																									n/a
		7.3.4 360 degree assessment																									n/a
		7.3.5 Training in performance management																									n/a
		7.3.6 KPI based progression																									n/a
		Percent Complete %																									
		Number of "yes" (complete)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Number of "no" (not complete)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Number of "O" (n / a)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Y
N
O

Facility Complete Percentage

#DIV/0!

3.4 – LEAN ASSESSMENT BY STRATEGOS

Questo tool, realizzato dalla Strategos (società americana che si occupa di consulenza per le aziende) è caratterizzato da nove categorie:

1. Inventory;
2. The Team Approach;
3. Processes;
4. Maintenance;
5. Layout and Handling;
6. Suppliers;
7. Setups;
8. Quality;
9. Scheduling/Control.

Per ogni categoria vengono poste domande con risposte a scelta multipla che possono essere espresse in percentuale, risposte descrittive o punteggi. Per rispondere alle domande basta porre una x all'interno della casella corrispondente alla risposta esatta, in base alla situazione aziendale presente al momento dell'implementazione dell'assessment (Fig 3.6).

Fig 3.6: Struttura dell' assessment (Fonte: www.strategosinc.com)

1.0	Inventory	Response	X
1,1	For the categories of Finished Goods, Work-In-Process (WIP) and Purchased/Raw Materials, what portion of middle and upper managers can state from memory the current turnover and the purpose of each type?	0%-6%	
		7%-55%	
		56%-80%	X
		81%-93%	
		94%-100%	
1,2	What is the overall inventory turnover, including Finished Goods, WIP and Purchased/Raw material?	0-3	
		4-6	X
		7-12	
		13-24	
		25+	
1,3	What is the ratio of Inventory Turnover to the industry average?	<=1.0	
		1.1-2.0	
		2.1-4.0	
		4.1-8.0	X
		8.1+	

In questa tabella viene mostrato come rispondere alle domande.

2.0	The Team Approach	Response	X
2.1	What is the organization type?	Exploitive	
		Bureaucratic	
		Consultive	
		Participative	
		Highly Participative	
2.2	How are workers on the factory floor compensated?	Individual Incentive	
		Hourly Wage	
		Group Incentive	
		Salary	
		Salary+Annual Bonus	
2.3	To what extent do people have job security?	Layoffs Every Year	
		Layoffs	
		Layoffs Are Rare	
2.4	What is the annual personnel turnover	31%+	
		14%-30%	
		7%-11%	
		3%-6%	
		0%-2%	
2.5	What percentage of personnel (ALL Personnel) have received at least eight hours of teambuilding training?	<5%	
		6%-10%	
		11%-30%	
		31%-90%	
		91%-100%	
2.6	What percentage of personnel are active members of formal work teams, quality teams, or problem-solving teams?	<5%	
		6%-10%	
		11%-30%	
		31%-90%	
		91%-100%	

3.0	Processes	Response	X
3.1	How many large-scale machines or single-process areas are in the plant through which 50% or more of different products must pass?	4+	
		3	
		2	
		1	
		0	
3.2	How would you rate the overall bias of the plant's process selction with respect to scale?	Large Scale	
		Medium/Mixed	
		Small Scale	
3.3	How easy is it to shift output when the product mix changes?	Very Difficult	
		Moderately Difficult	
		Easy	
3.4	How easy is it to alter the total production rate by +/-15%?	Very Difficult	
		Moderately Difficult	
		Easy	
3.5	What is management's target operating capacity for individual departments or machines?	96%-100%	
		91%-95%	
		86%-90%	
		76%-85%	
		50%-75%	
3.6	How would you rate the overall bias of the plant's process selection with respect to technology level?	Complex Technologies	
		Moderate/Mixed	
		Simple Technologies	

4.0	Maintenance	Response	X
4.1	Describe equipment records and data. Include records of uptime, repair history, and spare parts. Include repair and parts manuals.	Non-Existent	
		Substantially Complete	
		Complete & Accurate	
4.2	Excluding new installations and construction projects, what percentage of maintenance hours is unplanned, unexpected, or emergency?	71%-90%	
		51%-70%	
		26%-50%	
		11%-25%	
		0%-10%	
4.3	Does maintenance have and follow a defined preventive schedule?	No PM	
		1%-10% Coverage	
		11%-30% Coverage	
		31%-90% Coverage	
		91%+ Coverage	
4.4	Do equipment breakdowns limit or interrupt production?	Often	
		Occasionally	
		Frequently	
4.5	What is the overall average availability of plant equipment?	Unknown	
		0%-75%	
		76%-90%	
		91%-95%	
		96%-100%	

5.0	Layout & Handling	Response	X
5.1	What portion of total space is used for storage and material handling?	71%-100%	
		46%70%	
		30%-45%	
		16%-30%	
		0%-15%	
5.2	What portion of the plant space is organized by function or process type?	71%-100%	
		46%70%	
		30%-45%	
		16%-30%	
		0%-15%	
5.3	How would you characterize material movement?	Pallet-size (or larger) loads, long distances (>100'),complex flow patterns, confusion, & lost material	
		Mostly tote-size loads, bus-route transport, & intermediate distances	
		Tote-size or smaller loads, short distances (<25'), simple & direct flow pattern	
5.4	How would you rate overall housekeeping and appearance of the plant?	Messy, Filthy, Confused	
		Some dirt, Occasional Mess	
		Spotless , Neat, & Tidy	
5.5	How well could a stranger walking through your plant identify the processes and their sequence?	Impossible to see any logic or flow sequence.	
		Most processes are apparent with some study. Most sequences are visible.	
		Processes and their sequences are immediately visible.	

6.0	Suppliers	Response	X
6.1	What is the average number of suppliers for each raw material or purchased item?	2.5+	
		1.6-2.4	
		1.3-1.7	
		1.2-1.4	
		1.0-1.1	
6.2	On average, how often, in months, are items put up for re-sourcing?	1-11	
		12-17	
		18-23	
		24-36	
		36+	
6.3	What portion of raw material & purchased parts comes from qualified suppliers with no need for incoming inspection?	0%	
		1%-10%	
		11%-30%	
		31%-70%	
		70%-100%	
6.4	What portion of raw material and purchased items is delivered directly to the point of use without incoming inspection or storage?	0%	
		1%-10%	
		11%-30%	
		31%-70%	
		70%-100%	
6.5	What portion of raw materials and purchased parts is delivered more than once per week?	0%	
		1%-10%	
		11%-30%	
		31%-70%	
		70%-100%	

7.0	Setups	Response	X
7.1	What is the average overall setup time (in minutes) for major equipment?	61+	
		29-60	
		16-30	
		10-15	
		0-9	
7.2	What portion of machine operators have had formal training in Rapid Setup techniques?	0%	
		1%-6%	
		7%-18%	
		19%-42%	
		43%-100%	
7.3	To what extent are managers and workers measured and judged on setup performance?	Not at All	
		Informal Tracking & Review	
		Setups Tracked, Performance In Job Description	

8.0	Quality	Response	X
8.1	What portion of total employees have had basic SPC training?	0%-6%	
		7%-55%	
		56%-80%	
		81%-93%	
		94%-100%	
8.2	What portion of operations are controlled with Statistical Process Control (SPC)	0%	
		1%-10%	
		11%-30%	
		31%-70%	
		71%-100%	
8.3	What portion of the SPC that is done is accomplished by operators as opposed to Quality or Engineering specialists?	0%	
		1%-10%	
		11%-30%	
		31%-70%	
		71%-100%	
8.4	What is the overall defect rate?	0%	
		1%-10%	
		11%-30%	
		31%-70%	
		71%-100%	

9.0	Scheduling/Control	Response	X
9.1	What portion of work-in-process flows directly from one operation to the next without intermediate storage?	0%	
		1%-10%	
		11%-35%	
		36%-85%	
		86%-100%	
9.2	What portion of work-in-process is under Kanban or Broadcast control	0%	
		1%-10%	
		11%-35%	
		36%-85%	
		86%-100%	
9.3	What is the on-time delivery performance?	0%-50%	
		51%-70%	
		71%-80%	
		81%-95%	
		95%-100%	

Le nove aree che si trovano in questo assessment non sono ugualmente importanti nel determinare lo stato di performance. La loro importanza varia a seconda del prodotto, del processo o altri fattori in cui viene applicato il tool. Per cui chi andrà ad usare questo assessment dovrà valutare il relativo impatto strategico di ogni area in relazione alle altre, in modo da aiutare poi nel stabilire le priorità per l'implementazione della logica lean. Ad esempio un'azienda altamente automatizzata con processi complessi dovrà imporre il più alto fattore di impatto strategico nella categoria "Maintenance" al contrario di un'azienda che utilizza metodi manuali.La tabella riassuntiva dei risultati è qui di seguito rappresentata (Tab 3.3).

SECTION	SECTION POINTS	# OF QUEST	SECTION AVG	SECTION %	STRATEGIC IMPACT FACTOR	SECTION TARGET
1.0 Inventory	6	3	2,00	50%	12,0%	92,3%
2.0 Teams	0	6	0,00	0%	11,0%	84,6%
3.0 Process	0	6	0,00	0%	11,0%	84,6%
4.0 Maintenance	0	5	0,00	0%	8,0%	61,5%
5.0 Layout	0	5	0,00	0%	11,1%	85,5%
6.0 Supplier	0	5	0,00	0%	10,0%	76,9%
7.0 Setup	0	3	0,00	0%	11,1%	85,5%
8.0 Quality	0	4	0,00	0%	13,0%	100,0%
9.0 Scheduling	0	3	0,00	0%	13,0%	100,0%
				SUM:	**100%**	
				MAX:	**13,0%**	

Tab 3.3: Tabella riassuntiva dei risultati

All'interno della tabella è quindi possibile inserire in percentuale il fattore di impatto strategico in relazione alle varie sezioni non superando il valore del 13% per ogni sezione e del 100% nel totale. A seconda del fattore inserito, la tabella dà un target in percentuale che rappresenta il valore migliore a cui cercare di avvicinarsi o superare (con un fattore del 13% si ha un target del 100%, con un fattore del 12% si ha 92,3%).

A seconda della risposta scelta viene dato un punteggio da 0 a 4: nella tabella viene riportata per ogni sezione la somma dei punti, le risposte che sono state date, il risultato dato dal punteggio totale diviso il numero di risposte date (SECTION AVG), il punteggio in percentuale della sezione. In tabella è mostrato un esempio per la categoria "Inventory": nella seconda colonna il punteggio ottenuto, nella terza le domande risposte, nella quarta il section avg (calcolato dividendo il punteggio ottenuto con il numero totale delle domande) e infine la percentuale conseguita. Nel calcolare la section percentual il tool adotta questa operazione: *(section avg/4)*100.* Alla fine il risultato ottenuto nelle varie sezioni viene visualizzato in un radar chart (Fig 3.7) e messo a confronto con i valori migliori visualizzati nell'ultima colonna della tabella: la linea rossa rappresenta l'obiettivo da raggiungere descritto dall'ultima colonna della tabella 3.3, la parte colorata descrive la situazione attuale.

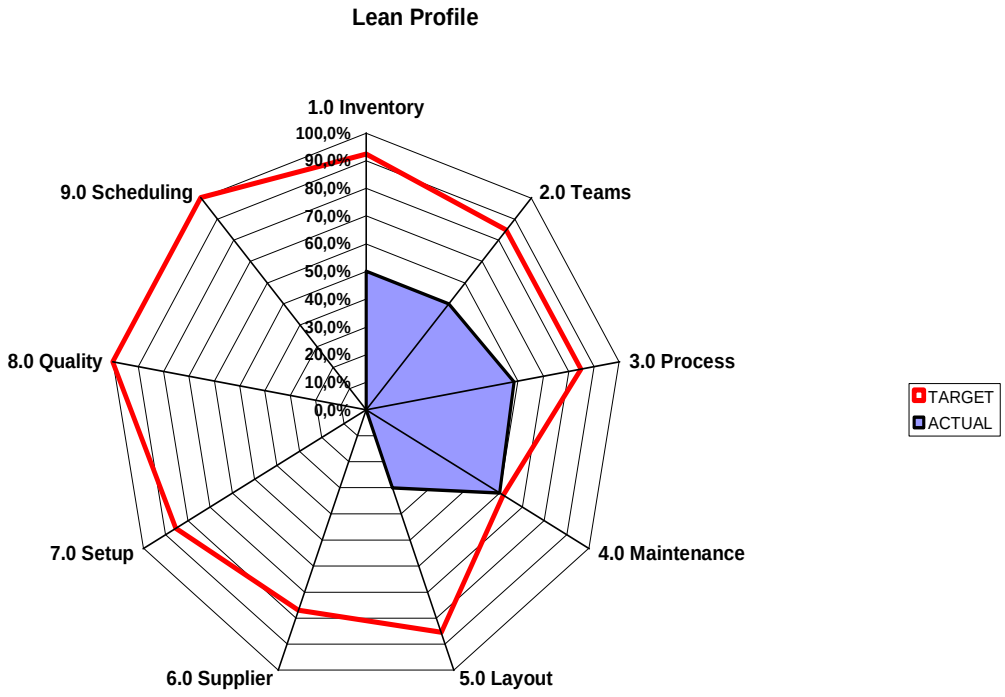


Fig 3.7: Radar chart

3.5 – THE CIP ASSESSMENT

IL CIP (Continuous Improvement Programme) Assessment, realizzato dalla Central CIP Management, è uno strumento e una linea guida nello stesso tempo. Come gli altri tool misura il grado di performance o indica la strada da seguire per uno sviluppo futuro del miglioramento.

Vengono considerate otto categorie nelle quali si trovano diverse sottocategorie:

1. Dynamic Leadership;
2. Strategic Alignment & Integration;
3. Cultural Perspectives;
4. Participation;
5. Teamwork;
6. Learning Organization;
7. Methods and Tools;
8. Key Measurables and Results.

In questo caso le risposte sono descrittive e suddivise in livelli o stage, da 1 a 5. Gli stage rappresentano qual è il potenziale per progredire, non significano meglio o peggio.

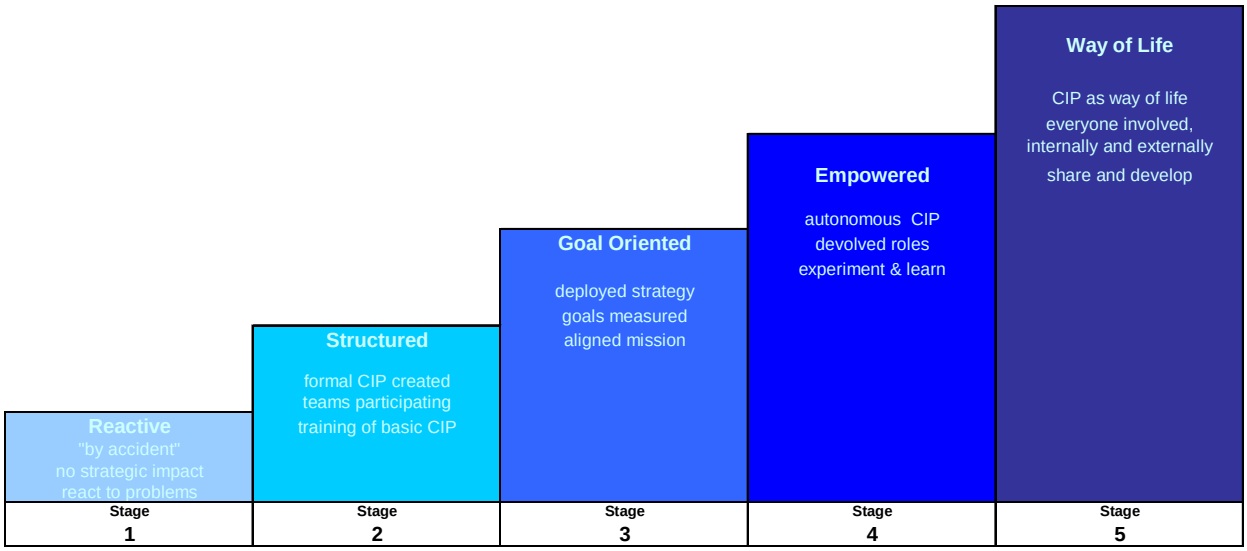


Fig 3.8: Rappresentazione degli stage (Fonte: www.c4c.ltd.uk)

Gli elementi dello stage precedente devono essere mantenuti se si aggiungono elementi per il prossimo stage. Quindi, per il stage massimo gli elementi degli altri stage devono essere ben presenti. Ad esempio, se si pensa di coprire gli aspetti dello stage 4, ma mancano alcuni elementi dello stage 3, bisogna segnare il proprio stato allo stage 2.

Gli stage sono costruiti uno dopo l'altro. Il processo attraverso gli stage richiede tempo. Per esempio viene indicato per il passaggio dallo stage 1 al 2 alcuni mesi; dal 2 al 3 servono almeno da alcuni mesi ad anni. Lo stage 5 deve essere visto come un livello al quale avvicinarsi lavorando duramente.

Attualmente, per la società che somministra questo assessment, sono state giudicate aziende con una buona performance allo stage 2.

Ogni risposta relativa alla domanda posta deve essere letta attentamente e se non si è sicuri della descrizione della situazione in uno degli stage rappresentati è necessario andare a segnare la risposta riguardante il livello precedente a quello che si vorrebbe indicare. Per ogni categoria si avrà così un'idea dello stage a cui si appartiene e capire dove si deve migliorare di più.

Fig 3.8: Struttura del CIP Assessment (Fonte: www.c4c.ltd.uk)

DYNAMIC LEADERSHIP	Management must fully understand both the principles and practices of Continuous Improvement and be committed to demonstrating and articulating the values of CIP in their role as a Dynamic Leader within the organisation.

		STAGE				
Characteristic	**Question**	**1**	**2**	**3**	**4**	**5**
DEPTH of KNOWLEDGE	What level of knowledge do you and the leaders in your organization have of CIP?	Some theoretical knowledge of CIP	A basic knowledge of CIP with a pilot project launched	Improved knowledge of CIP supported by leading broader applications	Clearly understands and fully applies both the principles and practices of CIP	Being a CIP guru
ORGANISATION	How do you and the leaders in your organization organise the CIP activities ?	React to problems and exert pressure on your people to solve them	Set-up improvement teams in specific problematic areas	Organise regular CIP for most processes	Develop and encourage self-managed CIP activities on all levels	Regularly review the effectiveness of the CIP organisational structure
ROLE and BEHAVIOUR	How do you and the leaders in your organization understand your role in CIP?	Instruct people on what improvements to make	Provide the necessary resources to help Teams	Provide a vision and a structure for CIP and actively drive it	Act as a CIP mentor, coach and guide to others	Facilitate the evolution of the CIP vision together with the people
REVIEW PROCESS	How do you and the leaders in your organization review the effectiveness of CIP?	Confirm improvement actions are complete	Confirm that improvement solutions are effective	Standardise solutions and monitor key performance trends	Monitor to improve upon all business performance indicators	Regularly review the effectiveness of CIP against recognised benchmarks
		Reactive	**Structured**	**Goal Oriented**	**Empowered**	**Way of Life**

STRATEGIC ALIGNMENT & INTEGRATION	The organization's ability to align CIP with the strategy. CIP is an integral part of the strategy. All employess support the achieving of the strategic goals. Partnership relationships are structured to create and maximise value.

		STAGE				
Characteristic	**Question**	**1**	**2**	**3**	**4**	**5**
IDENTIFICATION	Which role does CIP play within the strategy which you defined for your organization?	Sporadic improvement. Results may or may not have strategic impact.	Implementation of CIP is defined as a strategic objective	CIP forms a part of your strategy and supports achievement of strategic targets	CIP is a living part of all process strategies	Strategic impact of internal and external CIP is regularly reviewed to provide alignment with current and future business needs.
GOAL SETTING	How are goals established in your organization?	By yourself	By yourself and your direct reports	Involvement of all functions	Including contributions from all levels	Providing the opportunity for everyone to contribute incl. external partners' expectations
SCOPE of APPLICATION	In which areas of your organization is CIP applied?	Improvement activities occur in some spots of the organization.	CIP programs include selected areas of weaknesses identified.	CIP programs include all functional departments of the organization.	CIP programs are broken down to individual level. Major external partners are involved.	External partners are naturally integrated into the CIP programs.
DRIVERS of CIP ACTIVITIES	What drives your CIP activities?	Reaction to problems or personal interest.	Awareness of the need for improvement in selected areas	Understanding of the need to support the overall goal achievement	Autonomous teams understanding their responsibility for continuous improvement	The collective attitude of always trying to do better
KEY PROCESSES	Are the key processes of your area of work identified and designed to support strategy?	Some processes may be defined and may run well.	Some key processes are identified and defined	Most key processes are identified and key owners and key stakeholders defined.	All key processes are defined and designed to deliver strategy.	Key processes are regularly checked and further developed to provide alignment with current and future business needs.
		Reactive	**Structured**	**Goal Oriented**	**Empowered**	**Way of Life**

CULTURAL PERSPECTIVES	All differing cultural perspectives within the organisation need to be considered to ensure that there is an open partnership of trust between Senior Management, Middle Management, Functional Specialist and Working Levels.

		STAGE				
Characteristic	**Question**	**1**	**2**	**3**	**4**	**5**
PARTNERSHIP and TRUST	Is there partnership and trust throughout the levels of your organisation?	There is a inherent blame and excuse culture throughout the organisation	Trust does exist but only within the peer group levels of the organisation	People are encouraged to discuss issues openly at the next level of supervision	All employees at all levels are encouraged to work together in an open and trusting relationship	All employees play a part in the success of the organisation and are trusted equally
COMMUNICATION	How is the communication organized in your organization?	By accident	Top-down through the direct reporting channels	Regular communication focused on goal achievement	Formalised two-way communication focused on improvement opportunities	Open exchange of relevant information leading to action and feedback
EMPOWERMENT	Are the people in your organization encouraged and empowered to implement their ideas for improvement?	Senior Management decide what improvements are needed and instruct the working levels	Middle Management are empowered to implement improvements within their areas/department	People at working levels are asked to make improvements to their workplace as part of a CIP Team	Managed autonomy encourages people at working levels to implement their improvement ideas	People at all levels openly work together to implement improvements and exchange information as an integral part of their everyday activity.
IMPROVEMENT APPROACH	What is initiating improvement in your organization?	Reaction to a problem that has already happened	CIP takes place in areas with a history of problems but not necessarily a current constraint	CIP focuses on improvement of key processes to achieve strategic goals	CIP challenges will encourage experiments and innovation	The organisation is searching for new challenging levels after having achieved a benchmark status
		Reactive	**Structured**	**Goal Oriented**	**Empowered**	**Way of Life**

PARTICIPATION	CIP must involve all employees from across the organisation and be focussed on people making improvements at their own place of work and will require Management and Specialist support to co-ordinate, facilitate and mentor.

		STAGE				
Characteristic	**Question**	**1**	**2**	**3**	**4**	**5**
CIP at the WORKPLACE	How do CIP activities normally take place at the workplaces in your area?	Improvement ideas are developed in concept areas and implemented without workplace involvement.	CIP ideas are normally developed in concept areas with feedback from workplaces prior to implementation.	CIP ideas are developed and implemented in close cooperation of concept areas and workplaces	Improvement takes place at the workplace on a daily and ongoing basis	CIP ideas are exchanged and implemented between workplaces internally and externally to provide total process chain improvement
OWNERSHIP and AUTONOMY	What is the level of autonomy and ownership of CIP in your organization?	Management normally owns and drives the CIP activities	Ownership of improvements belongs to champions designated by management	Working levels are involved to create improvements	Management have created an environment that working levels own and drive CIP for their direct place of work	Managed autonomy ensures that every individual and team assumes responsibility for CIP
PROPORTION of INVOLVEMENT	What is the proportion of people practiCIPng CIP versus number of employees in your organization?	Up to 20 % Involvement	20 % to 40 % Involvement	40 % to 60 % Involvement	60 % to 80 % Involvement	80 % to 100 % Involvement
		Reactive	**Structured**	**Goal Oriented**	**Empowered**	**Way of Life**

TEAMWORK

The organization's ability to leverage the experience and skills of diverse groups to achieve optimal outcomes. Successful teams subordinate local or individual success to that of the broader organization. They are focused on a common set of objectives and work as a unified entity to attain them.

		STAGE				
Characteristic	**Question**	**1**	**2**	**3**	**4**	**5**
TYPE of IMPROVEMENT TEAMS	What types of improvement teams do you use?	Some people are directed by management to react to a problem	Functional or area teams organized by management meeting regularly	Nominated cross-functional teams	Self-initiated teams continually working towards further improvements	Teams span the boundaries of the organization extended to include external partners
SCOPE	What is the scope of operation for your teams?	Solution to a single problem	Improvement of pre-defined subjects in their specific area	Improvements to achieve defined targets within the organization	Improvements on subjects identified by the teams	Improvements on total process extended to include external processes
TEAM SKILLS	How are the skills needed to successfully work together developed in your organization?	By personal interest and in learning by doing	Training of Basic Team Skills (protocols, weekly meetings, etc.) for selected people	Training of basic team skills for people in all areas necessary for achieving their common objectives	Advanced team training and facilitation skills for the relevant people	Advanced team skills are enhanced by learning from everybody inside and outside the organization
		Reactive	**Structured**	**Goal Oriented**	**Empowered**	**Way of Life**

ORGANIZATIONAL LEARNING

The organization's ability to learn from past experience, to share best practice and to actively seek for new knowhow as the basis for being able to improve.

		STAGE				
Characteristic	**Question**	**1**	**2**	**3**	**4**	**5**
IDENTIFICATION	Which role does learning in general play within your organization?	Issue of personal interest.	A basic system in place to provide for learning	Defined as a strategic target.	Defined as a major strategic target and measured on every hierarchichal level.	Regularly reviewed to provide alignment with current and future business needs.
PEOPLE DEVELOPMENT	How do you develop people's skills and knowledge?	Left to personal interest.	Some core skills defined. Training offered. Training plans defined for selected individuals.	People's knowledge and competencies are identified and matched with CIP needs supported by formal training plans.	People are encouraged to actively seek more knowledge and helped to gain more skills.	Continuous learning is a way of life expanding new horizons
EXPANSION of the ORGANIZATION'S KNOWLEDGE and EXPERIENCE	How are knowledge and experience expanded in your organization?	By accident	Formal exchange of knowledge within departments or functions	Structured sharing between all areas within the organization	Defined level of trial & experimentation encouraged for developing new experiences.	Best practice is systematically identified and challenged internally and externally
STANDARDIZATION	How are key processes standardized throughout your organization to provide a stable basis for improvement, maintenance and exchange of best practice?	Processes are performed to the best knowledge of individuals.	Some key processes are described and/or defined.	All key processes are defined and their observance checked.	Standards for all key processes are set throughout the organization	Standards are regularly reviewed and improved by implementing latest developments
		Reactive	**Structured**	**Goal Oriented**	**Empowered**	**Way of Life**

METHODS & TOOLS

The organization's use of effective problem solving and continuous improvement methodologies to drive success.

		STAGE				
Characteristic	**Question**	**1**	**2**	**3**	**4**	**5**
APPLICATION	How and to what extent do you apply methods and tools for CIP?	Left to individual application	Selected tools provided for application	Application of a comprehensive set of methods and tools	Systematic application of effective and proven methods and tools	Aplication of methods and tools is subject to continuous improvement
SKILLS	How would you describe the CIP skills of the people working on CIP in your organization?	Limited skills acquired through experience	Some methods and tools are known and can be applied	A basic method and tool set made available for everybody involved, with advanced tools at specialist level	Everyone knows which tools to use and where to get them	People are innovative with tools and their application to achieve even higher effeciency
DEPLOYMENT	Referring to the skills described above, what is the percentage of people using it?	Less than 5%	5 to 20%	20-50%	50-75%	75-100%
ACCESSABILITY of KNOWHOW and EXPERIENCE	How would you describe the documentation from your CIP activities?	Individual Notes, No Formal Reports	Some formal reports and documentation available	Activities incl. Target achievement are systematically documented and displayed where necessary	CIP knowhow and experience is systematically stored and information made available where to find it	CIP knowhow and experience systematically documented and made accessable throughout the whole organization
		Reactive	**Structured**	**Goal Oriented**	**Empowered**	**Way of Life**

KEY MEASURABLES & RESULTS

The organization's ability to define valid performance targets and to review their achievement.

		STAGE				
Characteristic	**Question**	**1**	**2**	**3**	**4**	**5**
IDENTIFICATION	Are measurements and targets in place to review the results of CIP activities?	Some measurements may be in place but may not be key ones	Some key measurements for selected areas/processes are identified and in place with improvement targets set.	Operational measurements and targets are defined which are linked directly to strategic goals.	Key measurements and targets in day to day functions are defined which support department and strategic aims.	Key measurements, targets and their definitions are regularly checked and adapted to provide alignment with current and future business needs.
REVIEW and COMMUNICATION	How is progress and target achievement reviewed and communicated in your organization?	Sporadic.	Regular reviews through direct report channels.	Regular reviews on department or functional areas level. Key measurements and results are openly accessable in the organization.	Teams are responsible for reviewing and reporting their own target achievement.	A system is in place that enables everybody to identify his/her individual contribution to key targets. Each employee naturally checks and reports his/her personal target achievement and assists in the re-definition of key targets.
		Reactive	**Structured**	**Goal Oriented**	**Empowered**	**Way of Life**

3.6 – AME LEAN ASSESSMENT

Questo assessment è realizzato dalla AME (Association for Manufacturing Excellence) e tiene conto di ben quattordici categorie:

1. Management Support;
2. Culture;
3. 5S;
4. Value Strema Mapping;
5. Setup Reduction;
6. Total Productive Maintenance;
7. Pull Systems;
8. Production Flow;
9. Plant Layout;
10. Standard Work;
11. Lean Product and Process Design;
12. Accounting Support for Lean;
13. Supply Chain;
14. Continuous Improvement.

Esso comprende: le tabelle con le domande alle quali rispondere; una tabella riassuntiva dei punteggi ottenuti; quattro grafici di confronto. In questo tool non esistono delle vere e proprie sottocategorie, ma viene data una descrizione di una possibile situazione nella quale ci si può ritrovare. A seconda della condizione in cui ci si trova, si dà un punteggio come indicato vicino alla risposta. Nella figura seguente viene mostrata la struttura dell'assessment (Fig 3.9).

Fig 3.9: Struttura dell'AME Lean Assessment (Fonte: www.ameconference.org)

1. Management Support	Scoring Range	Score
Management is not aware of Lean concepts and has no plan to implement the strategy. No training for most managers.	0	1,0
Management is aware of Lean concepts but has not rationalized them for their operation. No evidence of Lean Thinking among employees or management processes.	1 to 1.9	
Management fully understands Lean concepts and has made the decision to implement but has not developed a vision or formal plan for implementation. Management gives permission but not seen to lead by visible support.	2 to 2.9	
Formal plan in place to implement Lean. Implementation team in place and starting to work in specific areas. Some metrics exist. Management shows evidence of walking their talk by coaching and supporting..	3 to 3.9	
Management fosters a Lean environment. Implementation teams involved throughout the company. A champion has been given responsibility of overseeing the Lean program. Metrics developed, visible and include financials.	4 to 4.9	
Lean has become the way of doing business. Management strongly supports Lean & CI visibly and with support. Accounting practices support Lean, as do reward and recognition systems	5	

2. Culture	Scoring Range	Score
No cultural improvements addressed. Little evidence of a 'no-blame' environment. Low employee involvement. Low management alignment & visibility. Feeling of 'I'm not sure I'd like to work here' present.	0	2,0
There is an awareness of the cultural issues in the organization but no specific plans to improve. Ideas are not brought forward easily. Managers not trained in diversity, conflict management, or culture issues.	1 to 1.9	
Awareness of cultural issues exist and specific plans are in place to improve. Encouragement for a 'no-blame' environment noted. Limited employee involvement noted or encouraged by management. Some diversity training.	2 to 2.9	
Cultural changes addressed via communication and team meetings. Managers trained in lean, performance improvement, and leadership. Management models the way. Employees are engaged and involved.	3 to 3.9	
Cultural improvements seen. Successes recognized & rewarded. Some areas embrace continuous improvement. Employees at ease putting ideas and improvements forward - Often contribute spontaneously.	4 to 4.9	
Continuous Improvement is part of the culture. Employee leadership widespread, spontaneous & visibly supported. Empowerment is given and received. Employees know their contribution & take responsibility with pride.	5	

3. 5S	Scoring Range	Score
No formal workplace organization standard (5S) in place. No workplace order can be seen. Area untidy. Materials, parts, and tools not organized & have multiple locations. End of day shift clean up may occur. High dependence on cleaning staff.	0	3,0
Company aware of the 5S principles but no training underway or completed. Non-routine cleaning takes place. Reliance on cleaning staff. Some areas are neater than others	1 to 1.9	
Some 5S training has been done and some areas of the company have done red tagging and are showing signs of order. End of day cleaning by employees evident in these areas.	2 to 2.9	
Most areas have begun 5S. Materials, parts and tools assigned permanent positions. Cleaning schedules followed. Teams investigate root causes of disorder. Employees participate, support, understand & do most cleaning.	3 to 3.9	
Audit teams periodically asses 5S standards throughout the company. All areas working on the 4th "S" and are standardizing all of their processes. Evidence of employee pride. Minimal use of cleaning staff.	4 to 4.9	
5S sustainment clearly part of company culture. Everyone knows the well defined process for analyzing root causes of contamination. Solutions prioritized and implemented quickly. Employee ownership visible. Almost no cleaning staff.	5	

4. Value Stream Mapping	Scoring Range	Score
No processes have been mapped	0	4,0
An understanding of VSM is evident. Some attempts have been made to map a simple process	1 to 1.9	
A number of people have been trained in VSM. Some processes have been mapped. No improvements have been seen	2 to 2.9	
Most understand the value of VSM. The mapping done has uncovered opportunities for improvement. Action plans have been put in place and responsibilities assigned. Rapid improvements blitzes preceded by VSM.	3 to 3.9	
VSM is done regularly. Trained people mentor, coach, and lead VSM. Mapping has uncovered opportunities for improvement. Action plans have been put in place to improve the process. Alignment with business objectives noted.	4 to 4.9	
Most processes mapped with results of the action plans recorded. VSM is recognized by all employees and management as a valuable tool in the continuous improvement effort. Part of daily thinking & done across company.	5	

5. Setup Reduction	Scoring Range	Score
Setup times not measured. No attempt to reduce setup on any piece of equipment or processes (including admin. processes). No appreciation of impact of setup time.	0	1,0
Setup times known and accounted for in scheduling the facility. Little evidence of knowledge of setup time reduction thinking.	1 to 1.9	
Some informal setup reduction has been attempted. Limited application in isolated locations. Some training and some awareness of the setup reduction process exists.	2 to 2.9	
Formal setup reduction program in place. A team has been put together and attempts made to identify and separate internal and external activities. Awareness of the basic process exists.	3 to 3.9	
Formal setup reduction program has realized 50% reduction in some setup times. Most critical pieces of equipment or processes have been visited at least once by the team. Some evidence of setup times being prioritized according to impact on the business	4 to 4.9	
Setup times are less than 10 minutes on all critical pieces of equipment or processes. Approaches to reducing setup times well defined and widely understood.	5	

6. Total Productive Maintenance	Scoring Range	Score
Maintenance only performed when the machine breaks down. No formal preventive maintenance system in place	0	2,0
Preventive maintenance is done on an ad hoc basis by the maintenance personnel or sub-contractors. No equipment history is collected	1 to 1.9	
A formal preventive maintenance system has been implemented. Evidence of the system is visible and easy to understand. Downtime is scheduled. History is kept.	2 to 2.9	
A daily/weekly preventive maintenance schedule is visible. The operators (and office staff) are involved in the process of carrying out basic maintenance functions.	3 to 3.9	
Maintenance personnel & operators work together to identify root causes and develop solutions. Teams formed to improve equipment through redesign & modification. Appropriate maintenance transferred to operators.	4 to 4.9	
Operators and Administrative staff take ownership of the equipment and are trained to carry out daily and weekly maintenance tasks. Maintenance personnel are alerted when major overhaul is required. Maintenance staff coaches and mentors.	5	

7. Pull Systems	Scoring Range	Score
Production scheduling based on forecasting. No pull systems are being used for administrative processes or supply.	0	3,0
Customer demand taken into account when scheduling production. Little knowledge of pull systems.	1 to 1.9	
Some form of kanban used in some areas. Employees understand value of a visual signaling system. A small number are trained in replenishment/pull systems.	2 to 2.9	
Kanban is used to schedule finished goods. Customer demand drives the system. The system is understood and visible to all employees. Widespread training of replenishment/pull systems. Some pull systems are being used for administrative processes or supp	3 to 3.9	
Kanban can be seen in most areas, including the office. Continuous improvement of the system is being done. Documentation shows improvements. Prioritized list of replenishment/pull system improvement projects exists.	4 to 4.9	
Customers, suppliers and production is run with kanban systems. Employees fully understand and utilize it and make adjustments.	5	

8. Production/Information Flow	Scoring Range	Score
No fixed flow for products, materials or information. Large batches and WIP exist. Little flow visible as it is obstructed by clutter and WIP.	0	4,0
Some evidence of product flow. Some analysis has taken place. Manufacturing sequences have been documented and some flowcharting has taken place for administrative processes.	1 to 1.9	
Flow can be seen in some areas. Takt time is known but not utilized to its fullest. Large batches and excessive WIP still exists	2 to 2.9	
Continuous flow can be seen in a product family, material and information flow. Takt time used and reduction in batch sizes and queues are evident.	3 to 3.9	
Most product families and information have been converted to flow. Batch sizes and WIP has been reduced and standard work is implemented and adhered to in most areas	4 to 4.9	
All areas have been converted to flow. Entire production, material and administrative flows have been Value Stream Mapped. Batch sizes and WIP are at minimal levels. Standard work is implemented in all areas	5	

9. Plant / Facility Layout	Scoring Range	Score
Plant/facility has traditional layout (process villages) with like processes & equipment making up departments e.g. Assembly; Consolidation, Machine Shop; Shipping etc. No evidence of layout associated with market demand or concern for efficiency.	0	1,0
Some machinery/operations arranged by product/service families. Large queues of WIP exist. No coordination of customer/supplier exists. Few visual indicators in the facility. Waiting occurs. Walking distances to job steps are long.	1 to 1.9	
Some cellular thinking (grouping of processes) seen. Some machines/processes arranged to satisfy product/service development flow. Excessive WIP, parts, and waste exists in the cell. Some evidence of sequencing to speed throughput to shipping.	2 to 2.9	
Cellular processing evident in plant/facility. Queues of materials, parts, and process steps in the cell minimized and documented. Cross training of workers has begun. Spaghetti diagrams, VSM tools etc. exist. Desire to reduce space.	3 to 3.9	
Workers within the cell have been cross trained. Some support and administrative staff have been assigned to the cell. WIP minimized using Takt time calculations where appropriate. Changes taken with consideration for impact on customers. Most flow through facility is visible, logical and visually signed	4 to 4.9	
Output synchronized between cells. Pull systems exist. WIP & parts minimized. Emphasis on making facility more responsive to customers. Layout impact considered in bidding of major contracts. Flexibility everywhere. Admin and support staff are assigned to the cell.	5	

10. Standard Work	Scoring Range	Score
No standard work procedures exist. No understanding of the connection between continuous improvement and work standards.	0	2,0
Some standard work procedures exist to show how the product is made, materials flow and administrative processes function, but are not current nor displayed in work areas. Thinking of internal customers beginning.	1 to 1.9	
Standard work procedures exist to show how the product is made, products flow and administrative processes function. Some procedures evident in work area and readily accessible. Preventive maintenance, setup, quality, reporting, etc standards are not us	2 to 2.9	
Standard product work procedures are current and posted in the appropriate areas for maximum availability. Evidence of other standard work procedures can be seen.	3 to 3.9	
All standard work procedures can be seen in most areas and are readily available. Process owners know the what, when, where, why and how of their areas. Ownership taken to use standards and keep them current.	4 to 4.9	
All standard work procedures seen in all areas. Employees have quick and free access. CI to operations reflected in procedures. Standard work recognized in everything that the company does but made easy to change fast.	5	

11. Lean Product and Process Design	Scoring Range	Score
Operational issues are considered late in the product and process design process. There is little awareness of Lean Product and Process Design methodology.	0	3,0
There is an awareness that product and process design has an impact on operations. Some of the key development staff have been trained in Lean Product and Process Design (LPPD). Some initial analysis has been undertaken.	1 to 1.9	
All key development and support staff have been trained in LPPD. A LPPD pilot has begun with some cross functional involvement. Operational issues are now being considered in the design process. There is some consideration given to the impact of the project on operations earlier in the process.	2 to 2.9	
A number of key projects are now utilizing an improved lean design process. There is a greater involvement by cross functional teams. Operational impact is now being considered as early as possible in the design process. Additional tools such as design for manufacturing (DFM), Design for Assembly (DFA), Design for Operations (DFO) and Quality Functional Deployment QFD are being evaluated	3 to 3.9	
Lean Product and Process Design has been adopted and implemented by the key development and support staff. DFM, DFA, DFO and QFD tools are being utilized when possible. Internal and external customer impact are being considered for all projects.	4 to 4.9	
All stake holders are considered in the product and process design cycle. DFA / DFM / QFD / DFO tools are utilized for all key projects. Internal and External Customer / Partner success and 'value add' are key drivers in product and process design.	5	

12. Accounting Support for Lean	Scoring Range	Score
Accounting system provides basic financial data based on cost accounting and batch production methodology. There is little awareness of accountings role in support lean initiatives.	0	4,0
There is an awareness that accounting has a role in supporting lean initiatives. Some of the accounting and support staff has been trained in Lean Accounting methods and some initial analysis has been undertaken.	1 to 1.9	
All of the key accounting and support staff have been trained in Lean Accounting Methods. A pilot project has begun in a value stream or cell utilizing lean financial measurements. Accounting has begun to target the elimination of waste in its own processes.	2 to 2.9	
A number of key value streams or cells are using lean performance measurements. Decisions regarding lean initiatives are beginning to use lean financial data. Accounting has value stream mapped most of its own processes. Some initial investigation has begun to review current standard costing methods	3 to 3.9	
All key value streams and cells are using lean performance measurements. All key decisions regarding lean initiatives are based on lean financial data. Standard costing methods are being reviewed and eliminated where possible.	4 to 4.9	
Accounting system provides financial data based on measurements at the value stream and cell activity level and provide support for lean initiatives. The need for traditional accounting and control transactions have been eliminated.	5	

13. Supply Chain	Scoring Range	Score
Supply Decisions are made on price only. Demand is communicated to suppliers primarily by purchase order. Material flow is not considered in supply chain planning. Suppliers metrics are not utilized	0	1,0
Knowledge of pull systems, but demand decisions are made primarily from forecast. Some supplier metrics are known but are not communicated to supplier. Additional costs are gathered but supply decisions are primarily by price.	1 to 1.9	
Some pull systems into place for suppliers. Metrics are communicated to a number of suppliers. Costs are known and being utilized for some supply decisions.	2 to 2.9	
Pull systems exist for key suppliers and customers. Metrics and scorecards are utilized for key suppliers. Costs are utilized for supply decisions.	3 to 3.9	
Pull systems are utilized for 50% of external demand. Metrics are being used for CI projects with suppliers. Supplier Certification exists. Material flow improvement projects are underway. Most supply costs are understood and being utilized for team based supply decisions.	4 to 4.9	
Team based Supply Decisions are made on total cost of purchasing. Demand is communicated to external partners primarily through pull systems based on customer demand. Material flow from supplier to customer has been maximized. Metrics and 360 degree certification are used as a tool for CI. Suppliers are utilized for CI projects	5	

14. Continuous Improvement	Scoring Range	Score
No formalized improvement methods exist. No evidence of employees, or managers concerned about continuous improvement.	0	2,0
Improvements reactive - usually come from management/engineering/supervision or when a customer complaint is received. Some training started in problem-solving.	1 to 1.9	
Some improvement methodology evident. Teams sometimes used to develop solutions and use similar methods. CI and problem-solving training supported by management and processes used by management.	2 to 2.9	
A consistent method used to improve processes. Normally CI is reactive but some proactively is seen. Process owners are involved in the improvement efforts. Results are documented and displayed.	3 to 3.9	
Cont. Improve. through teams used to advance company. All workers in an area trained in C.I. Tools & use. Open documentation & dashboard indicators used to track improvements. Improvements tied to dollar savings.	4 to 4.9	
Methods such as PDCA are known by all employees. Outside eyes used to bring an outside perspective to C.I. Process & uncover waste. C.I. part of the company's culture. CI used to improve relationships as well.	5	

I punteggi vengono poi raccolti in una tabella (Tab 3.4) e rappresentati in un radar chart e un istogramma.

AME Lean Assessment - Scorecard

ABC Company
Toronto, Ontario
2008
October

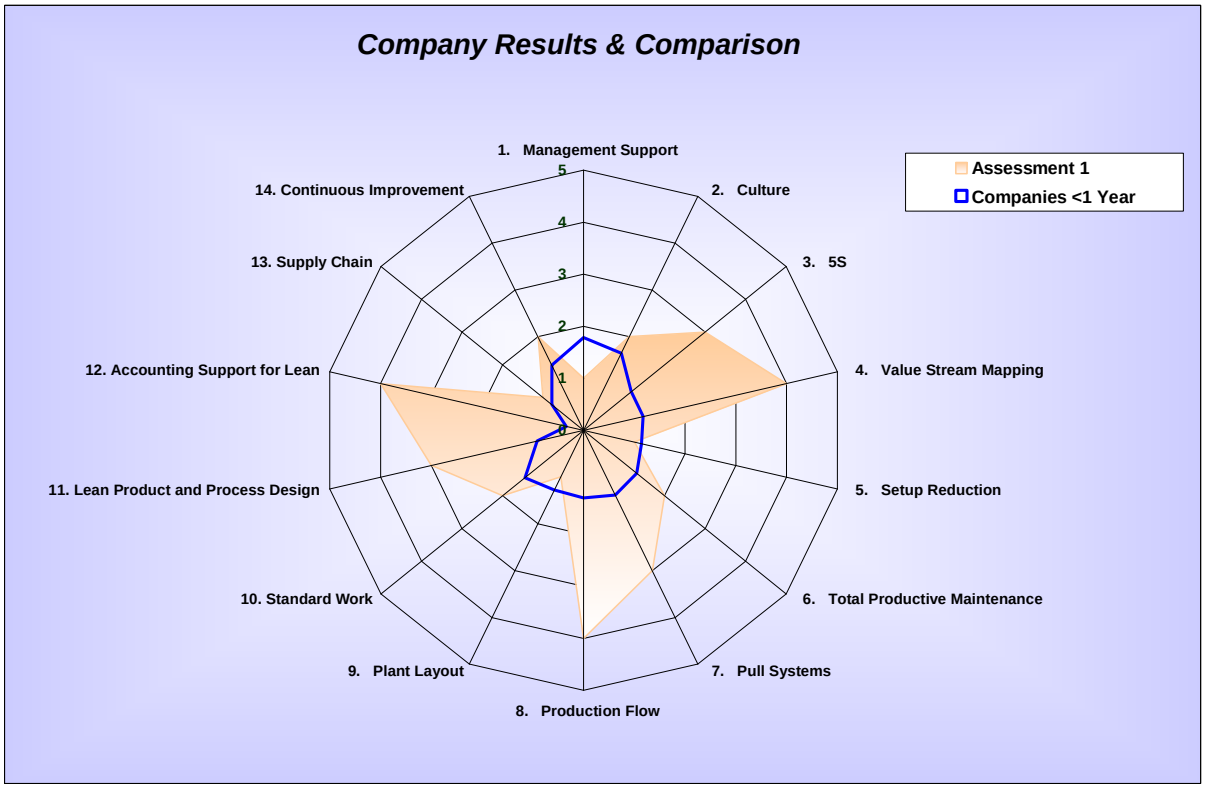
Lean Enterprise Attributes	Max. Score	Assessment 1 2008 October	Compare yourself to 80 companies: Companies <1 Year	Companies <2 Years	Companies <3 Years	Companies >3 Years
1. Management Support	5	1,00	1,78	2,32	2,25	3,70
2. Culture	5	2,00	1,65	2,30	1,98	3,55
3. 5S	5	3,00	1,18	2,10	1,80	2,93
4. Value Stream Mapping	5	4,00	1,17	2,14	2,30	2,28
5. Setup Reduction	5	1,00	1,14	1,54	1,10	3,13
6. Total Productive Maintenance	5	2,00	1,32	1,74	2,10	3,33
7. Pull Systems	5	3,00	1,38	1,93	1,98	3,08
8. Production Flow	5	4,00	1,31	2,00	2,33	3,43
9. Plant Layout	5	1,00	1,28	1,85	2,45	3,41
10. Standard Work	5	2,00	1,44	1,72	2,80	3,43
11. Lean Product and Process Design	5	3,00	0,91	1,13	1,30	2,43
12. Accounting Support for Lean	5	4,00	0,34	0,10	1,00	1,20
13. Supply Chain	5	1,00	0,79	0,64	1,50	1,60
14. Continuous Improvement	5	2,00	1,39	2,00	1,68	3,44
Lean Enterprise Score	5,00	2,36	1,22	1,68	1,90	2,92
Lean Enterprise Score %	100%	47,14%	24,40%	33,57%	37,93%	58,48%

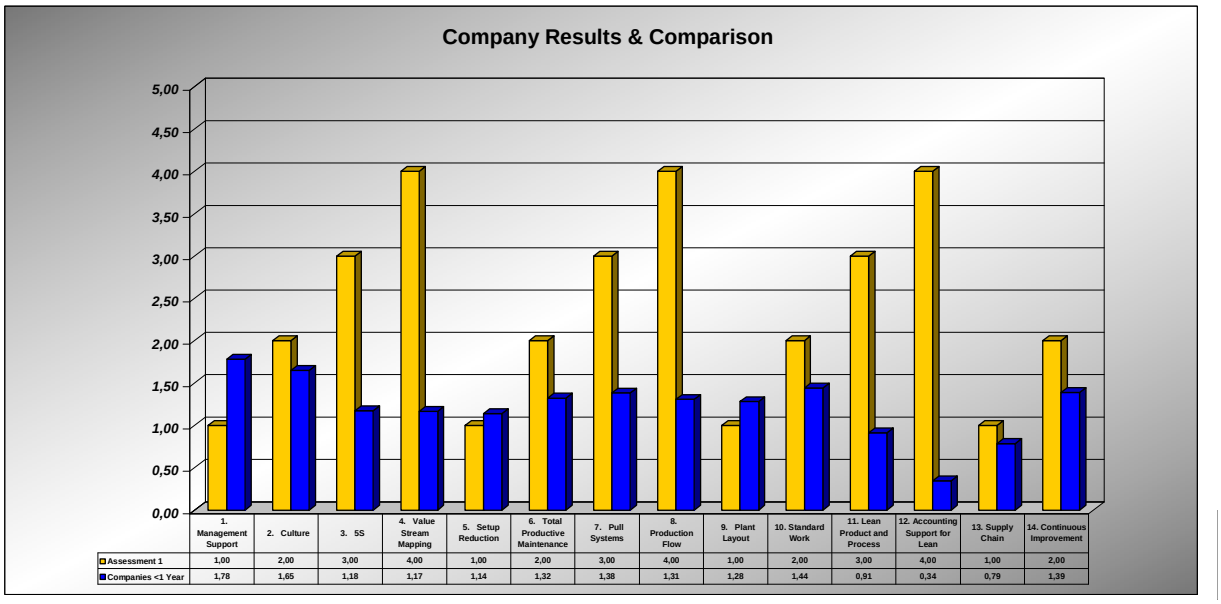
Tab 3.4: Tabella riassuntiva dei risultati

Una volta raccolti i dati, ciò che risulta viene confrontato con il risultato avuto dalla media di 80 aziende. Nel primo lo si confronta con il risultato medio di aziende che hanno implementato la lean in meno di un anno (Fig 3.10), nel secondo meno di due anni (Fig 3.11), nel terzo meno di tre anni (Fig 3.12), nel quarto da più di tre anni (Fig 3.13)..

In questo modo un'azienda può rapportarsi con il risultato medio di 80 compagnie e capire in quali categorie è il caso di lavorare più duramente.

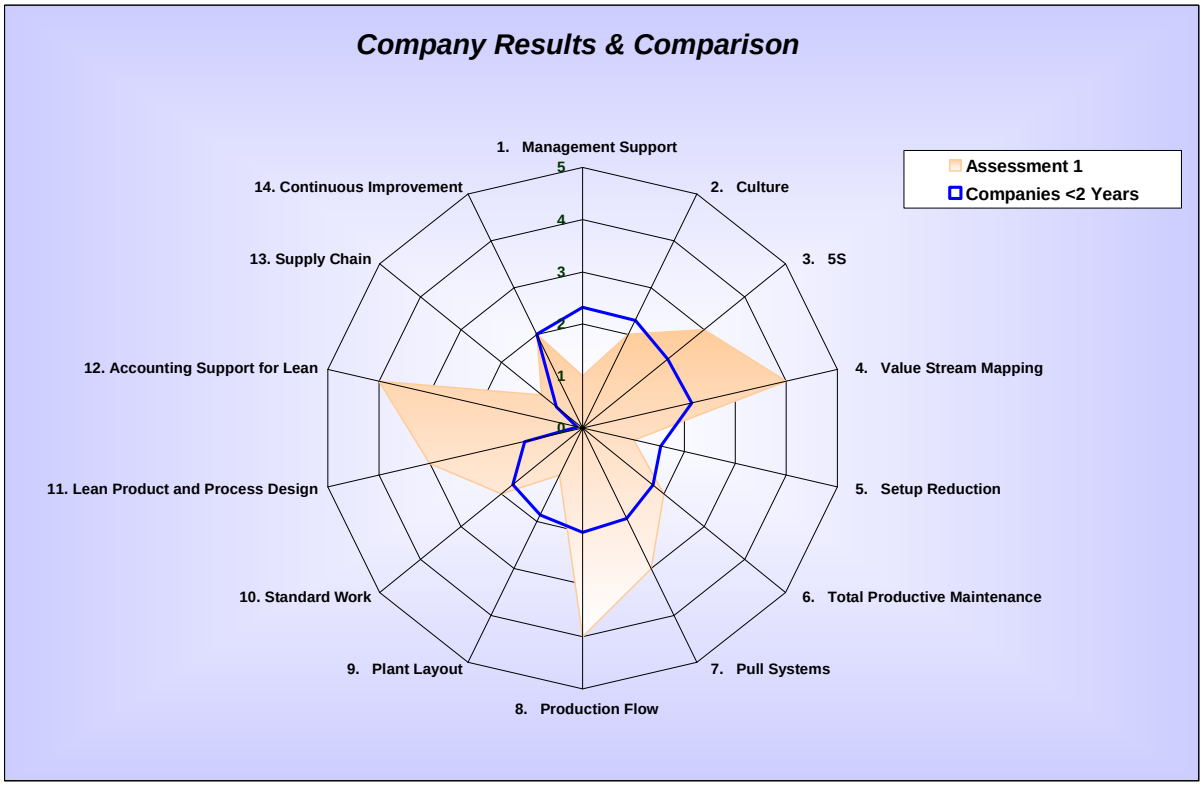
Nel seguito si mostrano i diversi grafici previsti adatti al confronto del risultato ottenuto.

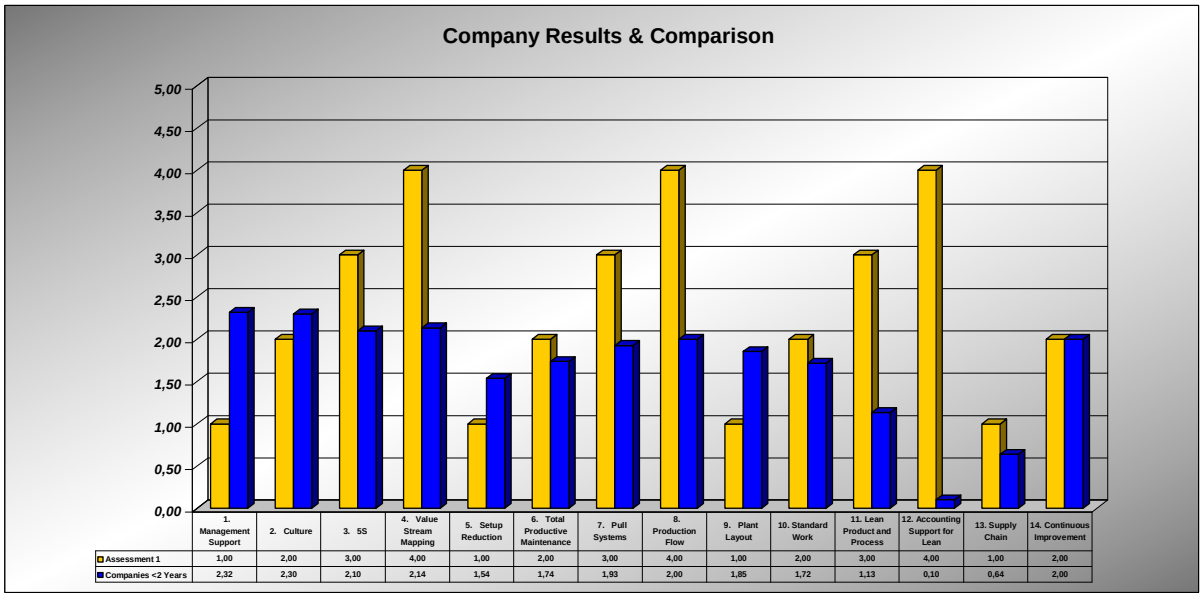




	1. Management Support	2. Culture	3. 5S	4. Value Stream Mapping	5. Setup Reduction	6. Total Productive Maintenance	7. Pull Systems	8. Production Flow	9. Plant Layout	10. Standard Work	11. Lean Product and Process	12. Accounting Support for Lean	13. Supply Chain	14. Continuous Improvement
Assessment 1	1,00	2,00	3,00	4,00	1,00	2,00	3,00	4,00	1,00	2,00	3,00	4,00	1,00	2,00
Companies <1 Year	1,78	1,65	1,18	1,17	1,14	1,32	1,38	1,31	1,28	1,44	0,91	0,34	0,79	1,39

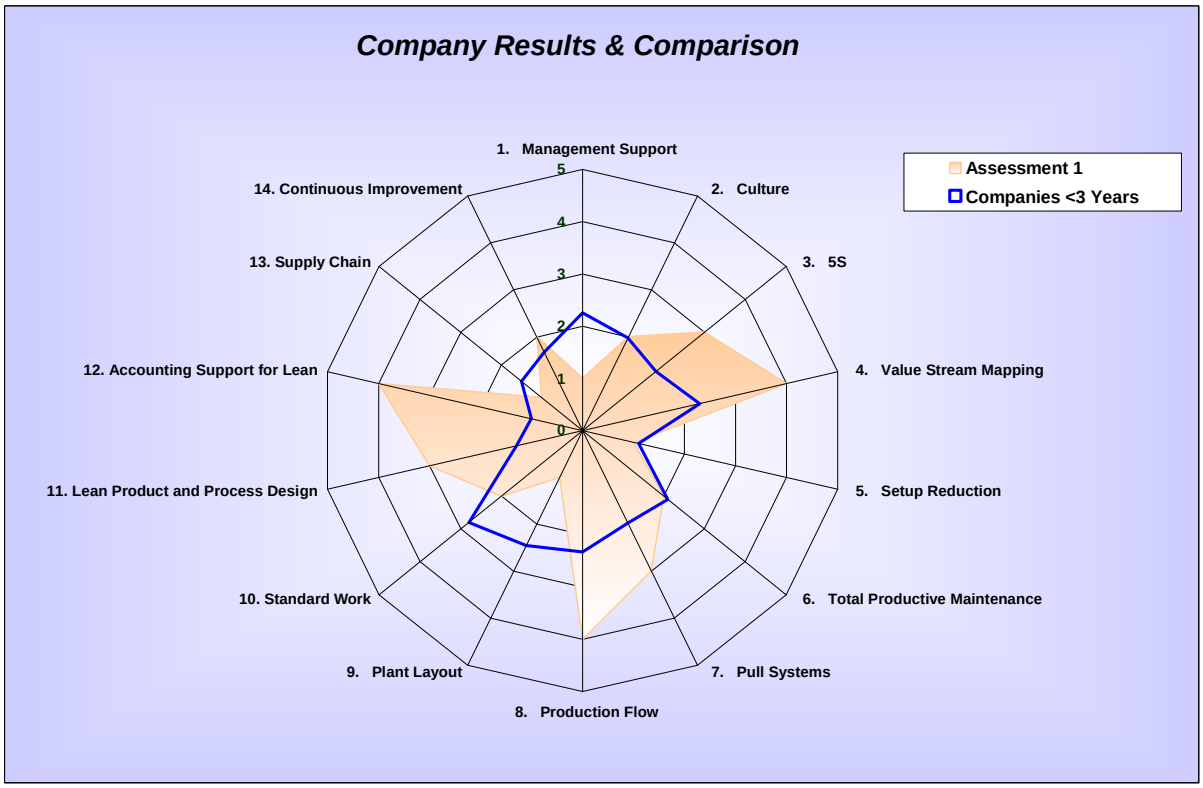
Fig 3.10: Radar chart e istogramma di confronto (aziende lean <1 anno)

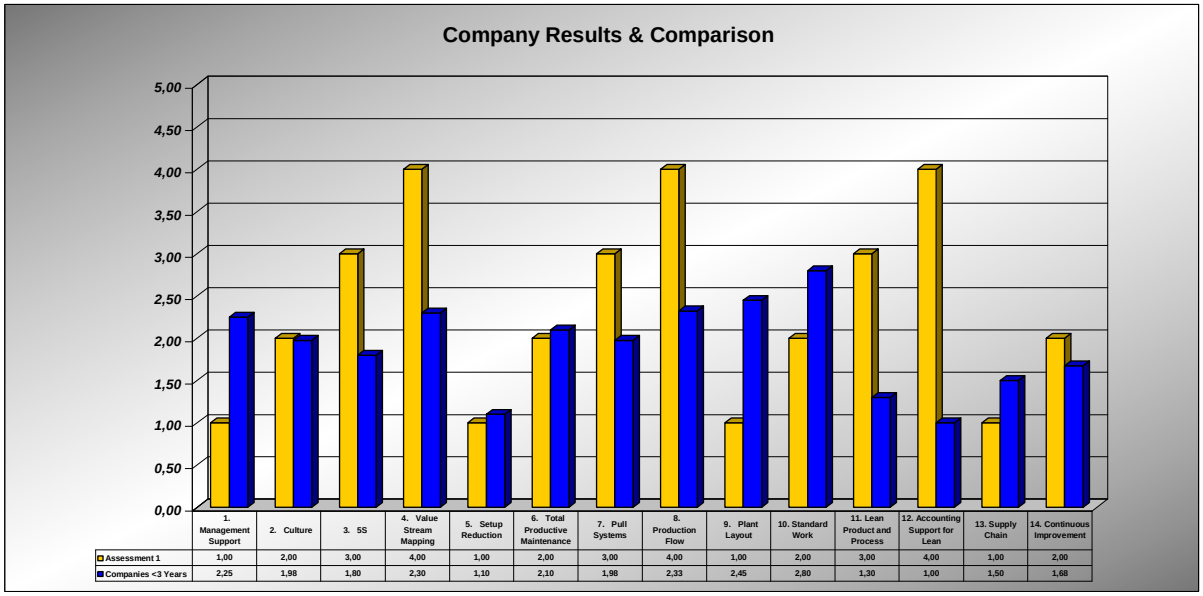




	1. Management Support	2. Culture	3. 5S	4. Value Stream Mapping	5. Setup Reduction	6. Total Productive Maintenance	7. Pull Systems	8. Production Flow	9. Plant Layout	10. Standard Work	11. Lean Product and Process	12. Accounting Support for Lean	13. Supply Chain	14. Continuous Improvement
Assessment 1	1,00	2,00	3,00	4,00	1,00	2,00	3,00	4,00	1,00	2,00	3,00	4,00	1,00	2,00
Companies <2 Years	2,32	2,30	2,10	2,14	1,54	1,74	1,93	2,00	1,85	1,72	1,13	0,10	0,64	2,00

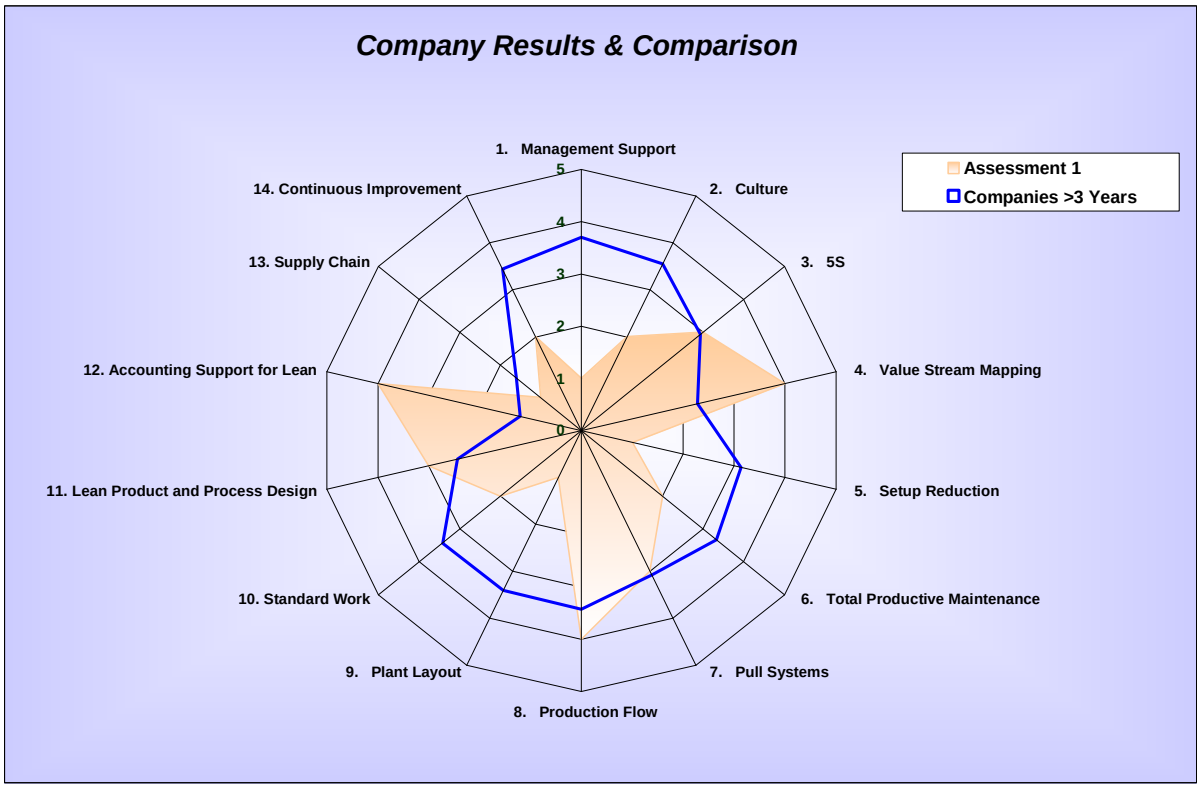
Fig 3.11: Radar chart e istogramma di confronto (aziende lean < 2 anni)

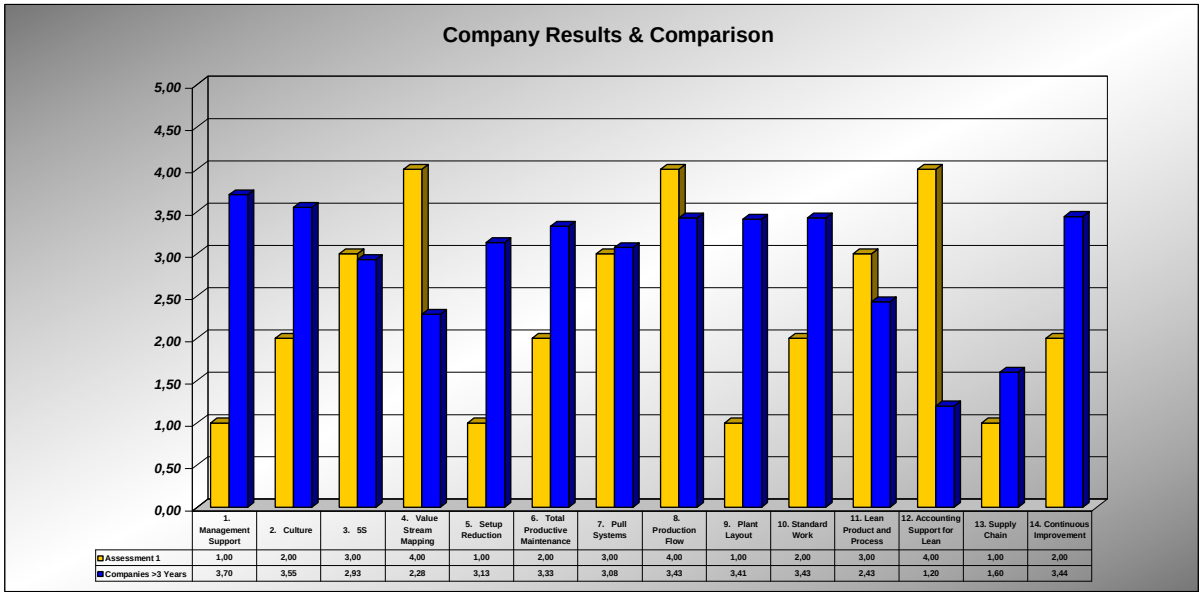




	1. Management Support	2. Culture	3. 5S	4. Value Stream Mapping	5. Setup Reduction	6. Total Productive Maintenance	7. Pull Systems	8. Production Flow	9. Plant Layout	10. Standard Work	11. Lean Product and Process	12. Accounting Support for Lean	13. Supply Chain	14. Continuous Improvement
Assessment 1	1,00	2,00	3,00	4,00	1,00	2,00	3,00	4,00	1,00	2,00	3,00	4,00	1,00	2,00
Companies <3 Years	2,25	1,98	1,80	2,30	1,10	2,10	1,98	2,33	2,45	2,80	1,30	1,00	1,50	1,68

Fig 3.12: Radar chart e istogramma di confronto (aziende lean <3 anni)





	1. Management Support	2. Culture	3. 5S	4. Value Stream Mapping	5. Setup Reduction	6. Total Productive Maintenance	7. Pull Systems	8. Production Flow	9. Plant Layout	10. Standard Work	11. Lean Product and Process	12. Accounting Support for Lean	13. Supply Chain	14. Continuous Improvement
Assessment 1	1,00	2,00	3,00	4,00	1,00	2,00	3,00	4,00	1,00	2,00	3,00	4,00	1,00	2,00
Companies >3 Years	3,70	3,55	2,93	2,28	3,13	3,33	3,08	3,43	3,41	3,43	2,43	1,20	1,60	3,44

Fig 3.13: Radar chart e istogramma di confronto (aziende lean >3 anni)

L'ultimo grafico (Fig 3.14) mostra il risultato ottenuto sulla curva che rappresenta lo sforzo necessario per raggiungere determinati livelli (in ascissa il punteggio che si ottiene, in ordinata lo sforzo necessario). La curva dimostra che per arrivare ad un livello più alto ci sia bisogno di uno sforzo sempre maggiore da parte dell'azienda nel migliorarsi e nell'avvicinarsi ad essere lean. Lo sforzo non viene misurato, è qualcosa di "astratto", rappresenta quanto ci si deve dare da fare.

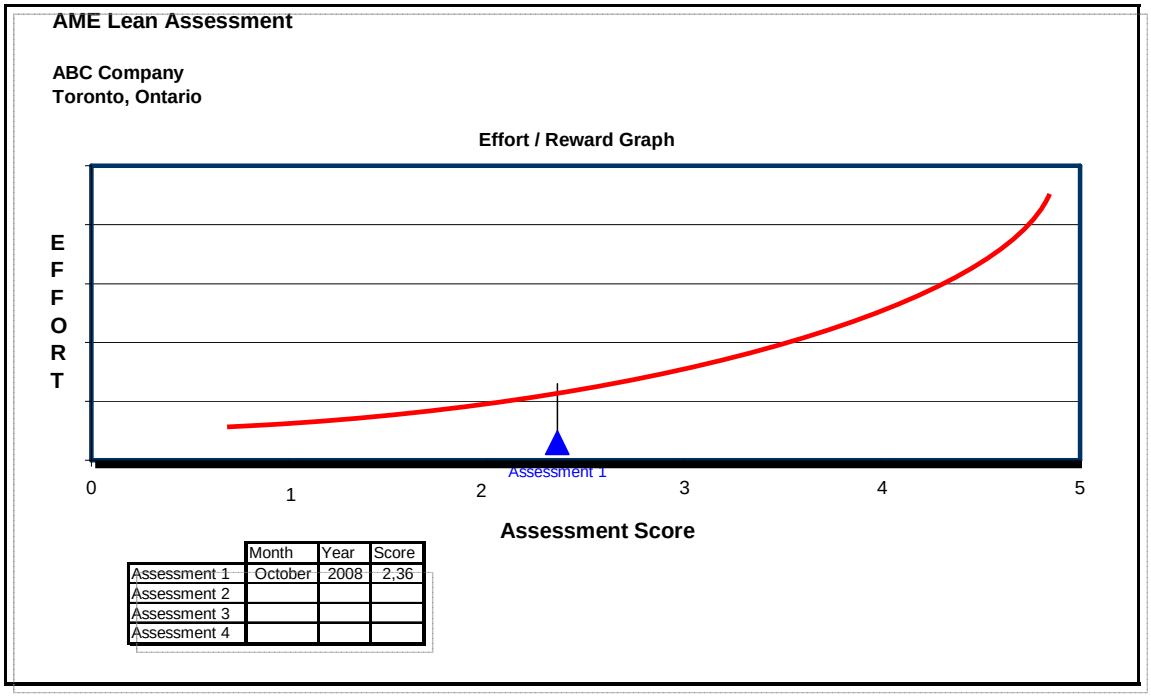


Fig 3.14: Risultato su curva dello sforzo per essere lean

3.7 – LEAN MANUFACTURING ASSESSMENT (GAP ANALYSIS)

Questo assessment, raccoglie tre categorie principali (Just in Time, People, Manufacturing Excellence) alle quali corrispondono ben dieci categorie:

1. Order Leveling;
2. Material Movement;
3. Flow Manufacturing;
4. Training;
5. Team Involvement;
6. Visual Controls;
7. Quality;
8. TPM;
9. Make Ready;
10. Workplace Organization.

Viene chiamato anche GAP ANALYSIS. L'assessment parte con una valutazione iniziale per quantificare il livello al quale ci si trova. Questo andrà a stabilire una linea guida. Una volta stabiliti dei target per ogni criterio, li si confronta con i risultati ottenuti e si osserva un divario (gap). Quindi il lavoro da fare è quello di chiudere questo divario.

Oltre a segnare a quale livello (Level) ci si trova e quindi capire se si lavora in un "mondo" tradizionale o lean, si può indicare quanto diffusa (Dissemination) è quella determinata pratica spiegata dalla domanda descrittiva in proposito. Per quanto riguarda la dissemination (diffusione) si intende quanto quella pratica viene utilizzata all'interno dell'azienda.

In fig 3.15 viene mostrato l'assessment nella sua struttura.

Fig 3.15: Struttura del Lean Manufacturing Assessment (Gap Analysis)

JUST-IN-TIME

TRADITIONAL — **ORDER LEVELING** — LEAN

1. Various order numbers are started at the same time in the value stream and there is no optimal overview of the logistic.

There is an optimal overview of the logistic - Order leveling is used to reduce variations in production volume.

	0	1	2	3	4	?
Level:						
Dissemination:						

Notes:

2. Orders are started without preparation and run through the production at random.

Orders are examined before starting, planned, and organized 100 % through the flow.

	0	1	2	3	4	?
Level:						
Dissemination:						

Notes:

3. Orders are started without knowledge of the actual turnaround time and capacity usage.

Orders are started with knowlegde of actual turnaround time and production capacity.

	0	1	2	3	4	?
Level:						
Dissemination:						

Notes:

4. The process time is not known/used.

The process time is known for all your main products

	0	1	2	3	4	?
Level:						
Dissemination:						

Notes:

Average - level	
Average - dissemination	

JUST-IN-TIME

TRADITIONAL **MATERIAL MOVEMENT** LEAN

8. Standard pack concepts are not used for in-process movement of product, packaging, labels, delivery notes, etc.

Standard pack concepts are fully implemented. Product is presented in common lots.

	0	1	2	3	4	?
Level:						
	0	1	2	3	4	?
Dissemination:						

Notes:

9. No organized approach to the movement of paper through the workplace exists.

Paper delivery throughout the workplace is based on pull signals.

	0	1	2	3	4	?
Level:						
	0	1	2	3	4	?
Dissemination:						

Notes:

10. Pull systems are not in use between operations.

Pull systems are fully implemented, maintained, and regularly analyzed for appropriateness.

	0	1	2	3	4	?
Level:						
	0	1	2	3	4	?
Dissemination:						

Notes:

JUST-IN-TIME

TRADITIONAL **MATERIAL MOVEMENT** LEAN

11. Operators unnecessarily leave their workstations to pick up and deliver material.

Product is delivered and removed from workstations without affecting job requirements.

	0	1	2	3	4	?
Level:						
	0	1	2	3	4	?
Dissemination:						

Notes:

12. There is no well organized approach to in-process inventories.

All in-process inventories are based on a well organized approach.

	0	1	2	3	4	?
Level:						
	0	1	2	3	4	?
Dissemination:						

Notes:

Average - level	
Average - dissemination	

JUST-IN-TIME

TRADITIONAL **FLOW MANUFACTURING** LEAN

13. The understanding of using the value stream model is not present in the organization.

The value stream of the products is visualized, and it reflects a high activity level regarding continuous improvements.

	0	1	2	3	4	?
Level:						
	0	1	2	3	4	?
Dissemination:						

Notes:

14. Physical arrangement of the workplace prevents flow to improve.

Physical arrangements of the workplace secure optimal flow.

	0	1	2	3	4	?
Level:						
	0	1	2	3	4	?
Dissemination:						

Notes:

15. Standardized process descriptions are not in use. Manpower is fixed regardless of customer demand.

Standardized process is fully developed and implemented. Flexible manpower responds to changes in customer demand.

	0	1	2	3	4	?
Level:						
	0	1	2	3	4	?
Dissemination:						

Notes:

16. Products are pushed through the production without any direct message from the downstream operator.

Pull system drives production. Nothing moves downstream unless in response to customer demand.

	0	1	2	3	4	?
Level:						
	0	1	2	3	4	?
Dissemination:						

Notes:

JUST-IN-TIME

TRADITIONAL — **FLOW MANUFACTURING** — LEAN

Average - level	
Average - dissemination	

PEOPLE

TRADITIONAL — **TRAINING** — LEAN

17. No employee training plan exists.

All employees contribute to their training plans, which are used extensively throughout the year.

	0	1	2	3	4	?
Level:						
	0	1	2	3	4	?
Dissemination						

Notes:

18. No analysis for training exists.

Each employee has a training gap analysis completed to drive the training plan.

	0	1	2	3	4	?
Level:						
	0	1	2	3	4	?
Dissemination:						

Notes:

19. Training of the employees is not documented.

All training is well documented for employees.

	0	1	2	3	4	?
Level:						
	0	1	2	3	4	?
Dissemination:						

Notes:

PEOPLE

TRADITIONAL **TRAINING** LEAN

20. The workforce is not cross-trained (specialists).

The workforce is cross-trained and certified, and a rotation system is in place.

	0	1	2	3	4	?
Level:						
Dissemination:						

Notes:

21. The workforce has no access to continuous improvement tools.

Regularly continuous improvement courses are held.

	0	1	2	3	4	?
Level:						
Dissemination:						

Notes:

Average - level	
Average - dissemination	

PEOPLE

TRADITIONAL **TEAM INVOLVEMENT** LEAN

22. The workforce is unaware of the company's core business and values.

The workforce has completely embraced the company's core business and values, and they are evident in business decisions.

	0	1	2	3	4	?
Level:						
Dissemination:						

Notes:

23. There is no plan for improvement and improvement suggestions.

There is a plan for improvement and the workforce is encouraged to submit individual and team suggestions.

	0	1	2	3	4	?
Level:						
Dissemination:						

Notes:

24. The workforce is not able to recognize different types of waste

The workforce is fully comitted to a culture of waste prevention. Waste is made visible and the employees are trained in eliminating waste.

	0	1	2	3	4	?
Level:						
Dissemination:						

Notes:

PEOPLE

TRADITIONAL **TEAM INVOLVEMENT** LEAN

25. The workforce is not involved in improvement activities, and the objectives are not clear and present.

The workforce is actively involved in improvement activities, and the objectives are clear and present.

	0	1	2	3	4	?
Level:						
	0	1	2	3	4	?
Dissemination:						

Notes:

26. The workforce gets no feedback on improvements.

The workforce is continuously getting feedback in line with objectives/intermediate objectives are achieved.

	0	1	2	3	4	?
Niveau:						
	0	1	2	3	4	?
Udbredelse:						

Noter:

Average - level	
Average - dissemination	

MANUFACTURING EXELLENCE

TRADITIONAL **VISUAL CONTROLS** LEAN

27. Visual control signals are not easy to understand and do not convey right information.

Visual control signals are very easy to understand and convey the right information.

	0	1	2	3	4	?
Level:						
Dissemination:						

Notes:

28. Visual control signals are manual.

Visual control signals are automatic.

	0	1	2	3	4	?
Level:						
Dissemination:						

Notes:

29. Visual control signals are not standardized and disseminated in the production.

Visual control signals are standardized and disseminated in the production.

	0	1	2	3	4	?
Level:						
Dissemination:						

Notes:

MANUFACTURING EXELLENCE

TRADITIONAL **VISUAL CONTROLS** LEAN

30. There is no shared visual communication system in the workplace.

The entire workplace uses a shared standardized visual communication system.

	0	1	2	3	4	?
Level:						
	0	1	2	3	4	?
Dissemination:						

Notes:

Average - level

Average - dissemination

MANUFACTURING EXELLENCE

TRADITIONAL **QUALITY** LEAN

31. Quality work is solely an area for the quality responsible.

Quality work is an integrated part of the organization with the top management's full support. All act proactive within the setting that a fully implemented quality system gives.

	0	1	2	3	4	?
Level:						
Dissemination:						

Notes:

32. There is no documentation for the calibration of production, measurement and testing equipment.

There is documentation for the calibration of production, measurement and testing equipment.

	0	1	2	3	4	?
Level:						
Dissemination:						

Notes:

33. There are no systematic checkpoints for quality control in the process flow.

Quality control is incorporated in the process flow.

	0	1	2	3	4	?
Level:						
Dissemination:						

Notes:

MANUFACTURING EXELLENCE

TRADITIONAL **QUALITY** LEAN

34. Error-proofing techniques are not evident in the processes, and there is no implementation plan to utilize error-proofing.

Error-proofing techniques are deployed throughout the organization. There is documentation that deviation reporting result in changes/improvements.

	0	1	2	3	4	?
Level:						
	0	1	2	3	4	?
Dissemination:						

Notes:

35. There is no continuous improvement process in the organization.

Continuous improvements are actively implemented in the processes. The acheived results are documented and visualized in the organization. They use deviation reports as a source to continuous improvements.

	0	1	2	3	4	?
Level:						
	0	1	2	3	4	?
Dissemination:						

Notes:

Average - level	
Average - dissemination	

MANUFACTURING EXELLENCE

TRADITIONAL **MAINTENANCE** LEAN

36. Maintenance of production equipment is not working.

Continuously maintenance is working and documented. Task lists are regularly used, prioritized, and implemented.

	0	1	2	3	4	?
Level:						
	0	1	2	3	4	?
Dissemination:						

Notes:

37. Logfiles for equipment do not exist.

Equipment logfiles are maintained, analyzed, and used to help establish production maintenance priorities.

	0	1	2	3	4	?
Level:						
	0	1	2	3	4	?
Dissemination:						

Notes:

38. Handling of unexpected breakdowns and stops are not organized.

Breakdowns and stops are quickly communicated to responsible personnel. There is a shared attitude that breakdowns and stops should be reduced to an absolut minimum.

	0	1	2	3	4	?
Level:						
	0	1	2	3	4	?
Dissemination:						

Notes:

MANUFACTURING EXELLENCE

TRADITIONAL **MAINTENANCE** LEAN

39. Maintenance objectives are not in use.

The main part of maintenance is proactive - planned maintenance. Almost all scheduled production maintenance is completed within the schedule time.

	0	1	2	3	4	?
Level:						
	0	1	2	3	4	?
Dissemination:						

Notes:

40. There is no maintenance plans for equipment.

Maintenance is a fully integrated part of the organization. There are maintenance plans and activities for almost all equipment.

	0	1	2	3	4	?
Level:						
	0	1	2	3	4	?
Dissemination:						

Notes:

41. No analysis or planning are made on training needs for operators or maintenance personnel prior to the introduction of new equipment.

Training needs are fully integrated into the planning process prior to the introduction of new equipment.

	0	1	2	3	4	?
Level:						
	0	1	2	3	4	?
Dissemination:						

Notes:

MANUFACTURING EXELLENCE

TRADITIONAL **MAINTENANCE** LEAN

42. Breakdowns are not tracked/traced.

The reason for breakdowns are tracked/traced and well documented and used as a source for process improvements

	0	1	2	3	4	?
Level:						
	0	1	2	3	4	?
Dissemination:						

Notes:

Average - level

Average - dissemination

MANUFACTURING EXELLENCE

TRADITIONAL **MAKE READY** LEAN

43. Set-up and make ready are improved with no relationship to the value stream.

Set-up and make ready are improved based on value stream plans.

	0	1	2	3	4	?
Level:						
Dissemination:						

Notes:

44. Set-up and make ready activity are not measured.

Set-up and make ready operations are analysed and used as a source of continuous improvements.

	0	1	2	3	4	?
Level:						
Dissemination:						

Notes:

45. Set-up and make ready tools are unorganized and not immediately available.

Set-up and make ready tools are well organized and immediately available.

	0	1	2	3	4	?
Level:						
Dissemination:						

Notes:

Average - level

Average - dissemination

MANUFACTURING EXELLENCE

TRADITIONAL **WORKPLACE ORGANIZATION** LEAN

46. There is no organized approach to the placement of necessary materials and tools at the workstations.

The workstations are well organized and materials and tools are in their proper places.

	0	1	2	3	4	?
Level:						
Dissemination:						

Notes:

47. The workstations are dirty and disorganized.

The workstations are neat and clean.

	0	1	2	3	4	?
Level:						
Dissemination:						

Notes:

48. Workers do not participate in cleaning and organising their workstations.

Workers are responsible for their own workstation and are participating in cleaning and organising their workstations.

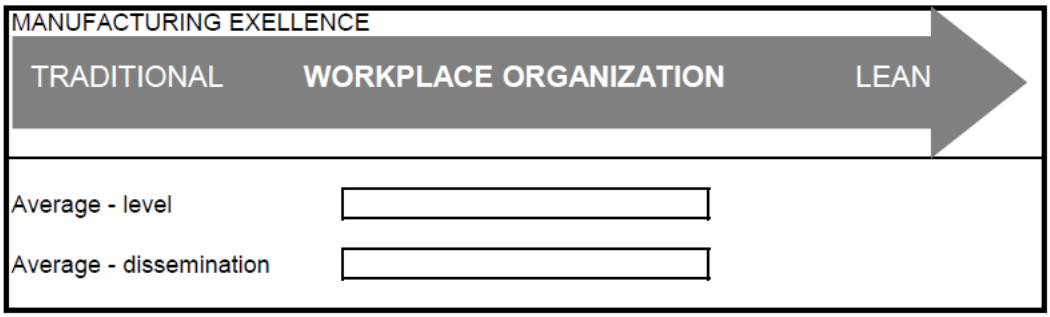
	0	1	2	3	4	?
Level:						
	0	1	2	3	4	?

49. There are no position, politics, or documented standards to follow for obtaining order at the workstations.

There are position, politics, and documented standards to follow for obtaining order at the workstations and they are fully implemented.

	0	1	2	3	4	?
Level:						
Dissemination:						

Notes:



I risultati che si ottengono vengono poi raccolti e visualizzati in due tabelle: nella prima (Tab 3.5) compaiono i risultati dati alle risposte con il relativo punteggio totale per ogni categoria; nella seconda (Tab 3.6) viene mostrato l'average per quanto riguarda il livello al quale ci si trova e la diffusione di una determinata pratica.

L'average-level e l'average-dissemination viene calcolato dividendo il punteggio totale con il numero totale delle domande.

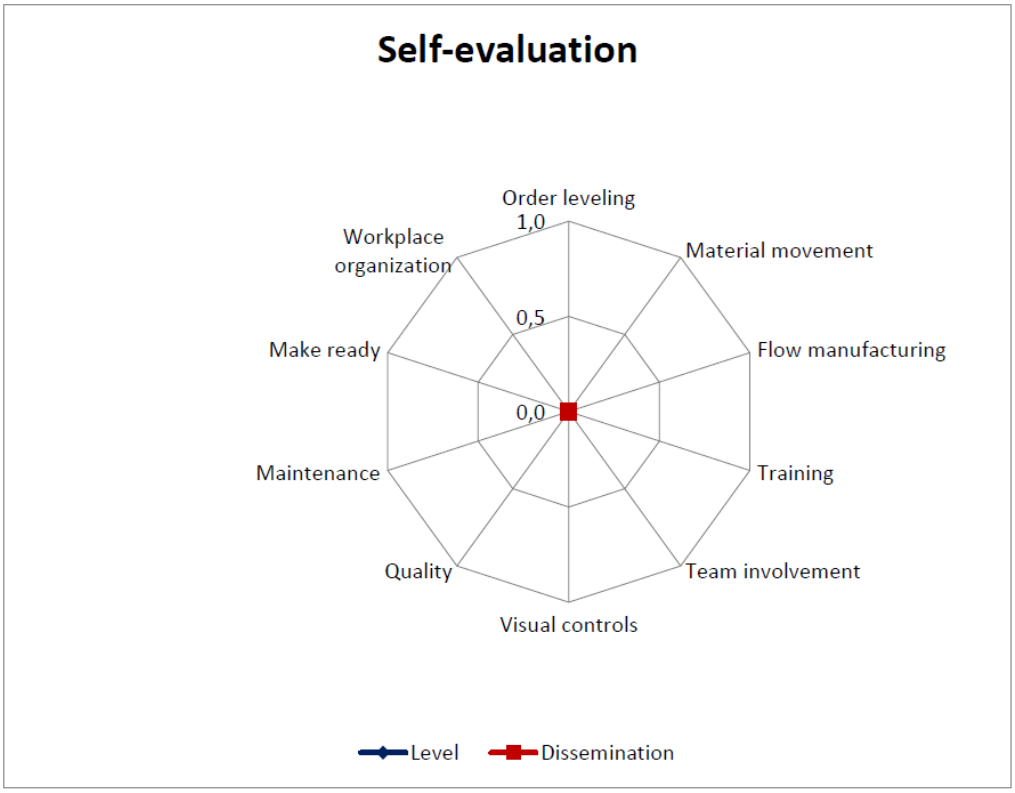
Tutto viene poi mostrato nel radar chart (Fig 3.16), inserendo i risultati sia per livello che per diffusione: in nero verranno segnati i risultati ottenuti per i livelli di ogni categoria, in rosso quelli conseguiti nella dissemination.

Area	Statement		Level	Dissemination
Order leveling	1		0,00	0,00
	2		0,00	0,00
	3		0,00	0,00
	4		0,00	0,00
		Average	**0,00**	**0,00**
Material movement	5		0,00	0,00
	6		0,00	0,00
	7		0,00	0,00
	8		0,00	0,00
	9		0,00	0,00
	10		0,00	0,00
	11		0,00	0,00
	12		0,00	0,00
		Average	**0,00**	**0,00**
Flow manufacturing	13		0,00	0,00
	14		0,00	0,00
	15		0,00	0,00
	16		0,00	0,00
		Average	**0,00**	**0,00**
Training	17		0,00	0,00
	18		0,00	0,00
	19		0,00	0,00
	20		0,00	0,00
	21		0,00	0,00
		Average	**0,00**	**0,00**
Team involvement	22		0,00	0,00
	23		0,00	0,00
	24		0,00	0,00
	25		0,00	0,00
	26		0,00	0,00
		Average	**0,00**	**0,00**
Visual controls	27		0,00	0,00
	28		0,00	0,00
	29		0,00	0,00
	30		0,00	0,00
		Average	**0,00**	**0,00**
Quality	31		0,00	0,00
	32		0,00	0,00
	33		0,00	0,00
	34		0,00	0,00
	35		0,00	0,00
		Average	**0,00**	**0,00**
Maintenance	36		0,00	0,00
	37		0,00	0,00
	38		0,00	0,00
	39		0,00	0,00
	40		0,00	0,00
	41		0,00	0,00
	42		0,00	0,00
		Average	**0,00**	**0,00**
Make ready	43		0,00	0,00
	44		0,00	0,00
	45		0,00	0,00
		Average	**0,00**	**0,00**
Workplace organization	46		0,00	0,00
	47		0,00	0,00
	48		0,00	0,00
	49		0,00	0,00
		Average	**0,00**	**0,00**

Tab 3.5: Tabella riassuntiva dei risultati ottenuti per ogni questione

TRADITIONAL	TOTAL	LEAN
Order leveling		
Level:	0,00	
Dissemination:	0,00	
Material movement		
Level:	0,00	
Dissemination:	0,00	
Flow manufacturing		
Level:	0,00	
Dissemination:	0,00	
Training		
Level:	0,00	
Dissemination:	0,00	
Team involvement		
Level:	0,00	
Dissemination:	0,00	
Visual controls		
Level:	0,00	
Dissemination:	0,00	
Quality		
Level:	0,00	
Dissemination:	0,00	
Maintenance		
Level:	0,00	
Dissemination:	0,00	
Make ready		
Level:	0,00	
Dissemination:	0,00	
Workplace organization		
Level:	0,00	
Dissemination:	0,00	

Tab 3.6: Tabella riassuntiva dei risultati ottenuti per categoria



	Level	Dissemination
Order leveling	0,00	0,00
Material movement	0,00	0,00
Flow manufacturing	0,00	0,00
Training	0,00	0,00
Team involvement	0,00	0,00
Visual controls	0,00	0,00
Quality	0,00	0,00
Maintenance	0,00	0,00
Make ready	0,00	0,00
Workplace organization	0,00	0,00

Fig 3.16: Radar chart

3.8 – THE POWER LEAN ASSESSMENT

Questo è un altro assessment realizzato dalla AME. Vengono considerate quindici categorie:

1. Commitment;
2. Empowerment;
3. Training;
4. Strategy/Hoshin Planning;
5. Continuous Improvement;
6. Metrics;
7. Value Stream Mapping;
8. Set Up Reduction;
9. Supply Chain;
10. Standard Work;
11. Six Sigma;
12. Material Flow;
13. Visual Control;
14. TPM;
15. 5S+1.

Per ogni categoria vengono poste delle descrizioni di situazioni o condizioni tipo alle quali si risponde dando un valore da 0 a 3 per indicare una condizione esistente o meno, da inserire nella colonna indicata dal numero stesso. A seconda del valore dato viene calcolato un punteggio che corrisponde all'average score, dato dal totale del punteggio (somma dei numeri inseriti nella tabella) diviso il numero delle domande:

average score= somma numeri inseriti/ numero domande

Di seguito viene mostrato l'assessment nella sua struttura (Fig 3.17). Nelle prime due tabelle viene mostrato come deve avvenire la risposta alle domande e l'inserimento dei numeri.

Fig 3.17: The Power Lean Assessment (www.ame.org)

	Score	0	1	2	3	
	Commitment - Mgmt. considers Lean principles in all aspects of plant operation. Organizational structure promotes the concepts of value-added flow, pull, and the pursuit of perfection.	Condition does not exist	Condition somewhat exists	Condition exists to a high degree	Condition exists to the fullest extent	**Notes/Comments**
1	Use of Hoshin Planning or a similar strategic planning tool, Lean, and Six Sigma tools are well established and continuous improvement is pursued in everything we do.			2		Establish clear links between the strategic plan and lean manufacturing techniques that will improve performance in throughput, reduce overtime, reduce set-up time and equipment downtime.
2	Hoshin Planning or similar strategic planning tool is in place and all process improvement activities are funneled through the Strategic Steering Committee to prioritize		1			At a minimum bi-weekly Strategic Planning Meetings should be held to review performance to key metrics and reallocate resources as needed.
3	All members of Mgmt. have been educated in Lean concepts and a formal implementation plan exists			2		Schedule Lean Overview Training for key employees ASAP.
4	Some members of Mgmt are aware of Lean concepts and sporadic use of Lean and Six Sigma tools exist.				3	
5	Mgmt. is aware of Lean concepts and is not interested in exploring the benefits of implementing the philosphy.		1			
	Average Score	1,8				

	Score	0	1	2	3	
	Empowerment - Plant personnel exhibit a positive team spirit along with intense loyalty and high motivation. Work practices promote personal productivity. Employee Promises are linked to the departmental and facility Strategic Plan to ensure alignment	Condition does not exist	Condition somewhat exists	Condition exists to a high degree	Condition exists to the fullest extent	**Notes/Comments**
1	The Strategic Plan communicates the Focus, Target, and Means necessary to reach the "Breakthrough Improvement" in the Target condition.			2		
2	The organizational structure is simple and flat (3 or fewer levels).		1			
3	The organization's structure is shaped around Lean concepts and strategic planning, resulting in high degrees of ownership at all levels.				3	
4	A rigorous, structured communications agenda is in place and adhered to.			2		
5	Multi-directional communication systems are in place, designed to generate 360 degree feedback.		1			
6	Teaming concepts are used to generate and implement continuous improvement.	0				
7	Job designs have moved from traditional single-task to muti-task formats. A premium on flexibility has emerged.			2		
8	Leadership styles have evolved from hierarchical to at least partially team based decision making.				3	
9	Information flow has been improved from a controlled, "need to know" basis to an open/sharing approach.		1			
10	Rewards and recognition systems have migrated away from individual to team based systems.			2		
	Average Score	1,7				

	Score	0	1	2	3	
	Training	Condition does not exist	Condition somewhat exists	Condition exists to a high degree	Condition exists to the fullest extent	**Notes/Comments**
1	Job skills training exists for all major processes and includes Standard Work documentation posted in the work area for all positions.					
2	Performance criteria is clearly established and is enforced (jobs skills training).					
3	Metrics in place to measure the training effort, including effectiveness; a direct link to productivity has been established.					
4	Training program includes all key ESH elements but is largely focused on job skills and improved flexibility.					
5	Deployment of training program is planned and delivered per a set schedule; resources are planned for.					
6	A cross training matrix exists for each major process and is updated and visually posted.					
7	The Continuous Improvement Manager is well grounded in Lean and Sigma Tools and techniques.					
8	A basic Lean training course has been conducted with all employees.					
9	Employees are aware of basic business conditions and drivers and understand how their performance impacts success.					
10	Employees know who internal and external customers of their products are and understand fundamental customer needs.					
11	Employees understand more than just the "trouble-free" operation of their equipment and are able to perform initial troubleshooting and basic maintenance items.					
12	Employees share best practices regarding equipment operation with each other and have input in procedure and training improvements.					
	Average Score	#DIV/0!				

	Score	0	1	2	3	
	Strategy/Hoshin Planning - The Hoshin Plan or similar planning tool is a living document and regularly scheduled meetings are held to review progress in reaching the goals outlined in the Target Condition. Rapid Improvement Events and Black Belt Projects are approved, prioritized, scheduled, and monitored. Resources are allocated to ensure the "Means" are available to reach the Target Condition outlined in the Hoshin Plan.	Condition does not exist	Condition somewhat exists	Condition exists to a high degree	Condition exists to the fullest extent	**Notes/Comments**
1	A multi year Hoshin Plan or similar strategic plan has been established that links long term business objectives and strategies to short term action plans.					
2	The business team has developed clearly stated global performance targets (specific product costs, lead-times, & dates). Targets are linked to plan achievement dates.					
3	Capital planning is based on Hoshin Plan or similar strategic planning tool and justification is derived from the Target Condition commitments					
4	The planning process begins with the needs of the Customer and Corporate business objectives					
5	Customers and suppliers are actively engaged (as business partners) in the overall Lean transformation process.					
	Average Score	#DIV/0!				

	Score	0	1	2	3	
	Continuous Improvement	Condition does not exist	Condition somewhat exists	Condition exists to a high degree	Condition exists to the fullest extent	**Notes/Comments**
1	Favorable trends have been established in all key metrics (month to month).					
2	A Lean Champion is in place with responsibility to drive overall continuous improvement. Ideally this person reports to the Plant Manager.					
3	Training and education are viewed as investments and equate to over 100 hours per employee per year.					
4	External benchmarking is used constructively. "Pursuit of perfection" mentality exists.					
5	Broad based (top-down and bottom-up) processes are in place to generate improvement ideas and to cultivate ownership.					
6	Current State Conditions and Future State Goals and Objectives are clearly communicated to all employees.					
7	The improvement culture is such that some projects can gain support even if "bottom line" results are unclear (customer satisfaction, morale, etc.)					
8	Culture is such that decisions are made on a long-term rather than short-term basis.					
9	Kaizen events are documented.					
	Average Score	#DIV/0!				

	Score	0	1	2	3	
	Metrics - Plant exhibits a culture of fact-based decision making. A broad program of data gathering exists employing the concepts of brainstorming, process mapping, and numerous data tools. Complexity is avoided and metrics are easily internalized by all employees.	Condition does not exist	Condition somewhat exists	Condition exists to a high degree	Condition exists to the fullest extent	**Notes/Comments**
1	Hourly Production goals and actuals are posted and visible to associates on the shop floor. An Operation Room is established with all key metrics posted with daily goals and actuals color coded to quickly communicate whether the targets were met. Daily goals and actuals are roll into month to date and year to date charts to easily communicate hits and misses. Owner's of metrics that miss the target are responsible for proposing and implementing short term countermeasures and developing long term solutions that eliminate the root cause for the miss. The Owner may elicit the help of the PI Experts in Lean and Six Sigma to help identify and eliminate the root cause.					
2	Cycle times and Takt times are calculated and posted with Standard Work to ensure operators understand the work content, sequence of events, and expecations					
3	Metrics have been adjusted and modified to "make sense" to the target audience (Standard WIP for shop personnel vs. days of inventory on hand for managers).					
4	Multi-year objectives have been established for all key metrics and are published on scheduled intervals.					
5	Reporting intervals have been minimized so as to establish a clear link between effort and result (performance results are shared in a near real-time fashion).					
6	Key metrics help facilitate the proper actions and behaviors to drive success.					
7	Metrics are tracked and posted near the employees closest to the activity (machine operator/mechanic for set-up time, lab tech for quality results, etc.)					
8	All posted metrics clearly display goal values.					
	Average Score	#DIV/0!				

	Value Stream Mapping	Condition does not exist	Condition somewhat exists	Condition exists to a high degree	Condition exists to the fullest extent	Notes/Comments
1	Manufacturing family definitions have been established based on process flows, routings, and unit volume information.					
2	VSM's exist for key manufacturing families and are updated regularly to show both current and future state conditions.					
3	Critical (pacing) process operations have been identified.					
4	VSM's are presented to and approved by top management on a scheduled frequency.					
5	Transformation plans are detailed with names/dates and are visible. Obvious progress is being made per schedule.					
6	Extended value stream thinking is in place, bringing customers and suppliers into the process.					
	Average Score	#DIV/0!				

	Score	0	1	2	3	
	Set-up Reduction	Condition does not exist	Condition somewhat exists	Condition exists to a high degree	Condition exists to the fullest extent	Notes/Comments
1	Set-up procedures are documented and posted.					
2	A structured process is in place to reduce set-up times. Program elements include new machine design specification, tooling, off-line kitting, and operator training.					
3	A closed loop system is in place to link best practice procedures, including latest kaizen results, to formal training program.					
4	Only minimal variation exists between operators on set-up sequence and methodology.					
5	Critical set-ups are measured and posted against published targets (as per VSM)					
6	Average set-up times are < takt time (or <10 minutes if takt time unknown) on critical equipment.					
	Average Score	#DIV/0!				

	Score	0	1	2	3	
	Supply Chain	Condition does not exist	Condition somewhat exists	Condition exists to a high degree	Condition exists to the fullest extent	Notes/Comments
1	Key supplier on-time delivery is >99%.					
2	Just-in-time delivery frequency established for all key suppliers (turns on raw material >10).					
3	All key suppliers are certified for "Dock to Stock" status, requiring only skip lot (audit) incoming receiving inspection.					
4	Suppliers embrace Lean as a way of life as evidenced by favorable trends for cost/price; quality and delivery performance is world class.					
5	Point of sale data is automatically transmitted to manufacturing to drive replenishment.					
6	Customer service performance is measured and is considered to be world class (based on business type, MTO, MTS, etc.)					
7	A variety of collaborative processes exist to engage both suppliers and customers in managing and improving the overall supply chain.					
	Average Score	#DIV/0!				

	Score	0	1	2	3	
	Standard Work	Condition does not exist	Condition somewhat exists	Condition exists to a high degree	Condition exists to the fullest extent	**Notes/Comments**
1	SW documents are posted at all operations and reflect latest best practice agreements (set-up instructions, process sequence, operator daily inspection or TPM check list).					
2	All key process/operating parameters are visually documented and only minimum variation is observed.					
3	Compliance to standards is audited an monitored.					
4	Takt time is known & understood by all employees, actual work pace is measured/controlled, pitch dictates flow.					
5	A closed loop system is in place to control and update procedures, documents, and training materials.					
	Average Score	#DIV/0!				

	Score	0	1	2	3	
	Six Sigma	Condition does not exist	Condition somewhat exists	Condition exists to a high degree	Condition exists to the fullest extent	**Notes/Comments**
1	All key processes mapped including all PIV's and POV's with Rolled Throughput Yield from each process step.					
2	Cpk >1.33 for critical processes based on CTQ's or KPIV's. Gage R&R <30% on all critical measurement systems.					
3	Mistake proofing devices in place on a widespread basis, technology being used to automate poka yoke devices.					
4	Defect per million opportunities systems and metrics in place, DPMO rates <10. Control plans in place.					
5	Critical To Quality (CTQ) items identified using customer input.					
6	Cause and Effect Matrices completed for each process step, identifying predicted relationships between PIV's and POV's (CTQ's). Initial KPIV's and KPOV's identified.					
7	Customer requirements (specs) identified for each CTQ.					
8	All CTQ's measured and/or verified.					
9	Process Control charts maintained for each CTQ (KPIV) with customer specs.					
10	Basic relationships established between PIV's and KPOV's (Multi-Vari study, Main Effects plots, etc). KPIV's identified.					
11	All KPIV's measured, measurement systems validated with R&R values <30%.					
13	Failure Modes and Effects Analysis completed for all KPIV's.					
14	Clear, statistically significant relationships established between KPIV's and KPOV's (ANOVA, etc).					
15	Realistic tolerancing completed on KPIV's.					
16	SPC charts maintained and utilized for each KPIV. Variation identified.					
17	Capability analysis performed with respect to KPIV's. Variation identified.					
18	Designed Experiments used to optimize KPIV setups to reduce variation in KPOV's.					
19	Improvements implemented from FMEA, RPN's reduced. DOE results utilized to reduce variation (waste) in process.					
20	Capability studies show increased Cpk.					
21	Control plan implemented to sustain the gain (procedures updated, instrumentation improved, spec sheets modified, equipment installed, etc.)					
	Average Score	#DIV/0!				

	Score	0	1	2	3	
	Material Flow	Condition does not exist	Condition somewhat exists	Condition exists to a high degree	Condition exists to the fullest extent	**Notes/Comments**
1	Value streams have evolved to a mature, integrated state, value add ratios >25%.					
2	One piece flow dominates, transfer batches, when required, have been leveled and are controlled by pitch.					
3	All material flows are based on PULL signals that are controlled by customer demand and/or internal consumption.					
4	All inventory buffers are planned, sized, and controlled.					
5	Value stream design determines inventory levels & cycle time.					
	Average Score	#DIV/0!				

	Score	0	1	2	3	
	Visual Control	Condition does not exist	Condition somewhat exists	Condition exists to a high degree	Condition exists to the fullest extent	**Notes/Comments**
1	Visual controls are in place for all key work processes, "explaining" work content, sequence, and method.					It should be very easy to separate normal from abnormal conditions on the manufacturing floor. Highly visual real time production numbers posted in relation to takt time.
2	The organization uses a standard visual communication system throughout all work areas including offices.					
3	Visual control signals have been automated and are updated frequently.					Use of color coded stack lights to visually communicate operating status of key equipment.
4	Visual controls are easy to understand and visitors can "read the workplace" with little help.					
5	Visual controls are utilized to display and communicate performance to stated goals and objectives.					
6	Procedures for the unplanned and abnormal are controlled through visual processes.					
7	A closed loop process is in place to update and maintain visual documents as improvements are adopted as standard work.					
	Average Score	#DIV/0!				

	Score	0	1	2	3	
	TPM - This section deals with the facilities ability implement a comprehensive Total Productive Maintenance Program that improves the percent of planned maintenance, autonomous operator involvement, and OEE. TPM Small Groups should be in place following a carefully planned agenda, that reviews downtime data, paretos causes, and initiates events/projects that eliminate root cause and improve OEE. PM's are complete, accurate, and visibly posted and audited by the TPM Small Group to ensure they are fully completed on time. (Use TPM Small Group Templates)	**Condition does not exist**	**Condition somewhat exists**	**Condition exists to a high degree**	**Condition exists to the fullest extent**	**Notes/Comments**
1	Maintenance is viewed as a value add function by all areas (Staff, operating departments, engineering, maintenance).					
2	All aspects of TPM and TPM Small Group Concepts have been successfully implemented.					
3	An on-going skills enhancement program is in place for skilled craft. Retention rates are >99%.					
4	A formal planning and scheduling process has been established with clear responsibilities assigned.					
5	Proper metrics have been established and are being posted to evaluate both effectiveness and efficiency of the maintenance process.					
6	Greater than 80% of maintenance activities are planned for and are preventive or predictive in nature.					
7	An effective Maintenance Management system is in place that provides work order management, equipment history, cost/labor information, and spare parts control.					
8	Maintenance management system integrates all maintenance information needs.					
9	Data from the Copics is considered to be accurate and can be easily accessed.					
10	PMs are comprehensive and include desired & recorded observations.					
11	PMs include operator level tasks.					
12	PM compliance is measured and is above 95%.					
13	Spare parts listings and inventories are maintained and controlled. Inventory record accuracy is high.					
14	Spare parts inventory levels are periodically reviewed and adjusted to reflect current conditions.					
15	Equipment histories are detailed with spare parts usage, failure reporting, etc.					
16	Predictive techniques such as oil and wear particle analysis, vibration analysis, corrosion analysis, and thermography are used in a preemptive fashion.					
17	Equipment Strategies are performed by TPM Small Groups on a regular basis with high success in achieving Maintenance Excellence objectives.					
18	Average Downtime of all major equipment <3% operating schedule.					
	Average Score	#DIV/0!				

	Score	0	1	2	3	
	5S+1	Condition does not exist	Condition somewhat exists	Condition exists to a high degree	Condition exists to the fullest extent	**Notes/Comments**
1	Expected standards are posted and workplace indicates that 5S activities are in compliance. Aisleways and workstations are unobstructed, organized, and clean.					Organize a 5S Blitz team to sort & clean aisleways and around machinery - Document with before & after photos & post for visualization.
2	Regular audits/inspections are taking place and audit scores are posted with action items necessary to raise the score.					Restructure current Housekeeping Audits to include 5S standards (see example)
3	Results of audits are posted and communicated as they occur.					Identify & standardize area for the housekeeping audit scores - Communicate in daily huddles
4	Audit action items are resolved in a timely, appropriate time frame.					Include 5S audit action items in daily staff meeting
5	Machine leaks have been eliminated. **NA**					PM schedules should include machine/air leaks
6	A regular "red tag" process has been established.					Red Tag process should be implemented to eliminate unecessary equipment and items (see examples)
7	Operators can explain the importance of 5S as it relates to the overall Lean initiative.					Schedule 5S training for all employees
8	Active, structured ESH program is in place.					Establish systems to monitor effectiveness of current Safety process
9	OSHA total recordable incident rate at or below budget					Identify areas of high accident frequency and conduct RIE to eliminate root causes
10	Regular ESH audits are conducted and reviewed by upper management.					
11	Employees are wearing appropriate PPE.					
12	Aisleways and workstations are unobstructed, organized, and very clean.					Organize a 5S Blitz team to sort & clean aisleways and around machinery - Document with before & after photos & post for visualization.
13	Machine guarding is adequate and differentiated by color.					Add hand rail or equivalent to the walk over at the Dry Saw
14	The Lock Out/ Tag Out system is always used.					
	Average Score	#DIV/0!				

Il punteggio per ogni categoria viene poi visualizzato in una tabella (Tab 3.7). Il Current score viene calcolato moltiplicando il numero delle domande per l'average score. Il "2008 target" è un valore di riferimento che si voglia supporre di raggiungere in quel determinato anno. La "% of Max score" viene ricavata andando a dividere il "Maximum %" con il rapporto tra il "Maximum Total Score" e il Current score.

Current score= Numero domande average score*

% of Max Score= Maximum% / (Maximum Total Score/ Current score)

Nelle prime due tabelle (Fig 3.17) è stato dato un esempio di come andare a segnare all'interno i numeri riguardanti la situazione a cui si pensa di trovarsi con la propria azienda per la pratica considerata. Nella tabella che segue vengono riportati i valori ritrovati nelle due tabelle e poi riportati nel radar chart (Fig 3.18): con colore verde la situazione attuale, in rosa l'obiettivo da raggiungere nell'anno, in blu l'esterno rappresentante la condizione lean ottimale.

Lean Category	Average Score	Current Score	Number of Questions	Maximum Total Score	2008 Target	Maximum %	% of Max Score
Commitment	1,8	9,00	5	15	60%	100%	60%
Empowerment	1,70	17,00	10	30	60%	100%	57%
Training	#DIV/0!	#DIV/0!	12	36	60%	100%	#DIV/0!
Strategy/Hoshin Planning	#DIV/0!	#DIV/0!	5	15	60%	100%	#DIV/0!
Continuous Improvement	#DIV/0!	#DIV/0!	9	27	60%	100%	#DIV/0!
Metrics	#DIV/0!	#DIV/0!	8	24	60%	100%	#DIV/0!
Value Stream Mapping	#DIV/0!	#DIV/0!	6	18	60%	100%	#DIV/0!
Set-up	#DIV/0!	#DIV/0!	6	18	60%	100%	#DIV/0!
Supply Chain	#DIV/0!	#DIV/0!	8	24	60%	100%	#DIV/0!
Standard Work	#DIV/0!	#DIV/0!	6	18	60%	100%	#DIV/0!
Six Sigma	#DIV/0!	#DIV/0!	21	63	60%	100%	#DIV/0!
Material Flow	#DIV/0!	#DIV/0!	5	15	60%	100%	#DIV/0!
Visual Controls	#DIV/0!	#DIV/0!	7	21	60%	100%	#DIV/0!
TPM	#DIV/0!	#DIV/0!	18	54	60%	100%	#DIV/0!
5S and Safety	#DIV/0!	#DIV/0!	14	42	60%	100%	#DIV/0!

Tab 3.7: Tabella riassuntiva dei risultati ottenuti

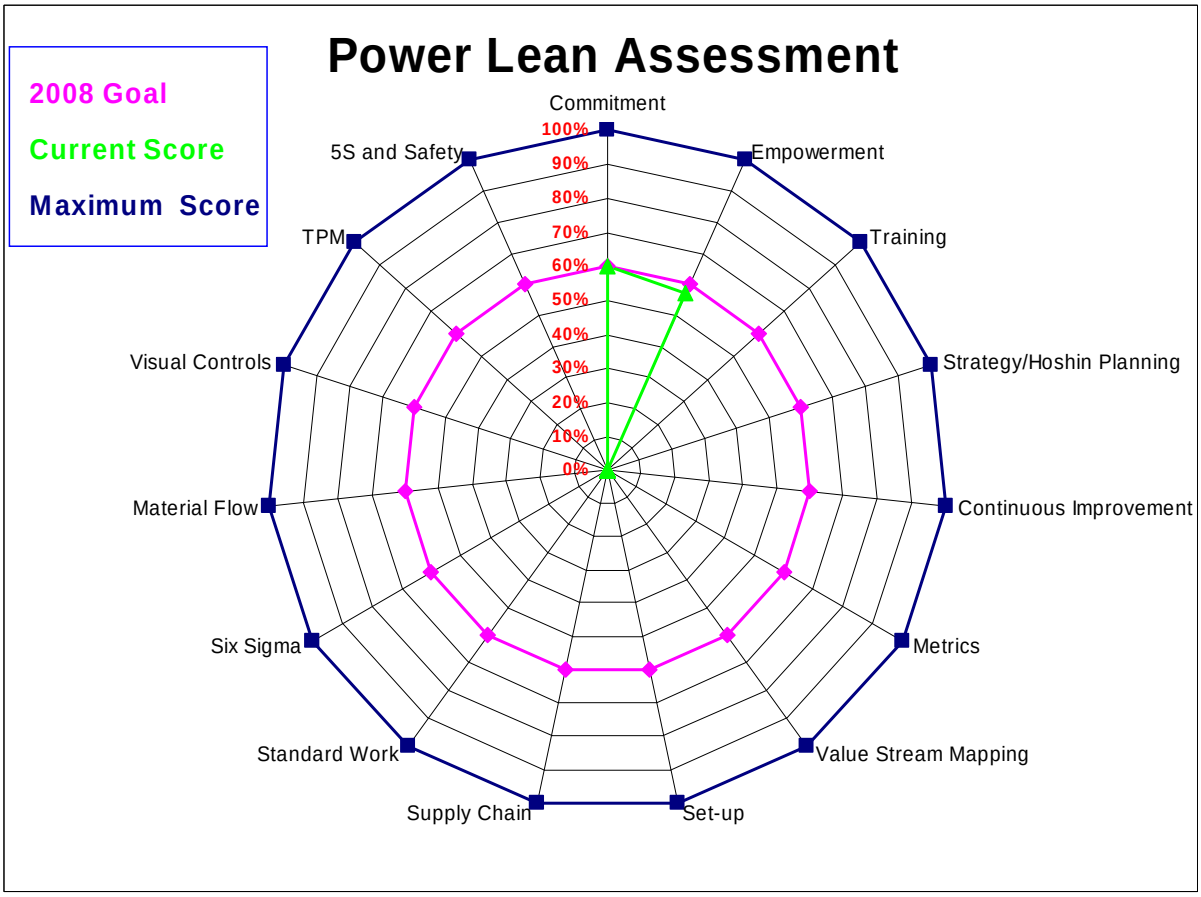


Fig 3.18: Radar chart

3.9 – LEAN ASSESSMENT TOOL (PROCESS COACHING INCORPORATED)

Nel seguente assessment sono considerate sette categorie principali:

1. Workplace Organization (5S);
2. Single Part Flow;
3. Built in Quality;
4. Associate Participation;
5. Visual Management;
6. Continuous Improvement;
7. Supply Chain Management.

Come negli altri tool, anche in questo per ogni categoria vengono introdotte delle sottocategorie che riguardano nello specifico la pratica adottata. Per ogni sottocategoria viene data una descrizione di una condizione tipo. A seconda di quella in cui ci si trova si dà un voto. Ad esempio se si pensa di essere nella prima colonna ma più vicini alla seconda, anche se non del tutto, si può dare come punteggio 4 o 5 in quanto per trovarsi nella condizione descritta nella seconda colonna bisogna dare minimo 6. Lo stesso vale se si crede di essere vicini alla situazione della terza e quindi inserire come punteggio, per esempio, 8. Il punteggio totale viene trovato andando a sommare i punteggi inseriti e dividendolo per il totale delle domande.

In fig 3.19 viene mostrato l’assessment nella sua struttura.

Fig 3.19: Struttura del Lean Assessment Tool (Fonte: www.processcoachinginc.com)

1. Workplace Organization (5S)

Category	Valuation Factors			Valuation Comments	Valuation Rating
	1	6	10		
Safety	Unsafe, many hazards, policies loosely enforced, local ordinances violated	Moderately safe. Few hazards, policies enforced somewhat, general local compliance	Very safe, no hazards, rigid adherence to policies, full local compliance		**3**
Lighting / Brightness	Poorly lit, dingy, looks like a cave, no fresh paint	Moderately lit, some fresh paint in offices, ceilings, walls, machines, floor	Brightly lit, freshly painted floors, ceilings, offices, machines and walls		**2**
Cleanliness	Very dirty, floors not clean, dust / oil on machines, desks and chairs dirty	Generally clean, floors, offices, machines somewhat clean, some end of shift cleaning	Offices / factory immaculate, no dust and oil on machines, floors free of debris		**3**
Order	Very cluttered, lots of junk in aisles and work areas, desks and cabinets disorganized	Some training at associate level	Only critical items on shop floor, offices and work areas clear, marking on floor and use of shadow boards		**1**
Overall	Pig Sty	OK, but not great	Looks like a hospital		**2,25**

2. Single Part Flow

Category	Valuation Factors			Valuation Comments	Valuation Rating
	1	6	10		
Continuous Flow Manufacturing	Disjointed operations, colonies of machines, large batches of parts	Some processes in continuous flow	High degree of continuous flow, small batch sizes for remaining batch processes		**3**
Pull Scheduling	No pull scheduling, heavy MRPI use, build to forecast philosophy	Some pull scheduling via Kanban system on shop floor, not linked to customer of supplier, primarily build to forecast	Full Kanban use from customer orders, MRPI for planning only and long lead release, build to customer demand		**2**
Line Change - Over Machine Setup	Long Hours	Some short changeovers, most long	Assembly line changeover in one takt time, batch changeovers less than 10 minutes		**3**
Equipment Management	None, fix it when it breaks	Some training at associate level	Full implementation of TEM Program		**1**
Manufacturing Process Engineering	Designing machinery large lot sizes, long set up times, knowledge of process limited	In between	Designing machinery for flow and not for capacity, fully present on factory floor, full process and product knowledge		**5**
Overall	Mass Producer	In between	True lean producer		**2,8**

3. Built in Quality

Category	Valuation Factors			Valuation Comments	Valuation Rating
	1	6	10		
Equipment Designs to detect defects and stop production	None	Some machines have self stop capability	All machines stop automatically when defects are detected		**0**
Operators authority to stop production for the quality defects	None	Operators have authority to stop but use it only sporadically	Operators have authority and responsibility to stop line, individual quality is fully internalized.		**0**
Mistake Proofing to prevent defects	None	Partial implementation for critical processes	Full implementation on all processes		**0**
FIFO Inventory Controls	None	Some training at associate level	Rigidly adhered to, easy to use, flow through racks		**0**
Root Cause Problem Solving	Rare; Fixing Quality Problems is not a priority	Sporadic, Problem solving stops at easiest solution, not correct solution	Rigorous use of Problem Solving. Key persons trained in problem solving systems		**0**
Use of SPC	None	Approximately 50% of key processes control to six sigma levels	All processes controlled to six sigma levels		**0**
Incoming Products and Material Quality	No self certified suppliers	Some suppliers are self certified and consistent quality is experienced	All key suppliers are self certified and supply agreed upon quality products		**0**
Standardized Work	None	Visual work instructions in place; consistent application of work instruction to production	Visual Standardized Work and combination charts are developed and displayed in the work cells		**0**
Overall	Questionable Quality	Average Quality	Six Sigma Producer		**0**

4. Associate Participation

Category	Valuation Factors			Valuation Comments	Valuation Rating
	1	6	10		
Autocratic versus participate management	Autocratic, Theory X Management	Mixed autocratic and participate management style	Participate management style with strong employee input and strong manager leadership		**0**
Self Directed Work Teams	None	Some implementation of self directed teams	Operators have authority and responsibility to stop line, individual quality is fully internalized		**0**
Team Empowerment	None	Some, but largely in name only	High degree of team Empowerment to make key decisions		**0**
Lean Skill Building	None	Some training at associate level	Full understanding at associate level of Lean Production System		**0**
Overall	Traditional, Autocratic	Transitioning to team environment	Full implementation of empowered teams, a real lean facility.		**0**

5. Visual Management

Category	Valuation Factors			Valuation Comments	Valuation Rating
	1	6	10		
Visual Performance Charts	None, management by computer reports, key performance data available to select few	Some use of visual display techniques, data available to certain levels	Clear visual display of plant performance and team performance at work cells or meeting areas		**0**
Warehouse Inventory Control	Inventory in random access supermarkets, only computer knows, no visual control	Some implementation of visual inventory control	Delivery location and end user location clearly defined with visual label used		**0**
Shop Floor WIP Inventory Control	Minimal visual control inventory stacked in work stations in random order	Approximately 50% implementation of shop floor WIP control	Clear fixed locations with FIFO controls, Kanban squares used for floor WIP		**0**
Use of Visual Charts	None	Some training at associate level	Operators and office personnel use factory and office charts to manage their daily work		**0**
Visual Indicators Updated	Seldom updated	Some updates weekly or monthly, implemented by manager	Operators and office personnel update charts and visual information displays continuously		**0**
Overall	Traditional company information management	In between	Fully Visual Company		**0**

6. Continuous Improvement

Category	Valuation Factors			Valuation Comments	Valuation Rating
	1	6	10		
PCR and Process Change Implementation	None	Process in place but each request had to get in line, occasional response to requests	All company organizations available and respond to rapid change and support within 48 hours		**0**
Operators and office personnel meetings	Occasionally, once or twice a month	Some implementation of information meetings but not systematic and widespread	Meetings held every day for 10 minutes and once a week for 1/2 hour		**0**
Continuous Improvement teams	None	Some, but largely in name only, limited Empowerment to realize change	Large number of teams with established rules for meetings, clear improvement results attainable in short term		**0**
Waste Culture	None	Some training at associate level	Fully committed to eliminating waste		**0**
Overall	Talk the talk but don't walk the walk	In between	Full walking the walk, true lean environment		**0**

7. Supply Chain Management

Category	Valuation Factors			Valuation Comments	Valuation Rating
	1	6	10		
Acquisition Team Formation	Little to no acquisition team activity	Acquisition Teams established for key suppliers or commodities	Acquisition teams are conducting regular management reviews with key suppliers or commodities		**0**
Price Benchmarking	Price benchmarking / target costing activities not being conducted	Some understanding of competitive position of key commodities. Beginning to implement target costing concepts	Extensive understanding of competitive marketplace / target costing approaches utilized		**0**
Supplier Quality	No SQA activity. Reject bad components mentality	Limited involvement with key suppliers in problem solving activities / defect prevention activities	Deployment of quality management tools and supplier stratification methodologies to enhance supplier development		**0**
Cost Management	Quote and source mentality	Some integration of supplier capability / suggestions into system design	Use of target pricing models, VA/VE Models in design of components and sourcing		**0**
Overall					**0**

Nelle prime due tabelle sono stati inseriti dei punteggi in modo da mostrare come funziona il calcolo del punteggio totale.

All'interno del tool c'è una tabella riepilogativa (Tab 3.8) dei risultati ottenuti: per ogni sottocategoria viene data una descrizione della situazione in cui ci si trova (la stessa che si trova nella struttura dell'assessment) e, a seconda del punteggio risultante, si può capire come il proprio processo, sistema di produzione o l'azienda stessa si sta trasformando o implementando la logica lean (traditional, beginning lean, world class) per quella data pratica.

L'assessment può essere utilizzato più volte. Nella tabella ci sono due colonne: beginning result, current result. Nella prima colonna viene indicato il risultato che si ottiene utilizzando la prima volta il tool (che sarà poi anche quello corrente); nella seconda colonna verrà visualizzato il risultato che si otterrà andando a riproporre l'assessment.

Date: October 16, 2007

	Factor	Beginning Result	Current Result	TRADITIONAL	BEGINNING LEAN	WORLD CLASS
				1	6	10
1. Workplace Organization (5S)	Safety	3	3	Unsafe, many hazards, policies loosely enforced, local ordinances violated	Moderately safe. Few hazards, policies enforced somewhat, general local compliance	Very safe, no hazards, rigid adherence to policies, full local compliance
	Lighting / Brightness	2	2	Poorly lit, dingy, looks like a cave, no fresh paint	Moderately lit, some fresh paint in offices, ceilings, walls, machines, floor	Brightly lit, freshly painted floors, ceilings, offices, machines and walls
	Cleanliness	3	3	Very dirty, floors not clean, dust / oil on machines, desks and chairs dirty	Generally clean, floors, offices, machines somewhat clean, some end of shift cleaning	Offices / factory immaculate, no dust and oil on machines, floors free of debris
	Order	1	1	Very cluttered, lots of junk in aisles and work areas, desks and cabinets disorganized	Some training at associate level	Only critical items on shop floor, offices and work areas clear, marking on floor and use of shadow boards
2. Single Part Flow	Continuous Flow Manufacturing	3	3	Disjointed operations, colonies of machines, large batches of parts	Some processes in continuous flow	High degree of continuous flow, small batch sizes for remaining batch processes
	Pull Scheduling	2	2	No pull scheduling, heavy MRPI use, build to forecast philosophy	Some pull scheduling via Kanban system on shop floor, not linked to customer of supplier, primarily build to forecast	Full Kanban use from customer orders, MRPI for planning only and long lead release, build to customer demand
	Line Change - Over Machine Setup	3	3	Long Hours	Some short changeovers, most long	Assembly line changeover in one takt time, batch changeovers less than 10 minutes
	Equipment Management	1	1	None, fix it when it breaks	Some training at associate level	Full implementation of TEM Program
	Manufacturing Process Engineering	5	5	Designing machinery large lot sizes, long set up times, knowledge of process limited	In between	Designing machinery for flow and not for capacity, fully present on factory floor, full process and product knowledge
3. Built in Quality	Equipment Designs to detect defects and stop production	0	0	None	Some machines have self stop capability	All machines stop automatically when defects are detected
	Operators authority to stop production for the quality defects	0	0	None	Operators have authority to stop but use it only sporadically	Operators have authority and responsibility to stop line, individual quality is fully internalized.
	Mistake Proofing to prevent defects	0	0	None	Partial implementation for critical processes	Full implementation on all processes
	FIFO Inventory Controls	0	0	None	Some training at associate level	Rigidly adhered to, easy to use, flow through racks
	Root Cause Problem Solving	0	0	Rare; Fixing Quality Problems is not a priority	Sporadic, Problem solving stops at easiest solution, not correct solution	Rigorous use of Problem Solving. Key persons trained in problem solving systems
	Use of SPC	0	0	None	Approximately 50% of key processes control to six sigma levels	All processes controlled to six sigma levels
	Incoming Products and Material Quality	0	0	No self certified suppliers	Some suppliers are self certified and consistent quality is experienced	All key suppliers are self certified and supply agreed upon quality products
	Standardized Work	0	0	None	Visual work instructions in place; consistent application of work instruction to production	Visual Standardized Work and combination charts are developed and displayed in the work cells
4. Associate Participation	Autocratic versus participate management	0	0	Autocratic, Theory X Management	Mixed autocratic and participate management style	Participate management style with strong employee input and strong manager leadership
	Self Directed Work Teams	0	0	None	Some implementation of self directed teams	Operators have authority and responsibility to stop line, individual quality is fully internalized
	Team Empowerment	0	0	None	Some, but largely in name only	High degree of team Empowerment to make key decisions
	Lean Skill Building	0	0	None	Some training at associate level	Full understanding at associate level of Lean Production System
5. Visual Management	Visual Performance Charts	0	0	None, management by computer reports, key performance data available to select few	Some use of visual display techniques, data available to certain levels	Clear visual display of plant performance and team performance at work cells or meeting areas
	Warehouse Inventory Control	0	0	Inventory in random access supermarkets, only computer knows, no visual control	Some implementation of visual inventory control	Delivery location and end user location clearly defined with visual label used
	Shop Floor WIP Inventory Control	0	0	Minimal visual control inventory stacked in work stations in random order	Approximately 50% implementation of shop floor WIP control	Clear fixed locations with FIFO controls, Kanban squares used for floor WIP
	Use of Visual Charts	0	0	None	Some training at associate level	Operators and office personnel use factory and office charts to manage their daily work
	Visual Indicators Updated	0	0	Seldom updated	Some updates weekly or monthly, implemented by manager	Operators and office personnel update charts and visual information displays continuously
6. Continuous Improvement	PCR and Process Change Implementation	0	0	None	Process in place but each request had to get in line, occasional response to requests	All company organizations available and respond to rapid change and support within 48 hours
	Operators and office personnel meetings	0	0	Occasionally, once or twice a month	Some implementation of information meetings but not systematic and widespread	Meetings held every day for 10 minutes and once a week for 1/2 hour
	Continuous Improvement teams	0	0	None	Some, but largely in name only, limited Empowerment to realize change	Large number of teams with established rules for meetings, clear improvement results attainable in short term
	Waste Culture	0	0	None	Some training at associate level	Fully committed to eliminating waste
7. Supply Chain Management	Acquisition Team Formation	0	0	Little to no acquisition team activity	Acquisition Teams established for key suppliers or commodities	Acquisition teams are conducting regular management reviews with key suppliers or commodities
	Price Benchmarking	0	0	Price benchmarking / target costing activities not being conducted	Some understanding of competitive position of key commodities. Beginning to implement target costing concepts	Extensive understanding of competitive marketplace / target costing approaches utilized
	Supplier Quality	0	0	No SQA activity. Reject bad components mentality	Limited involvement with key suppliers in problem solving activities / defect prevention activities	Deployment of quality management tools and supplier stratification methodologies to enhance supplier development
	Cost Management	0	0	Quote and source mentality	Some integration of supplier capability / suggestions into system design	Use of target pricing models, VA/VE Models in design of components and sourcing

Summary Results

1. Workplace Organization (5S)	2,25	2,25
2. Single Part Flow	2,8	2,8
3. Built in Quality	0	0
4. Associate Participation	0	0
5. Visual Management	0	0
6. Continuous Improvement	0	0
7. Supply Chain Management	0	0

Tab 3.8: Tabella riepilogativa dei risultati

Alla fine vengono proposti 2 radar chart (Fig 3.20 e 3.21): sul primo viene visualizzato su ogni raggio il punteggio ottenuto per ogni categoria; nel secondo viene mostrato su ogni raggio il punteggio per ogni sottocategoria (34 point radar chart).

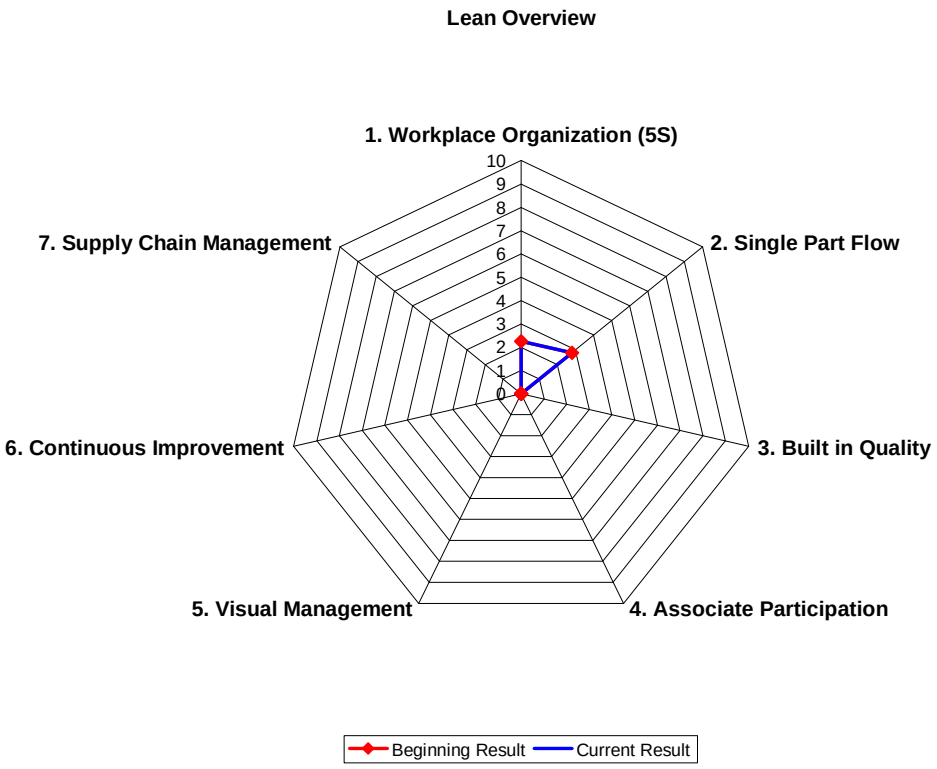


Fig 3.20: Radar chart rappresentante le categorie

In rosso viene segnato il risultato iniziale, in blu quello corrente (in questo caso entrambi i valori coincidono).

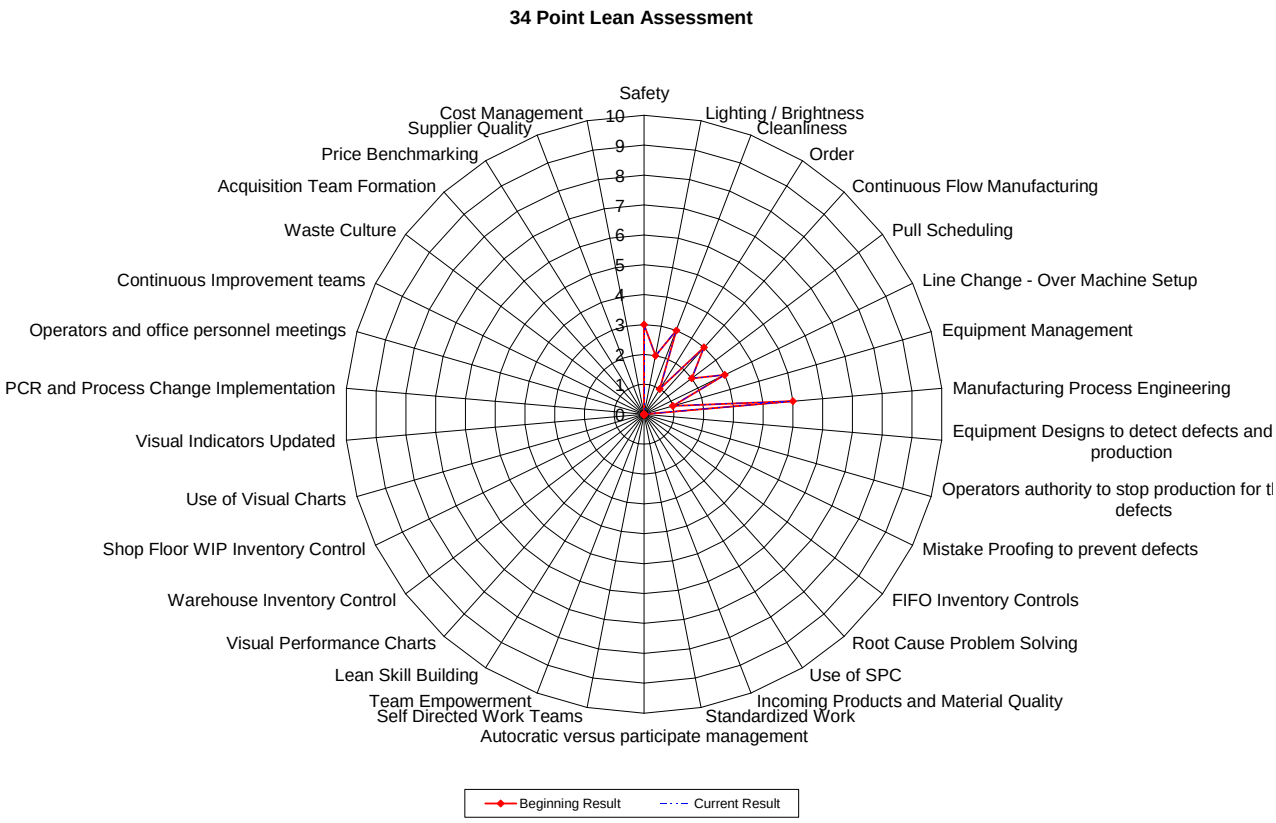


Fig 3.21: Radar chart rappresentante le sottocategorie

3.10 – LEAN ENTERPRISE SELF-ASSESSMENT TOOL (LESAT)

Il LESAT è un self-assessment usato per valutare quanto un'azienda è snella e quanto sia pronta al cambiamento. E' stato realizzato dalla LAI (Lean Advancement Iniziative) al Massachusetts Institute of Technology grazie alla partecipazione attiva del personale del Lai inglese e statunitense.

Il LESAT è composto da 15 categorie raggruppate in tre sezioni ognuna delle quali comprende delle pratiche, 54 in totale:

I sezione: Lean Transformation and Leadership;

II sezione: Life-Cycle Processes;

III sezione: Enabling Infrastructure.

Nella prima sezione troviamo sette categorie:

1. Enterprise Strategic Planning;
2. Adopt Lean Paradigm;
3. Focus on the Value Stream;
4. Develop Lean Structure and Behavior;
5. Create and Refine Transformation Plan;
6. Implement Lean Initiatives;
7. Focus on Continuous Improvement;

Nella seconda sezione troviamo sei categorie:

1. Business Acquisition and Program Management;
2. Requirements Definition;
3. Develop Product and Process;
4. Manage Supply Chain;
5. Produce Product;
6. Distribute and Service Product.

Nella terza sezione troviamo due categorie:

1. Lean Organizational Enablers;
2. Lean Process Enablers.

La struttura di tutte le tabelle presenti nel LESAT è di questo tipo (Fig 3.22):

Section, Group # and Group Name: Brief description of this Group number. In Section I, the Group is one of the Primary Activities from the Transition-to-Lean (TTL) Roadmap						
Diagnostic Questions	1.0 Generic questions regarding the performance of the enterprise relative to this Group of practices					
LP#	**Lean Practices**	**Capability Levels**				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
	A specific lean practice associated with this Group **Sound bit phrase**	Statement describing little awareness of this lean practice C D	C D	C D	C D	Statement describing world-class behavior for this lean practice C D
	Lean Indicators	Outcomes and lean behaviors that an enterprise will exhibit as it proceeds on its Lean transformation				
	Evidence	Supporting data utilized in assessing the current capability level of the Enterprise on this lean practice				
	Opportunities	Inputs to plans of action to leverage opportunities or to move to the desired level of capability				

Fig 3.22: Rappresentazione di una tabella tipo presente nel LESAT

Per ogni categoria viene data una descrizione della stessa, poi si trovano le domande riferenti. All'interno della tabella, per ogni pratica, troviamo diversi livelli rappresentanti una certa situazione. Lette le domande e le descrizioni, si deve dare una risposta corrispondente a quale livello ci si trova attualmente e a quale si desidera arrivare. Possono essere scritti anche commenti riguardanti esempi della propria situazione ed esempi per poter migliorare.

Di seguito viene mostrato l'assessment nella sua struttura (Fig 3.23).

Fig 3.23: Struttura del LESAT (Fonte: lean.mit.edu)

I.A. Strategic Planning and Leadership - the decision to implement and sustain a lean transformation is strategic in nature. Its impact throughout the organization is profound, and extends outward to both customers and external suppliers. The adoption of a lean vision affects all business practices and processes within the organization. The lean organization will behave in a new manner, not only identifying and eliminating waste, but focusing on enhancing the relationships with all the stakeholders inside, and in contact with, the organization

Diagnostic Questions

- Is your organization's leadership familiar with the dramatic increase in competitiveness that many companies have realized as a result of transitioning to lean?
- Are organization leaders fully aware of the potential opportunities afforded by a lean transformation? These opportunities include stabilized cash flow with partner companies, greater business growth and profitability, and increased market penetration.
- A lean transformation will free up resources otherwise occupied by wasteful practices. Has your organization identified a suitable strategy for growth to utilize resources freed up by improvements?
- Has your organization identified its "customer values"? Does customer value strongly influence the strategic direction of the organization?
- "Extended Enterprise Stakeholders" refers to key personnel both up and down the supply chain. This includes your organization's personnel, and management, as well as those of the organization's customer and suppliers. Does your organization's strategic plan leverage the various needs of these extended enterprise stakeholders? Has your organization formally identified its extended stakeholder network and their respective needs?

LP#	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
I.A.1	**Integration of Lean in Strategic Planning Process** Lean impacts growth, profitability, and market penetration.	Concepts and benefits of lean principles and practices are not evident in culture or business plans.	Lean is recognized, but relegated to lower levels of the organization and application of "lean" is fragmented.	The growth implications of lean are understood and lean implementation plans are formulated, but not integrated into the strategic plan.	Transitioning to lean is adopted as a key enterprise strategy and included in the strategic plan.	Strategic plans leverage the results of lean implementation to achieve growth, profitability, and market position
		☐ Current State ☐ Desired State	☑ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☑ Desired State	☐ Current State ☐ Desired State
	Lean Indicators (examples)	- Lean implementation is planned, and included explicitly in the organization's strategic plan. - Strategic planning makes allowance for anticipated gains from lean improvements - Strategic partnerships allow for smoothing payments to your organization to ease financial planning burdens and lower overall management costs				
	Write a few examples as evidence for your organization's current level					
	Write a few examples of opportunities for improvement					
I.A.2	**Focus on Customer Value - Customers create the requirements that "pull" value from the organization's value stream and set the strategic direction of the organization**	Means of defining value to customers is informal and unstructured	Structured process for defining customer value is applied to selected customers.	How the organization can best contribute to the customer's success is well-defined and incorporated into most of the organization's projects and programs	The customer definition of value strongly impacts your organization's strategic direction.	Competitiveness is enhanced as customer value becomes the predominant driving force throughout the extended enterprise.
		☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☑ Current State ☐ Desired State	☐ Current State ☑ Desired State	☐ Current State ☐ Desired State
	Lean Indicators (examples)	- Your organization employs a formal process for determining customer needs and communicating those needs to the employees. - Your organization understands what constitutes success in the "eye of the customer". - A formal process exists to measure and assess customer satisfaction. - Customer value and customer satisfaction strongly influence the way decisions are made in the organization.				
	Write a few examples as evidence for your organization's current level					
	Write a few examples of opportunities for improvement					
I.A.3	**The Extended Enterprise Picture - Your customer and your suppliers represent different ends of your value stream. The value streams from your customer, through your organization and to your suppliers, and so on...**	Relations with customers and suppliers reflects a "We-Them" mentality	Initial opportunities identified for establishing extended enterprise linkages. In other words, you have begun to look outside your organization to the adjacent links in your supply chain (i.e. customer and key suppliers)	Strategic planning process explicitly includes consideration of key stakeholders in the value stream.	Your organization collaborates with key suppliers in a strategic partnerships that serve your mutual needs and interests. This strategic partnership balances stakeholder values and improves working relationships with the key elements of the value stream	Integration of the extended enterprise contributes to overall improvement in innovation, growth, increased profitability, and market position for the strategic partners.
		☑ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☑ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State
	Lean Indicators (examples)	- When your organization conducts strategic planning, it is strongly influenced by stakeholder and customer value. - Your organization's strategic planning process looks outside the organization itself, to the customer, partners, suppliers, and employees that make up the value stream, - Your organization accepts some risk when planning supplier, customer, or partner activities and responsibilities, some of the risk is also shared by those same groups.				
	Write a few examples as evidence for your organization's current level					
	Write a few examples of opportunities for improvement					

I.B. Adopting the Lean Vision - An increase in Lean behavior beyond staffing reduction requires a deeper understanding of lean principles and a formal vision for its implementation. Transitioning to Lean requires a significant change to the business model of the enterprise. It is imperative that the enterprise leadership understands and buys into the lean vision, since they will be required to create a vision for doing business, behaving and seeing value in fundamentally different ways.

Diagnostic Questions

- Do your organization's leaders / senior management and "visionaries" understand the lean paradigm at the enterprise level?
- Does your organization's leadership enthusiastically support a transformation to lean? Do they "walk the talk"?
- Has a common vision of lean been communicated throughout your organization? Has it been communicated to your customers? Your suppliers? The extended enterprise? lean"?

LP#	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
I.B.1	**Learning and Education in "Lean" as it relates to your organization's leadership - "Unlearning" the old ways of doing business, and internalizing the lean paradigm.**	Little interest in learning lean principles is evident among your organization's leadership. Lean is treated as "just another method".	Your organization's leaders are actively seeking opportunities to learn about lean. There is a basic understanding of the value of a lean transformation.	Your organization's leaders are adopting lean learning and continuously applying lean principles across the internal operations of the organization.	Your organization's leadership contributes to the development and refinement of the body of knowledge about lean. In particular, they are able to adapt lean principles to the needs of your organization.	Lessons learned from lean implementation are actively shared across the organization and within the extended enterprise.
		☐ Current State ☐ Desired State	☑ Current State ☐ Desired State	☐ Current State ☑ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State
	Lean Indicators (examples)	- A formal lean education process for the organization leaders has been established. - A majority of your organization's senior management have received significant exposure and education in lean principles, practice, and behavior. - Your organization's leaders regularly apply and use "lessons learned" in lean.				
	Write a few examples as evidence for your organization's current level					
	Write a few examples of opportunities for improvement					

I.B.2	**Senior Management Commitment - Is your organization's senior management leading the Lean Vision personally?**	The level of commitment among the organization's senior management is variable - some endorse, while some may actively resist.	The senior management buys into your organization's group "vision". Those leaders / managers who will not adapt are replaced.	"Lean" is integral to the objectives of group and organization-wide meetings. Senior managers personally and visibly lead the lean transition.	Senior leaders in your organization are championing the transformation to lean. They clearly "believe" in lean, and are fairly relentless in their pursuit of lean in your organization.	The leadership championing described in level 4 is extended outside the organization to the extended stakeholder network.
		☑ Current State ☐ Desired State	☐ Current State ☑ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State
	Lean Indicators (examples)	- There is a uniform, consensus commitment support within your organization's leadership to transition to lean. - Your leadership seems excited and impatient to begin the lean transformation. - Management provides support and recognition for positive action towards a lean transformation, as well as for "lean acts" that improve the organization's profitability.				
	Write a few examples as evidence for your organization's current level					
	Write a few examples of opportunities for improvement					
I.B.3	**Lean Enterprise Vision - Does your organization have a new "mental model" of the enterprise?**	Senior Management and organization leaders have varying visions of "lean", ranging from none to well-defined.	Senior Management and organization leaders adopt a common vision of "lean".	Your organization's "lean vision" has been communicated and is understood by you, and most of the employees	A common vision of lean is shared by the extended enterprise. This means both inside and outside the organization, and extends to key customers and suppliers.	The enterprise stakeholders have internalized the lean vision, and are an active part of achieving it. Lean has become operating philosophy, not just a "program" requirement.
		☑ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☑ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State
	Lean Indicators (examples)	- The role that lean plays in achieving the vision is clearly defined. - Your organization's lean vision has been communicated to all levels and has extensive buy-in by most employees. - Your organization's lean vision incorporates a new mental model of how the organization would act and behave according to lean principles and practices. - Your organization's lean vision is compatible with, and compliments the lean vision of your customers and key suppliers.				
	Write a few examples as evidence for your organization's current level					
	Write a few examples of opportunities for improvement					
I.B.4	**A Sense of Urgency - Your organization's transformation to lean is organic, forming an integral element of a whole, and is seen as an urgent priority.**	Looking at your organization's competition and competitive environment identifies competitive threats and need for (change) actions.	Your organization's senior leadership has developed an urgent and compelling case for the lean transformation.	The urgent and compelling case for lean transformation has been communicated to everyone, and the organization rallies behind it.	Your organization's urgent and compelling case for lean is expanded to, and accepted by, key suppliers.	Your organization's urgent and compelling case for lean is expanded to and accepted throughout the extended enterprise.
		☐ Current State ☐ Desired State	☑ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☑ Desired State	☐ Current State ☐ Desired State
	Lean Indicators (examples)	- A compelling business case for lean has been developed and communicated. - The implications and time scales of the lean vision have been translated for each area of the extended enterprise (Including both customer and supplier value chains). - The lean transformation progress is integral to leadership discussions, decisions, and program events. - Customer value and customer satisfaction strongly influence the way decisions are made in the organization.				
	Write a few examples as evidence for your organization's current level					
	Write a few examples of opportunities for improvement					

I.C. Focus on the Value Stream - Creation of value and elimination of waste internal and external to the organization becomes the driving force for the organization and extended enterprise. The current means of delivering customer value are determined, followed by improving the value stream by minimizing waste. Lean metrics are specified and stakeholder involvement in the extended enterprise is clarified.

Diagnostic Questions	- Is a formal process utilized to explicitly determine "value" to the customer? - Have the value streams of all stakeholders been mapped? Integrated? Balanced against the needs of your organization and the overall extended enterprise? - Does your organization understand how material and information flow throughout various elements of the enterprise? - Has a system of balanced performance measures been established that reflect progress toward strategic *lean* business objectives? - Are enabling infrastructure (IT, procedures, organizational structure, rewards, etc.) processes being aligned to the value stream flow? - Does your organization, and everyone within it, clearly understand how it delivers value to the customer?

LP#	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
I.C.1	**Understanding the Current Value Stream** - Assessing how customer value is delivered (both upstream and downstream in the value chain).	The documented process flow differs from the actual flow. There is an initial understanding of the need for formal mapping and further analysis.	Key stakeholders and what they value are identified. Present processes are mapped and initial analysis is underway.	The principal (current) value streams are identified, and critical interactions of the value streams emerge. Significant opportunities for waste elimination and value creation are identified. These opportunities are aligned to the strategic objectives.	The value stream elements are understood with depth and breadth of knowledge. Supporting processes and their interdependencies across the organization are exposed and understood.	The (updated) value streams and their interdependencies are evaluated across the extended value stream (customers, suppliers and stakeholders).
		☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State
	Lean Indicators (examples)	- A formal process has been established for identifying customer and stakeholder value.. - The practice and language of value stream mapping is recognized as an important part of an iterative improvement process. - Current value stream maps of major customers/product lines have been mapped, and hand-off points and interfaces are clearly defined.				
	Write a few examples as evidence for your organization's current level					
	Write a few examples of opportunities for improvement					
I.C.2	**Enterprise Flow** - Re-evaluating "economies of scale" assumptions, and adopting "single piece flow" of materials as well as information.	Material and information flows are disjointed and "optimized" process by-process. "Pushing" the product or information through the system is the flow mentality.	Some primary information or process flow paths have been overhauled to overcome significant barriers to the flow.	Primary flow paths are simplified and aligned to the value stream(s), which allows information and material to flow as required.	Material and information flow seamlessly throughout the organization, "pulled" by the need for the product, process, or information.	Material and information flow seamlessly and responsively throughout the extended enterprise, both up and downstream in the value stream.
		☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State
	Lean Indicators (examples)	- Information flows have been rationalized to assure interoperability among enterprise elements. - Material flow paths have been simplified and shortened to enhance flow. Work in Process (WIP) inventories are reduced. - Information and material flows are responsive to the actual stakeholder needs.				
	Write a few examples as evidence for your organization's current level					
	Write a few examples of opportunities for improvement					

I.C.3	**Designing the Future Value Stream - Integrating your organization's value stream to meet the extended enterprise vision**	Management in your organization understands that the present processes do not meet the future lean enterprise objectives.	A general understanding of the stakeholder requirements has lead to the ability to weigh and balance relative needs. A concept for future (new) value stream design has been developed based on those balanced needs.	Future value stream(s) are developed, which encompass future enterprise goals and satisfy stakeholder intents and requirements.	Future value stream(s) are refined to accommodate a changing environment. The value stream is not static, but identifies and is able to respond to changes in the competitive landscape.	Future value stream(s) are refined to dynamically accommodate a changing environment across the extended enterprise.
		☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State
	Lean Indicators (examples)	- A formal process has been established to identify how the enterprise can best deliver value to customers and stakeholders. - The future value stream(s) reflect new and improved ways to increase value and minimize non-value added activity. - Future value stream(s) designs have been generated for the primary value stream(s) and their supporting processes.				
	Write a few examples as evidence for your organization's current level					
	Write a few examples of opportunities for improvement					
I.C.4	**Performance Measurement Since performance measurement tends to drive individual behavior, and ultimately the organization's culture, has your organization's performance measurements been aligned to adequately measure progress towards a lean enterprise?**	Performance measures are ad hoc, inconsistent and focused on function of the individual or area, rather than the value stream.	Baseline performance measures are established to stimulate progress towards the lean future state and are visible throughout the organization.	Performance measurement systems use a minimal and balanced set of measures based upon strategic objectives and aligning the individual, group, operational, and organization lean objectives	Measurement systems and target setting pulls performance improvement throughout the organization. In other words, the measurement system incentivizes and rewards lean progress.	A common target setting and measurement process pulls performance improvements across the extended enterprise. In this case, the entire value stream is improved.
		☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State
	Lean Indicators (examples)	- A balanced and minimal set of performance measures are used to track the lean implementation progress. - The performance metrics keep the lean implementation process aligned toward your organization's strategic objectives. - The performance measures used assure that the individual, group, organization, and extended enterprise metrics are aligned . - Waste elimination, value creation and customer satisfaction strongly influence the performance measures.				
	Write a few examples as evidence for your organization's current level					
	Write a few examples of opportunities for improvement					

I.D. Develop Lean Structure and Behavior - Your organization's infrastructure must be assessed and modified prior to launching a lean initiative as well as throughout the lean transformation. Your organization's organizational structure, incentives, policies, business systems, and operational processes must be aligned and coordinated to elicit the behavior required for successful implementation of lean principles and practices.

Diagnostic Questions	- Has an organizational structure been implemented that focuses on core processes along the customer value stream? - Is your organization's organizational structure designed for flexibility and responsiveness to changes in the external or competitive environment? - Are your organization's relationships with internal and external stakeholders based on mutual respect and trust? - Are your organization's policies and procedures updated to promote and encourage lean behavior? - Are people with a clear vision and commitment to lean transformation (i.e. "lean change agents") positioned and empowered to provide guidance and leadership for the lean transformation? - Has decision making in your organization been delegated to the lowest practical level? - Is prudent risk-taking encouraged by your organization? How is failure dealt with?

LP#	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
I.D.1	**Enterprise Organizational Orientation - An assessment of how well your organization is organized to support value delivery.**	Your organization operates as "functional silos" - that is, groups do not interact much, and your organization is essentially organized to operate as separate functional units.	Initial efforts are underway to identify functional barriers and understand their full implications.	Your organization operates as a partially deployed cross-functional organization. Where many of the functional barriers are removed and process are aligned with the organization's strategic objectives and value stream(s).	Extensive cross-functional processes are implemented across the organization. Functional units now serve as knowledge centers for skill retention.	Cross-functional, process-based orientation is aligned across the extended enterprise. Knowledge and skills are shared by upstream and downstream stakeholders for extended value creation.
		☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State
	Lean Indicators (examples)	- Functional barriers have been minimized. - There is extensive use of cross-functional processes across the organization. - Career progression potential exists across both processes and functions.				
	Write a few examples as evidence for your organization's current level					
	Write a few examples of opportunities for improvement					
I.D.2	**Relationships Based on Mutual Trust** - "win-win" vs. "we-they" attitude, enterprise value is created when stakeholders trust and respect each other.	Relationships in your organization tend to be determined by organizational role, resulting in a "we-they" perspective.	The selective application of "lean" perspective results in breaking down some of the organizational barriers and the development of mutual trust between groups and individuals within the organization.	Stable and cooperative relationships exist across the organization; cooperative relations are established with some enterprise partners	Mutual respect and trust exists across the extended enterprise with equitable sharing of benefits from continuous improvement initiatives.	The upstream and downstream stakeholders modify their operational behavior so as to enhance the extended enterprise's performance ("win-win").
		☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State
	Lean Indicators (examples)	- Communication barriers based on organizational position have been significantly reduced.. - Stable and cooperative relationships exist among most enterprise stakeholders. - There is an almost palpable sense of "team" when interacting with customers or suppliers, it is understood by all that "we are all in this together".				
	Write a few examples as evidence for your organization's current level					
	Write a few examples of opportunities for improvement					

I.D.3	**Open and Timely Communication** - Information is exchanged when it is needed and has the most positive impact on stakeholder value.	Information flow is largely one-way, often top-down, and is limited. The information flow typically lags, which tends to escalate the magnitude of problems to the point that they are much more difficult to solve.		Basic communication mechanisms are employed, but are not uniform; your organization's communication strategy is under development.		Your organization's leaders are accessible and visible, developing two-way communications in open, concise and timely form.		The communication processes are undergoing continuous refinement, and information is accessible and freely exchanged, or can be pulled as required. Most employees know how and where to access the information they need.		Your organization has a comprehensive system of two-way communication that is employed throughout the extended enterprise. Information is freely exchanged as needed with all stakeholders.	
		☐ Current State	☐ Desired State	☐ Current State	☐ Desired State	☐ Current State	☐ Desired State	☐ Current State	☐ Desired State	☐ Current State	☐ Desired State
	Lean Indicators (examples)	- Open and timely communications exist among stakeholders, i.e. regular meetings with employees, newsletters, central data repositories. - Technology has been leveraged to speed communication flow and accessibility, while filtering unnecessary communications. - Employee input is valued, and plays a key part in decision making. - All personnel in your organization know where, and how, to get the information they need to do their job.									
	Write a few examples as evidence for your organization's current level										
	Write a few examples of opportunities for improvement										
I.D.4	**Employee Empowerment - Does your organization enable decision making at its lowest possible level?**	Decision making in your organization is largely centralized, and occurs in a hierarchical structure with limited delegation of authority. Lower levels have very little input into the decision making process.		Your organization realized it needs to enable appropriate lower-level decision making. Structure and training is being put in place to enable lower level decision making empowerment.		Your organization's organizational environment and management system supports limited decision-making at point of application and need. Employees clearly understand their responsibilities for decision making, and are empowered to make decisions within the scope of their application.		Decision making processes are continually refined to promote increased accountability and decision-making ownership at point of use.		Decision making across the extended enterprise is delegated to the point of application. Suppliers and Customers are an integral part of the decision making process, and are trusted and empowered to make decisions at their point of use that impacts the overall enterprise as well as your organization.	
		☐ Current State	☐ Desired State	☐ Current State	☐ Desired State	☐ Current State	☐ Desired State	☐ Current State	☐ Desired State	☐ Current State	☐ Desired State
	Lean Indicators (examples)	- Managers and supervisors serve as mentors and educators, promoting lower-level decision making. - The extent and types of empowerment are tailored to match the environment and people that are influenced by, and responsible for, the decision. - Empowerment enables swift and effective decision making closest to the point of use. - Lower level decisions are communicated to the appropriate stakeholders.									
	Write a few examples as evidence for your organization's current level										
	Write a few examples of opportunities for improvement										
I.D.5	**Incentive Alignment** - Reward the behavior you want.	There is a sporadic use of incentives and an awareness that some incentives discourage lean behavior/		Incentives that reward and encourage lean behavior are deployed in some areas, but not others.		Executive compensation and employee incentives are linked directly to attainment of lean objectives		Incentive systems successfully contribute to achievement and sustainability of lean objectives.		Lean incentives are deployed, with measurable success across the extended enterprise.	
		☐ Current State	☐ Desired State	☐ Current State	☐ Desired State	☐ Current State	☐ Desired State	☐ Current State	☐ Desired State	☐ Current State	☐ Desired State
	Lean Indicators (examples)	- Incentives include a balance of monetary and non-monetary rewards and recognition to encourage lean activity. - Incentives are based on performance measures that encourage lean activity.. - Incentives encourage local improvements that will benefit multiple processes or value stream performances. - Incentives ultimately "pull" the lean behavior needed to sustain the lean enterprise.									
	Write a few examples as evidence for your organization's current level										
	Write a few examples of opportunities for improvement										
I.D.6	**Innovation Encouragement** A lean transformation requires that you move form risk aversion to prudent risk rewarding.	Innovation initiatives are sporadic and ad hoc; security, stability, and risk aversion drive most decision making.		Initial efforts are underway to develop systems, processes and procedures for fostering innovation.		Innovation initiatives are underway in selected areas; measures for assessing impact are in use.		Innovation initiatives are flourishing across the enterprise; prudent risk taking is encouraged and rewarded.		Comprehensive innovation program is implemented and positive results are recognized across the extended enterprise.	
		☐ Current State	☐ Desired State	☐ Current State	☐ Desired State	☐ Current State	☐ Desired State	☐ Current State	☐ Desired State	☐ Current State	☐ Desired State
	Lean Indicators (examples)	- The review process for suggestions has been streamlined and gives clear visibility of the progress of each suggestion. - Suggestion programs have been properly incentivized to give recognition to originators of innovative ideas. - Risk is understood, not avoided. Prudent risk taking is seen as a core strength of your organization, not a liability. - Innovations can be measured against the organization's lean vision, and the value of the innovation is considered in relation to its impact on the values stream.									
	Write a few examples as evidence for your organization's current level										
	Write a few examples of opportunities for improvement										
I.D.7	**Lean Change agents** - To implement and sustain change, lean visionaries or champions are empowered as change agents to inspire and drive change.	Change agents are sporadically distributed in your organization, but without clear change authority.		Your organization has identified the role of the change agent, and is developing the organizational infrastructure to support a network of change agents.		There is formal identification and definition of the change agent's role in the organization. They are empowered to make the necessary changes. Further, they are tasked to delegate their responsibilities as well as implement a program of education and training for new change agents.		Change becomes self-generating, initiated by employees, management, as well as change agents.		Your organization's change agents are a critical resources for lean knowledge, skill and experience within the extended enterprise. Their skills and knowledge are shared with the extended enterprise to help improve the value to the extended enterprise.	
		☐ Current State	☐ Desired State	☐ Current State	☐ Desired State	☐ Current State	☐ Desired State	☐ Current State	☐ Desired State	☐ Current State	☐ Desired State
	Lean Indicators (examples)	- Lean change agents have been designated and empowered in your organization, with a mandate to increase value and eliminate waste. - Lean change agents operate throughout all areas of your organization and cross-transfer knowledge gained and lean implementation experience to other areas of your organization. - A process for mentoring and developing new change agents has been established. - Each individual in your organization feels a personal responsibility and authority to make positive change occur in their position.									
	Write a few examples as evidence for your organization's current level										
	Write a few examples of opportunities for improvement										

I.E. Create and Refine Your organization's Transformation plan - In this section, you will evaluate how completely your organization has identified, prioritize and sequence a comprehensive set of lean initiatives that collectively constitute the plan for achieving the desired lean transformation.

Diagnostic Questions

- Is the enterprise-level lean transformation plan prioritized and aligned with the organization's strategic business objectives?
- Have adequate resources been provided to facilitate the lean transformation?
- Does the current education and training program adequately support your organization's strategic direction(s) and lean transformation?
- Have "lessons learned" and "best practices" been effectively incorporated within the lean transformation planning?

LP#	Lean Practices	Capability Levels				
		Level 1	*Level 2*	*Level 3*	*Level 4*	*Level 5*
I.E.1	**Enterprise-Level Lean Transformation Plan** - Charting the transformational course across the extended enterprise.	There is no formal lean transformation plan. Or there is a loosely defined plan with little priority or coordination established at the enterprise level.	While there is not necessarily a formal lean transformation plan, your organization has identified the requisite lean implementation projects. These projects are prioritized to meet long and short-term strategic objectives	Your organization has created a formal lean enterprise improvement plan(s), and it is coordinated and prioritized across the organization's value stream(s), with a timeline for expected and measurable results.	The lean transformation plan is being executed in your organization, and is continuously refined through learning from implementation results and changing strategic requirements.	The dynamic lean transformation plan balances mutual benefits of the stakeholders across the extended enterprise.
		☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State
	Lean Indicators (examples)	- A process is in place to incorporate lessons learned from transition-to-lean activities into the enterprise-level lean transformation plan. - The milestone targets of the lean transformation plan are broken down by section and deployed across the organization. - Your transformation plans balance long-term and short-term stakeholder objectives for the best "value chain" solution. Cost savings and value improvements are shared across the enterprise.				
	Write a few examples as evidence for your organization's current level					
	Write a few examples of opportunities for improvement					
I.E.2	**Commit Resources for Lean Improvements** - create a reasonable and adequate resource provision for lean.	There are little or no resources provided in your lean transformation plan and budgeted by your organization for process improvement or waste elimination	Limited enterprise-level resources are committed and often applied to the symptoms of a problem, rather than the elimination and prevention of the root causes. Once a problem is fixed, it is rarely studied for root cause elimination ("There just isn't time or budget!" is often quoted).	Resources in your organization are allocated as required for the execution of the lean transformation plan and prioritized across the value stream.	A pre-planned amount of organization resources is provided for lean initiatives, access to the resources requires minimal justification, as long as it is within the strategic transformation objectives.	A pool of earmarked resources is provided for lean initiatives across the extended enterprise. A formal plan is in place to share the costs and benefits from the lean transformation throughout the extended enterprise.
		☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State
	Lean Indicators (examples)	- Resources are committed to support the level and speed of the lean transformation required within your organization. - Sufficient time to build on lean improvements through personal contribution is given at all levels. - The procedure to apply for lean improvement resources has been simplified, and gives priority to improvements that benefit multiple areas.				
	Write a few examples as evidence for your organization's current level					
	Write a few examples of opportunities for improvement					
I.E.3	**Provide Education and Training - Just-in-time learning. Ensuring a common understanding of the lean vision and the organization's implementation plan, as well as the employee's role in the transformation.**	There is little coordination of education and training programs within your organization to facilitate lean change.	Your organization's education and training program covers a minimum set of skills required to support the lean transformation plan.	Your organization's education and training program is comprised of a balanced and sequenced set of elements to support the coordinated transformation plan.	Education and training at all levels is periodically reviewed to check alignment and suitability to the lean transformation plan. Employee knowledge is enriched through professional development education and training, which strengthens their value as individuals within the organization.	Your organization's education and training program supports the upcoming needs of the extended enterprise transformation plan.
		☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State
	Lean Indicators (examples)	- Education and training programs, including refreshers, are provided on a just-in-time basis. - Education and training has a balanced and sequenced set of elements to support the lean transformation plan. - The application of lean principles learned in training and education is formally appraised. - Employees are trained not only in "lean", but in areas that increase their knowledge, and further develop their skills and abilities. This, in turn, reinforces lean behavior.				
	Write a few examples as evidence for your organization's current level					
	Write a few examples of opportunities for improvement					

I.F. Implement Lean Initiatives - In this section, you will evaluate how completely your organization has flowed the organization-level lean transformation plan and lean vision into specific actions, programs and projects. You will also determine how thoroughly theses projects are executed within each organizational process area and determine how they are re-integrated at the enterprise level.

Diagnostic Questions

- Has the enterprise-level lean transformation plan been translated into detailed execution projects?
- Has a uniform system been established to track the progress of the lean initiatives with respect to the overall plan?
- Do lean initiative plans contain a feedback mechanism for revision? How are lessons learned incorporated into the plan?
- How flexible is the plan? How often is it reviewed? What is it measured against? How do you know progress is being made?

LP#	Lean Practices	Capability Levels				
		Level 1	*Level 2*	*Level 3*	*Level 4*	*Level 5*
I.F.1	**The Development of Detailed Plans Based on the organization's "Enterprise Plan" - The coordination of lean improvements up and down the organizational structure.**	Local improvements in process are generally optimized for individual areas and employees cannot clearly see the links between localized improvements and the enterprise goals.	Key goals of the organization's lean transformation plan are understood by most employees. Process owners are involved in developing detailed plans that link to the goals and strategic objectives of the enterprise plan	Detailed lean implementation plans supporting the enterprise level plan are developed and coordinated across processes or business elements within the organization.	Interdependencies between groups are identified, and the detailed plans are refined to accommodate t the interdependency. The resultant plan is then integrated across the enterprise. Best practices are shared across the entire organization	Implementation plans from the extended enterprise are coordinated with, and support, your organization's lean transformation plan
		☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State
	Lean Indicators (examples)	- Detailed implementation plans are aligned to milestone targets of your organization's enterprise level plan - A process is in place to incorporate lessons learned in detailed implementation plans, and the enterprise level plan is adjusted as necessary. - Detailed improvement plans are coordinated throughout the enterprise where shared implications exist.				
	Write a few examples as evidence for your organization's current level					
	Write a few examples of opportunities for improvement					

I.F.2	**Tracking Detailed Implementation** - Assessing actual outcomes against the goals.	Results of process improvements are observed, but not quantified.	A process is under development at your organization to permit tracking and quantification of progress of the detailed lean implementation. Data from some projects are being reviewed.	A project management process has been implemented to track the progress of detailed lean projects against their planned milestones. Feedback on progress is provided to your organization's leaders so that appropriate enterprise-level corrective action can be initiated.	The project management process can readily assess detailed plans and can accommodate revisions mandated by changes to the enterprise level lean transformation plan. Information form this process flows up to organization leadership and down to the employees as needed.	The project management process is deployed across the extended enterprise to enable real-time tracking against the extended enterprise goals and values.
		☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State
	Lean Indicators (examples)	- Lean initiatives are coordinated and tracked, with the individual results "rolled up" and assessed against enterprise level milestones and targets. - The responsibility and accountability for improvement success is assigned locally to enable fast corrective action on deviations from the plan. - Changes to processes and value stream maps(s) are documented and updated regularly.				
	Write a few examples as evidence for your organization's current level					
	Write a few examples of opportunities for improvement					

I.G. Focus on Continuous Improvement - The successful execution of your organization's lean implementation plan forms the basis for future improvement. The improvement process is monitored and nurtured. Lessons learned are captured, and improved performance becomes a driving force for future strategic planning by organization leadership.

Diagnostic Questions	- Are guidelines for continuous improvement sufficiently developed for an effective organization-wide transformation to lean? - Is your organization's organizational structure designed for flexibility and responsiveness to changes in the external or competitive environment? - Are your organization's employees being challenged to sustain existing improvements and develop new improvements? - Is your organization's leadership actively involved in monitoring the progress of the lean implementation plan at all levels? - Is appropriate support and encouragement being provided to all employees involved in the lean transformation? - Are lessons learned being captured in a consistent, systematic manner? Are they accessible to the decision makers in your organization when needed? - Are lean implementation results impacting strategic planning?

LP#	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
I.G.1	**Structured Continuous Improvement Process** - Uniformity in how we get better.	Improvement initiatives in your organization are ad hoc, and are usually a reaction to some event. Proactive improvements are rarely undertaken, or the initiatives themselves are not data driven.	An formal improvement process for your organization is broadly defined, and is being selectively applied.	Your organization has a systemic, structured methodology for continuous improvement. Your improvement programs are centered around the principles of value creation, and its implementation is developed and deployed across many areas.	our organization has a structured continuous improvement process that is deployed at all levels across the organization. All of your initiatives use a structured value analysis to target improvements.	Your organization's structured continuous improvement process is fully ingrained in your organization, and is applied cooperatively outside the organization to the extended enterprise.
		☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State
	Lean Indicators (examples)	- A consistent improvement and transformation approach is implemented, and sustains the improvements made. - The continuous improvement process challenges people to tackle the root cause of waste or inefficiency, rather than the symptom. - Lean principles are being applied to most of your organization's systems and processes, and learning from past "lessons" and developing new insight..				
	Write a few examples as evidence for your organization's current level					
	Write a few examples of opportunities for improvement					
I.G.2	**Monitoring Lean Progress** - Assessing progress toward achieving enterprise objectives	Your organization's leaders are not actively involved in the progress review of the overall lean implementation plan.	Your organization's lean implementation plan progress is reviewed against high-level milestones and success criteria, for some projects but not others.	A formal methodology is used by your organization leadership to analyze the overall progress across all lean implementation projects. Current plans are adjusted based on learning from lean implementations.	Results of your organization's implementation projects are aggregated to permit reallocation of resources and to ensure on-going alignment with strategic objectives.	Senior managers monitor lean progress upstream and downstream in the value chain (throughout the extended enterprise). Results are impacting future strategic planning of your organization, its suppliers and its customers.
		☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State
	Lean Indicators (examples)	- The lean transformation progress is judged by its aggregate benefits, not just the individual or localized improvements. - Your organization's leaders actively participate in monitoring the implementation progress, and routinely and address deficiencies within the transformation plan. - Lean progress reviews are conducted, documented, and disseminated to the necessary groups and personnel.				
	Write a few examples as evidence for your organization's current level					
	Write a few examples of opportunities for improvement					
I.G.3	**Nurturing the Process** - Assuring executive level involvement	There is growing awareness that successful lean implementation is highly dependent upon senior management support and encouragement.	Some senior management are providing encouragement, support and recognition, but it is not consistent across the entire organization.	organization leaders seek to identify and remove barriers to the lean implementation. Teams and individuals who successfully implement lean practices are recognized and rewarded.	Senior managers across the entire enterprise are highly visible in their involvement, support and encouragement of the lean initiative. An enthusiastic atmosphere is evident.	Senior executives and managers champion and nurture a culture of continuous improvement in the extended enterprise.
		☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State
	Lean Indicators (examples)	- Leaders in your organization actively support the lean initiatives, and are ensuring the success of those initiatives. - Your leadership recognizes and rewards positive actions and efforts made by groups and individuals in the lean transformation process. It is common to recognize and reward significant efforts, even if improvements are not fully successful. - Employee input is valued by senior leadership, and plays a key part in adjusting the lean implementation plan. - All personnel in your organization know the organization's lean strategy, and are informed about any changes to the implementation plan.				
	Write a few examples as evidence for your organization's current level					
	Write a few examples of opportunities for improvement					

II.A. Business Acquisition and Program Management - To be successful in a (globally) competitive environment, companies must develop and manage partnerships with their customers and be able to rapidly re-configure and align their competencies among their suppliers and partners in order to deliver the best life-cycle value to its customers.

Diagnostic Questions

- Are new business opportunities arising from the gains made in the lean transformation?
- Does customer feedback and customer usage data drive new business process developments at your organization?
- Have you developed an understanding or partnership with your suppliers and customers to distribute assets throughout the extended enterprise in order to increase value at minimal cost?
- Are the program risks and your organization's resource requirements balanced to assure optimal product "flow" through its life cycle?
- Are skills and resources drawn from across the extended enterprise to enhance program development efforts? In other words, are you free to "borrow" resources as needed from your suppliers or customers to help you with the product or process development effort? Does your organization freely share its resources with its strategic partners?

LP#	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
II.A.1	**Utilize Lean Capability for Business Growth** - Exploiting new business opportunities arising from the resources freed up by the lean transformation.	Business improvement initiatives are ad hoc and are focused on operational efficiency. Very little thought given to "system" efficiency.	Improvement gains provide resources to facilitate future improvements. Potential business opportunities from applying lean thinking across core competencies are recognized and plans have been developed to utilize them.	Benefits sustained from applying lean thinking within your organization are used to improve the stability of the current business and/or win new business	Your organization knows how to measure and exploit its enhanced lean capabilities, and combines its lean resources with its customer knowledge throughout the organization to leverage opportunities for competitive advantage.	Your organization's strategic plan dynamically incorporates the capabilities of extended enterprise (supplier and customer) as well as key stakeholder interests to identify and leverage competitive opportunities.
		☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State
	Lean Indicators (examples)	- Reduced cost, increased quality and faster response times gained from lean efforts are used to maintain new business. - The ability to improve and refine processes quickly is used extensively to respond to changing customer requirements. - A process is used to scan the competitive environment to exploit opportunities arising from the enhanced capabilities of the lean enterprise.				
	Write a few examples as evidence for your organization's current level					
	Write a few examples of opportunities for improvement					
II.A.2	**Optimize the Capability and Utilization of Assets** - Using your people, equipment, facilities, etc., to their fullest. Lean enables business growth through the redeployment of assets to value-added activities.	The utilization of people and material assets within your organization is optimized within groups, departments, or functions, and there rarely coordination with outside groups.	There is evidence of ad hoc cooperation between functional units to eliminate waste and share resources.	An organization-wide "enterprise" approach provides a consistent and balanced asset allocation across your organization's value stream, but may not include growth strategy.	As a result of the application of lean concepts and techniques, assets are freed up to be applied across the enterprise to support current and growth activities.	The ability exists to easily and quickly shift or divest resources to new opportunities, there is a organization-wide understanding of the resource measurement and utilization policy, and the system works to provide agile resource management to the organization "strategy portfolio".
		☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State
	Lean Indicators (examples)	- Assets freed from lean implementation are readily redeployed. - The workforce and its knowledge is nurtured, reallocated, and maintained wherever possible. - Available assets and resources are coordinated throughout the organization to leverage resources to their most-value added usage.				
	Write a few examples as evidence for your organization's current level					
	Write a few examples of opportunities for improvement					
II.A.3	**Provide Capability to Manage Your Performance to Risk, Cost, and Schedule** Success requires an understanding risk while still encouraging prudent risk taking. In other words, "lean" presupposes effective risk management.	Programs are managed and staffed as independent entities. Risk assessment is done at the local level, and usually is viewed as local impact on cost, performance or schedule.	There is a management system to monitor and control program performance and staffing. Regular reviews focus on cost, schedule, and performance of individual programs. Information is communicated "up" the management chain.	Program reviews within your organization assess risk within individual programs and staffing is adjusted as necessary to mitigate risk. Risk information is shared to leaders throughout the organization.	The programs are reviewed assessing the risk across the portfolio of programs within the organization with appropriate reallocation of resources to mitigate the cost, schedule, performance, and customer satisfaction risks associated with the "big picture" risk.	Risk abatement processes are used to optimize performance of the portfolio of programs within your organization. Everyone knows their role in the process, and the system works like it is supposed to.
		☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State
	Lean Indicators (examples)	- Your organization's programs and process reviews have a "portfolio" approach to achieve organization-wide balance or priorities and interests. - A risk management process is fully integrated across the enterprise, every knows how to use it, and does. - A formal process for measuring performance to cost, schedule, risk, and customer satisfaction exists.				
	Write a few examples as evidence for your organization's current level					
	Write a few examples of opportunities for improvement					
II.A.4	**Allocate Resources for Program Development Efforts** - Teaming with key members of your value chain for greater success.	Program management efforts rely on your organization's functional units for the allocation of the required skills.	Your organization has begun to look beyond the functional unit to allocate resources. Some, but not all of the necessary skills are deployed across program boundaries.	Some of the skilled resources are routinely shared across your organization's programs. Formal methods are being developed for determining team makeup and the assignment of necessary skills.	Your organization's resources and skills are routinely balanced and shared across the portfolio of programs within your organization. Resource sharing is part of your organization's "culture".	Your organization shares resources with its suppliers and customers as necessary. A strong sense of "team" with your extended enterprise partners has created "virtual" organizations as needed from the extended enterprise. This extended enterprise lowers everyone's costs by providing partners with the skills and resources necessary to execute the development effort(s).
		☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State
	Lean Indicators (examples)	- A process is defined and used to ensure that cross-disciplinary skills are represented on teams - Resources and skills are easily and quickly shifted or divested to balance requirements across all program development efforts. - A strong sense of teamwork exists with your value chain partners, and you share resources freely, as pulled by program needs.				
	Write a few examples as evidence for your organization's current level					
	Write a few examples of opportunities for improvement					

II.B. Requirements Definition - Customer needs and values must be assessed continuously and translated into practical requirement statements that form the basis for your organization's product and process development activities.

Diagnostic Questions

- Are the customer's needs continually evaluated in determining product and process requirements?
- Does customer feedback and customer usage data drive new business process developments at your organization?
- Is a data collection and customer feedback process defined and deployed at your organization?
- Is product life cycle data used in determining requirements and subsequent specifications?
- Are product and process capability data matched to design criteria?

LP#	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
II.B.1	**Establish a Requirement Definition Process to Optimize Lifecycle Value** - Stakeholder "pull" vs. technology or product "push"	Requirements are defined internally based on past experience, rather than on a formal requirements definition process.	A requirements definition process, which balances cost, schedule, and performance is partially developed and deployed at your organization. It has been documented, and is under active review.	Your organization has a requirements definition process that leverages value chain capabilities (i.e. intelligently capitalizes on the strengths of your organization and its extended enterprise) and focuses on overall life cycle implementations.	Your organization has an iterative requirements definition process that spans the value chain, resulting in a minimal set of requirements that balances cost and performance with organization and stakeholder needs.	The requirements process is a strategic advantage for your organization and its extended enterprise. The use of your requirements process contributes to increased responsiveness and leads to new business opportunities.
		☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State
	Lean Indicators (examples)	- There is a process in place to determine the clear and concise product life cycle requirements, with acceptable ranges for the requirements. - The process ensures a balanced representation from all disciplines across your organization and throughout the value chain - Structured methods are used by your organization and its strategic partners to elicit and gather needs from different stakeholders and customers.				
	Write a few examples as evidence for your organization's current level					
	Write a few examples of opportunities for improvement					
II.B.2	**Utilize Extended Enterprise Data to Optimize Future Requirements Definition** - Closed-loop processes are in place to capture operational performance data.	Warranty claims and deficiency reports represent the primary source of data that is collected and analyzed for impact to present requirements for your organization's products and processes.	A proactive process is being developed by your organization to collect product usage data as the basis for future requirements.	Data are collected on usage, maintenance, disposal and future needs from across the present value chain and fed into future design solutions and requirement definitions.	Your organization's requirements definition process allows real time access, collection and dissemination of data from across the extended enterprise for analysis by stakeholders for future use.	The requirements definition process is established across your organization's extended enterprise to actively seek data on needs, usage, and process capability. The data populate a data repository that can be mined for future requirements.
		☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State
	Lean Indicators (examples)	- Customer feedback is actively sought and provided as input to the requirements definition process. - A database of usage, maintenance, and disposal data is maintained and extensively used to establish future requirements definitions. - Enhanced knowledge of customer and stakeholder requirements and desires is used to leverage future requirements.				
	Write a few examples as evidence for your organization's current level					
	Write a few examples of opportunities for improvement					

II.C. Develop Product and Process - Product and Process design decisions must be based upon value quantification and tradeoffs that incorporate inputs from the affected stakeholders.

Diagnostic Questions

- Is the product development process formalized and understood?
- Are customers and other life cycle stakeholders regularly involved in product and process development?
- Are downstream stakeholder issues in design and development considered and incorporated as early as possible in the process?
- Have most of the unnecessary iterations in the development cycle been removed?
- Are products and processes being developed concurrently? Do they align with your organization's strategic lean initiatives?

LP#	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
II.C.1	**Incorporate *Customer Value* in the Design of Products and Processes** - Understanding customer value allows continuous improvement of both products and processes	In your organization, customer inputs are captured only at the beginning of the development	Customer inputs are considered quantitatively in your organization through top-level customer liaison and occasional customer reviews.	The customer's) are formally represented on your organization's integrated product development teams (IPT). Feedback mechanisms exist in the product development process to understand and minimize design iterations.	The customer's) are actively involved with the IPT at multiple levels, and jointly improve the effectiveness and quality of the products and processes designed in your organization.	The customer's) are routinely involved with IPT and are valued team members. Sharing of benefits is well-established; value quantification and sharing as well as requirement tradeoffs are a continuous and automatic part of the process.
		☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State
	Lean Indicators (examples)	- Customer inputs are sought and used actively throughout the development process. - Designs satisfy customer value requirements, without unnecessary functionality - A "teaming" sense exists with your customer to better define and refine requirements during the product development process, costs are shared by the team as emergent properties develop.				
	Write a few examples as evidence for your organization's current level					
	Write a few examples of opportunities for improvement					
II.C.2	**Incorporate "Downstream" Values into Product and Process Design** - Understanding downstream stakeholders (manufacturing, support, etc.) allows value to flow seamlessly to the customer.	Manufacturing issues are considered late in the product development process. This often results in producibility problems or unnecessary production costs.	Manufacturing and assembly issues are considered early in the projects, but in an ad hoc manner. Supplier and cost considerations are limited.	Multi-functional teams include some downstream disciplines as well as your organization's key suppliers.	Priorities of downstream stakeholders are quantified as early as possible in design, and used for process evaluation and improvement.	Downstream stakeholder's values in the extended enterprise are quantified, and balanced via tradeoffs, and are a continuous part of the product development process.
		☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State
	Lean Indicators (examples)	- There is early consideration and incorporation of downstream stakeholders issues throughout the design development. - The scope of considerations integrated into designs has been extended to include manufacturing, assembly, test, serviceability, and cost implications. - Products are easier to produce and have lower life cycle costs as a result of "downstream value" consideration.				
	Write a few examples as evidence for your organization's current level					
	Write a few examples of opportunities for improvement					

II.C.3	**Integrate Product and Process Development - Breaking down functional groups ("silos") enables communication and value flow within your organization and along the value chain.**	Development is performed in functional organizations, and is not integrated in cross-functional teams.	Multidisciplinary development or IPTs are used to a limited extent.	Multidisciplinary development is used extensively; metrics are established for process evaluation.	Multidisciplinary techniques are deployed for most programs and product development efforts, metrics are used for process evaluation and improvements.	Product and process definition is seamlessly integrated both internally and with upstream and downstream stakeholders.
		☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State
	Lean Indicators (examples)	- Resources and skills are balance across projects and programs. There is extensive sharing and re-use of knowledge. - Suitability and timing of design information is released, and is matched to the requirements of subsequent processes. - A general understanding of diversity exists within your organization. That diversity is treasured, and forms the basis for rich multidisciplinary team constitution. Divergent thinking is encouraged, and often leads to creative results.				
	Write a few examples as evidence for your organization's current level					
	Write a few examples of opportunities for improvement					

II.D. Manage Supply Chain - Internal organization skills (core competencies) are aligned with those of suppliers such that the customer value chain is optimized throughout the extended enterprise.

Diagnostic Questions	- Have the number of suppliers been reduced to a level that can be effectively managed? - Do contractual requirements enable supplier flexibility and adoption to both expected and emergent changes? - Have the bottlenecks and constraints throughout the extended enterprise been identified? Do you know what they are? - Are supplier partnerships and strategic alliances established to strengthen the competitive advantage? Are both members of the team strengthened as a result of the alliance? - Are in-house capabilities balanced with supplier capabilities? Is there overlap? Can it be eliminated?

LP#	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
II.D.1	**Defined and Develop Supplier Network** - Skills, capabilities and core competencies are aligned across the supplier network	Your organization uses a large number of direct suppliers. There is little evidence of a defined supplier strategy and limited knowledge of the relationships within the supplier network	Your organization has reduced the number of key suppliers it interacts with. The supplier base has been rationalized to focus on key suppliers with high impact on strategic objectives.	Your organization's supplier network is established, based on a strategic analysis of the value creation process. The analysis includes both internal organization value creation, as well as value creation from various suppliers.	Strategic outsourcing and make-buy decisions focus on achieving an optimal combination of core competencies both within the organization and across the supplier network.	Your organization's supplier network is defined, developed, and integrated to ensure efficient creation of value for enterprise stakeholders over the entire product life cycle.
		☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State
	Lean Indicators (examples)	- The supplier network is defined and developed concurrent with the strategic plan, and ensures the efficient creation of value for all enterprise stakeholders - Your supplier's expertise and capabilities compliment your organization's needs for skills and capabilities; unnecessary overlap and duplication has been removed. - Your organization's supplier network is flexible, and can quickly adapt to changing requirements and unanticipated disruptions.				
	Write a few examples as evidence for your organization's current level					
	Write a few examples of opportunities for improvement					
II.D.2	**Optimize Network-Wide Performance** - Partnering with key suppliers and optimizing processes to achieve customer value.	Supplier relationships are at "arm's length" and somewhat adversarial. Your Purchasing department manages a large number of short-term, lowest -bid contracts	Your organization uses formal processes for supplier assessment and approval. Your organization has established long-term purchase agreements with key suppliers that focus on cost reduction. Still, there is limited visibility into your supplier's business processes.	Your organization has met with its key suppliers and mapped out common objectives, roles and responsibilities. These are established and communicated, and a few strategic alliances are in place. There is early involvement of key suppliers in your design and development decisions.	Your organization's strategic alliances with its key suppliers emphasize a high degree of information sharing, risk sharing, and benefit sharing. Both your organization's and your suppliers' production and delivery schedules are synchronized across the supplier network.	Supplier capabilities are dynamically optimized to ensure efficient value creation and building durable competitive advantage, creating flexibility and responsiveness to shifts in the marketplace.
		☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State
	Lean Indicators (examples)	- Formal processes are in place for supplier assessment and approval - Roles and responsibilities are clearly defined in contractual relationships, and risk and reward shares are agreed upon. - Production and delivery are synchronized throughout the supplier base to ensure continuous flow and minimal waste.				
	Write a few examples as evidence for your organization's current level					
	Write a few examples of opportunities for improvement					
II.D.3	**Foster Innovation and Knowledge-Sharing Throughout the Supplier Network** - Incentivizing innovation and technology transfer.	Your organization is primarily focused on internal capabilities, with little cognizance of tacit (experience based) or explicit (formal) knowledge sharing across suppliers	Your organization has adopted some internal processes to leverage supplier-based knowledge and innovation.	Your organization involves key suppliers to develop technology roadmaps in pursuance of a common strategic vision. Your organization shares metrics for continuous improvements with those key suppliers	A knowledge transfer mechanism is created for open and rapid access throughout the supplier network.	A mutually-beneficial arrangement has been established in your organization to foster innovation across suppliers. A process for on-going communication of vision, strategy, metrics an knowledge implementation is in place.
		☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State
	Lean Indicators (examples)	- Long-term collaborative relationships are established and maintained where possible - Processes to facilitate sharing and transfer for innovation, knowledge and technology are deployed. - A mutually beneficial continuous improvement process is established throughout the supplier network over the entire product life cycle.				
	Write a few examples as evidence for your organization's current level					
	Write a few examples of opportunities for improvement					

II.E. Produce Product - The production system must be designed and managed according to lean principles and practices. This is true of "thought processes" like R&D, reports, studies, etc, which can be managed similar to a "thought factory"

Diagnostic Questions

- Has enterprise strategy been aligned with production capability?
- Is production knowledge and capability regarded as a strategic competitive advantage?
- Are products "pulled" by actual customer demand, in real time?
- Has the production process been ordered and adapted for flow?
- Have the process bottlenecks been identified? Are inventories maintained at minimal levels throughout the production process?

LP#	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
II.E.1	**Utilize Production Knowledge and capabilities for Competitive Advantage** - Strategic leveraging of manufacturing capability	Production capability is not understood outside the manufacturing organization.	Production knowledge and capabilities are captured and used to influence manufacturing strategy, including make/buy decisions.	Production capabilities are understood and utilized across the organization. organization strategy and manufacturing capabilities are aligned.	Manufacturing system design is integrated with strategic make/buy decisions across the organization and is aligned with the organization strategy to create competitive advantage.	Production knowledge is leveraged across the extended enterprise to generate strategic opportunities of value creation
		☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State
	Lean Indicators (examples)	- Production capability constitutes a major consideration in enterprise-level long range strategic planning. - Knowledge of production capabilities are maintained and shared throughout the extended enterprise.				
	Write a few examples as evidence for your organization's current level					
	Write a few examples of opportunities for improvement					
II.E.2	**Establish and Maintain a Lean Production System** - Defect-free production pulled by the customer.	Your organization's production system operates on a batch and queue schedule with high in-process inventory, with quality based on inspection rather than prevention.	Your production system operates with a batch and queue schedule with limited cellular or in-line layouts to improve flow.	Product flow paths are identified and key elements of the production process layout have been reordered, enhancing flow and reducing in-process inventory, with some suppliers delivering to point-of-use where appropriate.	Selected products within your organization are produced using a "flow" system, pulled directly by a customer demand (takt time). Your key suppliers understand the takt time, and deliver materials to you just in time for production.	Work is segmented and organized along the value stream flows to achieve defect-free production upon demand through the implementation of pull form customer, through your key suppliers.
		☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State
	Lean Indicators (examples)	- Your organization's conversion to lean has freed up shop floor space, equipment, human resources, and capital for re-deployment - Your stock and inventory levels have been reduced in parallel with gains in your process stability and quality. - Production work is performed only when "pulled" from subsequent "customers" in the value chain.				
	Write a few examples as evidence for your organization's current level					
	Write a few examples of opportunities for improvement					
II.E.3	**Production Constraints Identification** - The limitations to the production process play a key role in the identification of future improvements	Bottlenecks appear "randomly" in your processes, and significant resources are wasted waiting for work to finish "downstream" in the process.	Some formal identification has been made for process bottlenecks, but no safety stock process exists to manage flow.	Process bottlenecks have been identified, and appropriate safety stocks have been assigned to fully utilize bottlenecks. Large inventories of parts or time are still used, and Quality assurance is usually left to the "end" of the production process.	All process improvement decisions are viewed in context with the process bottlenecks. Process improvement resources being allocated to lower inventory and improve flow.	The understanding of constraints in the production process has been expanded to include suppliers and customers, a formal process for identification and elimination of SYSTEM bottlenecks exists, and is being used.
		☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State
	Lean Indicators (examples)	- With the exception of safety stocks at the bottleneck, work-in-process inventory (WIP) is drastically reduced. - Working on freeing up the constraint is the single biggest driver in new process improvement projects within your organization. - A measurement system exists in your organization to adequately capture the costs associated with WIP.				
	Write a few examples as evidence for your organization's current level					
	Write a few examples of opportunities for improvement					

II.F. Distribute and Service Product - On-time deliveries of defect-free products are complemented by superior post-delivery service, support, sustainability and customer association.

Diagnostic Questions

- In your organization, are production schedules and capacity considered prior to making a sales/contract commitment?
- Are product delivery data flowed throughout the value chain?
- Does your organization satisfy its customer maintenance requirements? Are customer rejects/returns treated as opportunities for learning?
- Has the production process been sequenced and adapted for flow?
- Are in-service usage data deployed to appropriate personnel in your organization?

LP#	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
II.F.1	**Align Sales and Marketing Production** - Matching demand and capabilities	In your organization, marketing pushes product sales and bids on to production with little consideration of the current production capacity.	Marketing provides production with some, but limited, visibility to current and future potential order base. However, the order base not purposefully aligned to the production capacity.	Products are supplied in smaller, more frequent batches, balancing orders to current production capacity. Most running orders are fully visible to production.	Your organization matches real-time customer demand and delivery requirements with its production capabilities. Your organization has an extensive knowledge base of customer preferences, and uses it to help provide production visibility.	Actual and future prospective orders are matched in real-time with production capabilities throughout the extended enterprise, including your suppliers and customers.
		☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State
	Lean Indicators (examples)	- Sales or Bids are aligned to your current and future production capacity and capabilities. - There is a constant feedback and input between sales / marketing and the production elements of your organization. - Sales and bids commit product delivery to real-time customer demand, without the use of "buffer" stocks of inventory buildup.				
	Write a few examples as evidence for your organization's current level					
	Write a few examples of opportunities for improvement					

II.F.2	**Distribute Product in a Lean Fashion** - the right product, produced in the right quantity, delivered at the right time.	Your organization distributes form inventories by batch; the customer inspects the products upon receiving the shipment.	Your organization distributes in smaller batch sizes, more frequently, in line with increased reliability (compared to pre-lean transformation). Your organization has programs in place to reduce customer receiving inspection.	A pull system signals that stock is pulled directly from the production line, of from low-stock levels; some products are delivered directly to point of use with limited inspection.	Defect-free items are produced and delivered without receiving inspection to real-time customer usage; your organization's customers are given access to databases for order status visibility.	Defect-free distribution on demand is achieved via the implementation of customer pull from the "end customer" through the entire extended enterprise (including raw material suppliers).
		☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State
	Lean Indicators (examples)	- Point of use delivery to customers with minimal receipt inspection has become standard practice in your organization. - Your deliveries are synchronized to minimize goods in transit and transportation requirements. - Your organization's delivery cycle is shorter and more reliable, compared to its prior (pre-lean) system.				
	Write a few examples as evidence for your organization's current level					
	Write a few examples of opportunities for improvement					
II.F.3	**Enhance Value of Delivered Products and Services to Customers and the Enterprise** - Responding to the voice of the customer.	Your organization's product support system reacts to customer needs, usually on-time and from inventory.	Your organization's support system delivers products and services on time, but with disruptions to production flow and associated resources.	Your organization's support system flow paths are identified, and are starting to be integrated with lean product development and production flows.	Your organization has standardized customer and product support processes, which provides responsive information and product flow that is fully integrated with the development of production flows.	Customer needs for post-delivery products and services are anticipated in enterprise plans and fulfilled by adoption and extension of capabilities already provided.
		☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State
	Lean Indicators (examples)	- Solutions to product and service issues are coordinated throughout your organization and value chain to find fast, cost effective solutions. - Your customer and product support processes have been standardized and are regularly reviewed against customer feedback. - Disruptions to your design and production flows from support services have been minimized.				
	Write a few examples as evidence for your organization's current level					
	Write a few examples of opportunities for improvement					
II.F.4	**Provide Post Delivery Service, Support and Sustainability** - Providing customer solutions.	A high level of spares is necessary because of unknown failure rates and long lead times for spare replenishment.	Your organization has begun to collect data on failure trends, which permits both the determination of service interval points in preventative maintenance as well as a reduction of spare part levels.	The organization as a whole is increasingly involved in addressing customer maintenance solutions. Spare levels are reduced through common platforms; root cause analyses are fed back into your product design process.	The enterprise is part of the customer's maintenance solution by ensuring availability through replacement of critical components before failure.	The enterprise has become part of the customer's business solution via warranting of product performance.
		☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State
	Lean Indicators (examples)	- Customer feedback is proactively maintained and used to predict emerging service issues and enhance future designs. - Spares levels are reduced in-line with short predictable lead times for replacement spares.				
	Write a few examples as evidence for your organization's current level					
	Write a few examples of opportunities for improvement					

III.A. Lean Organizational Enablers- The support units of an enterprise must themselves become lean in executing their assigned function, but they must also redefine what they do such that they support lean implementation within the life cycle processes and the lean transformation and the leadership process.

Diagnostic Questions	- Do the finance and accounting measures used by your organization support the implementation of lean? - How well have the financial and accounting systems been integrated with the non-financial measures of value creation? - Can stakeholders retrieve financial information as required? - Are human resource practices reviewed to assure that the intellectual capital matches the process needs? - Are the information technology systems compatible with your suppliers and customers?

LP#	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
III.A.1	**Financial System Supports Lean Transformation** - Lean requires appropriate financial data	Your organization's financial system provides basic balance sheet and cost accounting data; there is little awareness and exploration of broader support roles for finance data.	Initial efforts are underway to adapt of modify financial systems to compensate for the inadequacies of the formal cost-accounting system.	Your organization's finance system is overhauled to provide data and financial information to support and enable a lean transformation at any level.	Your organization's financial system's scope is expanded to integrate with non-traditional measures of value creation (i.e. intellectual capital, balanced scorecard, throughput accounting, etc.)	Your financial systems provide seamless information exchange across the extended enterprise, with some direct measure on value creation for all stakeholders.
		☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State
	Lean Indicators (examples)	- Financial measures that conflict with lean activity are no longer used as the sole measure of lean progress and lean performance. - The financial system handles a balanced set of financial and non-financial measures to assist managerial decision making. - The financial system has been overhauled to ensure fast and efficient processing of information as required.				
	Write a few examples as evidence for your organization's current level					
	Write a few examples of opportunities for improvement					

III.A.2	**Enterprise Stakeholders Pull Required Financial Information** - Data on Demand	Your organization's financial information gives you a snapshot of past performance and is reported through regularly scheduled standardized reports. Specific requests for measures require extraordinary efforts.	Your organization's finance actively provides traditional financial information in real-time to assist users in planning and programming activities.	Users are able to directly access and use financial information to make trade-off decisions.	Users are able to pull financial and other value creation information to support decision analysis in the format desired	Users across the extended enterprise generate and share timely financial and performance data. You have access to pertinent supply chain partner's information, they have access to yours, and it is shared (as needed) in real time.
		☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State
	Lean Indicators (examples)	- Financial and performance measurement data can be accessed and used as needed in user-defined format. - Financial information can be extrapolated to forecast outcomes. - System provides up-to-date information on-demand and rationalizes information no longer used.				
	Write a few examples as evidence for your organization's current level					
	Write a few examples of opportunities for improvement					
III.A.3	**Promulgate the Learning Organization** - Learning organizations create a flexible workforce	The human resources processes concentrate on recruiting, placement, and benefits. Personnel training is ad hoc, and is not aligned to organizational needs.	A well-defined personnel development process, aligned with organizational needs, is applied for selected employees.	Personnel development process is extended to all employees and incorporates the anticipated future needs of the lean enterprise. Resources and facilities are dedicated for learning.	A learning climate is promoted within the organization through ready access to information and input to strategy and policy making. Opportunities for extending learning experiences are provided.	A learning climate is promoted throughout the extended enterprise by the sharing of capabilities knowledge, skills and best practice.
		☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State
	Lean Indicators (examples)	- Intellectual capital is regarded as a corporate assets - Employees have individual training plans, which are aligned to the current and projected skill base requirement. - Employees actively capture and incorporate lessons learned into future training and practices.				
	Write a few examples as evidence for your organization's current level					
	Write a few examples of opportunities for improvement					
III.A.4	**Enable the Lean Enterprise with Information Systems and Tools** - Facilitate the flow of information and knowledge	The information infrastructure in your organization consists mainly of stand-alone systems. The need for systems integration is recognized, but no improvement plan exists.	Elements of a common information infrastructure have been determined, and an implementation plan is under development. Maintenance of legacy systems consume most of your organization's IT resources.	The information infrastructure has been formalized and is in use in selected locations. Legacy systems are used only when necessary.	An information infrastructure is deployed that supports seamless information exchange across the organization.	Information systems between your organization and those of your are fully interoperable and the pertinent information is easily accessible and usable across the to your customer and supplier/partners.
		☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State
	Lean Indicators (examples)	- Compatible information systems and tools exist across the extended enterprise - Information Systems facilitate fast and effective transfer and retrieval of information required. - Information systems and tools compliment lean processes and practices and are easily adapted to accommodate change.				
	Write a few examples as evidence for your organization's current level					
	Write a few examples of opportunities for improvement					
III.A.5	**Integration of Environmental Protection, Health and Safety into the Business** - Cleaner, healthier, safer	Your organization complies with all known legal and regulatory requirements, and reacts if issues are identified.	Your organization gives consideration to means of mitigating conditions that cause environmental, health, and safety issues.	A process is in place to proactively identify environmental health and safety risks, and manage them appropriately, with a preference for source prevention	Forward-thinking solutions to environmental health and safety risks are implemented early in the product / service design, and continues throughout the life cycle of the product or service.	Environmental health and safety risk prevention and mitigation is part of the natural way business is conducted across the extended enterprise, creating a sustainable "safe" environment, and creating a competitive advantage for your enterprise.
		☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State
	Lean Indicators (examples)	- Health and safety issues are routinely addressed in employee driven improvement activities. - Processes and designs are proactively adapted to minimize environmental, health and safety issues at the source. - Designs meet current environmental regulations and are capable of easy adaptation to future requirements over the life cycle of the product.				
	Write a few examples as evidence for your organization's current level					
	Write a few examples of opportunities for improvement					

II.B. Lean Process Enablers - A number of "enablers" can facilitate lean implementation by the consistent application of processes throughout the enterprise.	
Diagnostic Questions	- Hs process standardization and knowledge re-use been imbedded in your organization's policies and procedures? - Have the full benefits from process standardization been realized across your organization? - Are common tools and systems used throughout your organization? Your suppliers? Your customers? - Is process variation diligently reviewed and reduced in all processes throughout your organization? - Has "Lean" become a vision shared by all employees in your organization?

LP#	Lean Practices	Capability Levels				
		Level 1	***Level 2***	***Level 3***	***Level 4***	***Level 5***
III.B.1	**Process Standardization** - Strive for consistency and re-use of knowledge.	Processes vary by program or product line, even for similar products.	Key processes in the organization have been identified that could benefit from standardization, with initial efforts underway.	Selected processes are standardized organization-wide.	Process standardization and knowledge re-use is consistently employed within your organization.	Interface processes between you and your suppliers and customers have been identified and standardized.
		☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State
	Lean Indicators (examples)	- The workforce plays a significant role in devising standard processes and practices, which are adhered to by all, and periodically updated. - Process improvements are documented in a concise and easy-to-understand format. The information is provided to key stakeholders as needed. - Processes are standardized where applicable throughout the extended enterprise.				
	Write a few examples as evidence for your organization's current level					
	Write a few examples of opportunities for improvement					
III.B.2	**Common Tools and Systems** - Assuring compatibility, reducing costs	Tools and systems vary by program of work center.	Your organization has identified high leverage opportunities for common tools and systems, and initial deployment is underway in a few areas.	Plans are in place for achieving common tools and systems have been implemented to varying degrees across your organization.	Common tools and systems have been fully implemented throughout your organization.	Your tools and systems are fully compatible with those of your enterprise strategic partners and customers.
		☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State
	Lean Indicators (examples)	- Policies have been established and deployed that require the use of common tools and systems throughout your organization. - Common tools and systems provide easy access and re-use of knowledge across the product life cycle. - organization-wide use of common tools and systems provides enhanced compatibility between processes and aids employee transfer.				
	Write a few examples as evidence for your organization's current level					
	Write a few examples of opportunities for improvement					
III.B.3	**Variation Reduction** - Reduce uncertainty by reducing variation	There is limited use of variation reduction tools and methods in your organization.	There is evidence that sources of variation are being identified and analyzed within your organization. Initial efforts are underway to reduce variability.	A formal approach that balances customer value and variation reduction is implemented in many parts of your organization.	Considerable benefits are realized from reduced variation in process and practices across your organization.	Benefits of reduced variation are realized across the extended enterprise, from your suppliers to your customer.
		☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State	☐ Current State ☐ Desired State
	Lean Indicators (examples)	- Process ownership and visual displays of process variation enable quick and easy identification of adverse trends - High levels of process stability are maintained by utilizing mistake-proofing and root cause identification techniques. - Variation reductions achieved enable short predictable lead times for information and material flow.				
	Write a few examples as evidence for your organization's current level					
	Write a few examples of opportunities for improvement					

Nelle prime due tabelle dell'assessment di fig 3.23 viene mostrato come andare a segnare la situazione corrente descritta dalla risposta e quella desiderata.

Date le risposte, si trova una tabella riassuntiva (Tab 3.9) nella quale viene mostrato il divario (gap) tra la situazione attuale e quella desiderata per ogni sezione dell'assessment.

Tab 3.9: Tabella riassuntiva dei risultati

TTL LINK	Lean Practice	Rating	Your Response	Gap
LEAN TRANSFORMATION/LEADERSHIP				
I.A Enterprise strategic planning	I.A.1. Integration of lean in strategic planning process	Current	2	
		Desired	4	2
	I.A.2. Focus on customer value	Current	3	
		Desired	4	1
	I.A.3. Leveraging the extended enterprise	Current	1	
		Desired	3	2
I.B Adopt Lean Paradigm	I.B.1. Learning and education in 'lean' for enterprise leaders	Current	2	
		Desired	3	1
	I.B.2. Senior management commitment	Current	1	
		Desired	2	1
	I.B.3 Lean Enterprise Vision	Current	1	
		Desired	3	2
	I.B.4. A sense of urgency	Current	2	
		Desired	4	2
I.C Focus on the Value Stream	I.C.1. Understanding the current value stream	Current		
		Desired		0
	I.C.2. Enterprise flow	Current		
		Desired		
	I.C.3. Designing the future value stream	Current		
		Desired		0
	I.C.4. Performance measures	Current		
		Desired		0
I.D Develop lean Structure and Behavior	I.D.1. Enterprise organizational orientation	Current		
		Desired		0
	I.D.2. Relationships based on mutual trust	Current		
		Desired		0
	I.D.3. Open and timely communications	Current		
		Desired		0
	I.D.4. Employee empowerment	Current		
		Desired		
	I.D.5. Incentive alignment	Current		
		Desired		0
	I.D.6. Innovation encouragement	Current		
		Desired		
	I.D.7. Lean change agents	Current		
		Desired		0
I.E Create and Refine Implementation Plan	I.E.1. Enterprise level lean implementation plan	Current		
		Desired		0
	I.E.2. Commit resources for lean improvements	Current		
		Desired		0
	I.E.3. Provide education and training	Current		
		Desired		

I.F Implement Lean Initiatives	I.F.1. Development of detailed plans based on enterprise plan	Current		
		Desired		0
	I.F.2. Tracking detailed implementation	Current		
		Desired		
I.G Focus on Continuous Improvement	I.G.1. Structured continuous improvement process	Current		
		Desired		0
	I.G.2. Monitoring lean progress	Current		
		Desired		0
	I.G.3. Nurturing the process	Current		
		Desired		0
	I.G.4. Capturing lessons learned	Current		
		Desired		0
	I.G.5. Impacting enterprise strategic planning	Current		
		Desired		0

SECTION II - LIFE CYCLE PROCESSES

TTL LINK	Lean Practice			
II.A. Business Acquisition and Program Management	II.A.1. Leverage lean capability for business growth	Current		
		Desired		0
	II.A.2. Optimize the capability and utilization of assets	Current		
		Desired		0
	II.A.3. Provide capability to manage risk, cost, schedule and performance	Current		
		Desired		0
	II.A.4. Resource and empower program development efforts	Current		
		Desired		0
II. B. Requirements Definition	II.B.1. Establish a requirements definition process to optimize lifecycle value	Current		
		Desired		
	II.B.2. Utilize data from the extended enterprise to optimize future requirement definitions	Current		
		Desired		0
II.C. Develop Product and Process	II.C.1. Incorporate customer value into design of products and processes	Current		
		Desired		0
	II.C.2. Incorporate downstream stakeholder values into products and processes	Current		
		Desired		0
	II.C.3. Integrate product and process development	Current		
		Desired		0
II.D. Supply Chain Management	II.D.1. Define and develop supplier network	Current		
		Desired		0
	II.D.2. Optimize network-wide performance	Current		
		Desired		
	II.D.3. Foster innovation and knowledge-sharing throughout the supplier network	Current		
		Desired		0

II.E. Produce Product	II.E.1. Utilize production knowledge and capabilities for competitive advantage	Current		
		Desired		0
	II.E.2. Establish and maintain a lean production system	Current		
		Desired		0
	II.E. 3 Production Constraints Identification	Current		
		Desired		0
II.F. Distribute and Service Product	II.F.1. Align sales and marketing to production	Current		
		Desired		0
	II.F.2. Distribute product in lean fashion	Current		
		Desired		0
	II.F.3. Enhance value of delivered products and services to customers and the enterprise	Current		
		Desired		0
	sustainability	Current		
		Desired		0
SECTION III - ENABLING INFRASTRUCTURE				
TTL LINK	**Lean Practice**			
III.A. Lean Organizational Enablers	III.A.1. Financial system supports lean transformation	Current		
		Desired		0
	III.A.2. Enterprise stakeholders pull required financial information	Current		
		Desired		0
	III.A.3. Promulgate the learning organization	Current		
		Desired		0
	III.A.4. Enable the lean enterprise with information systems and tools	Current		
		Desired		0
	III.A.5. Integration of environmental protection, heath and safety into the business	Current		
		Desired		0
III.B. Lean Process Enablers	III.B.1. Process standardization	Current		
		Desired		0
	III.B.2. Common tools and systems	Current		
		Desired		0
	III.B.3. Variation reduction	Current		
		Desired		0

Il tutto viene poi visualizzato in un grafico, tipo istogramma, nel quale vengono mostrate le risposte a tutte le pratiche con il relativo gap (Fig 3.24).

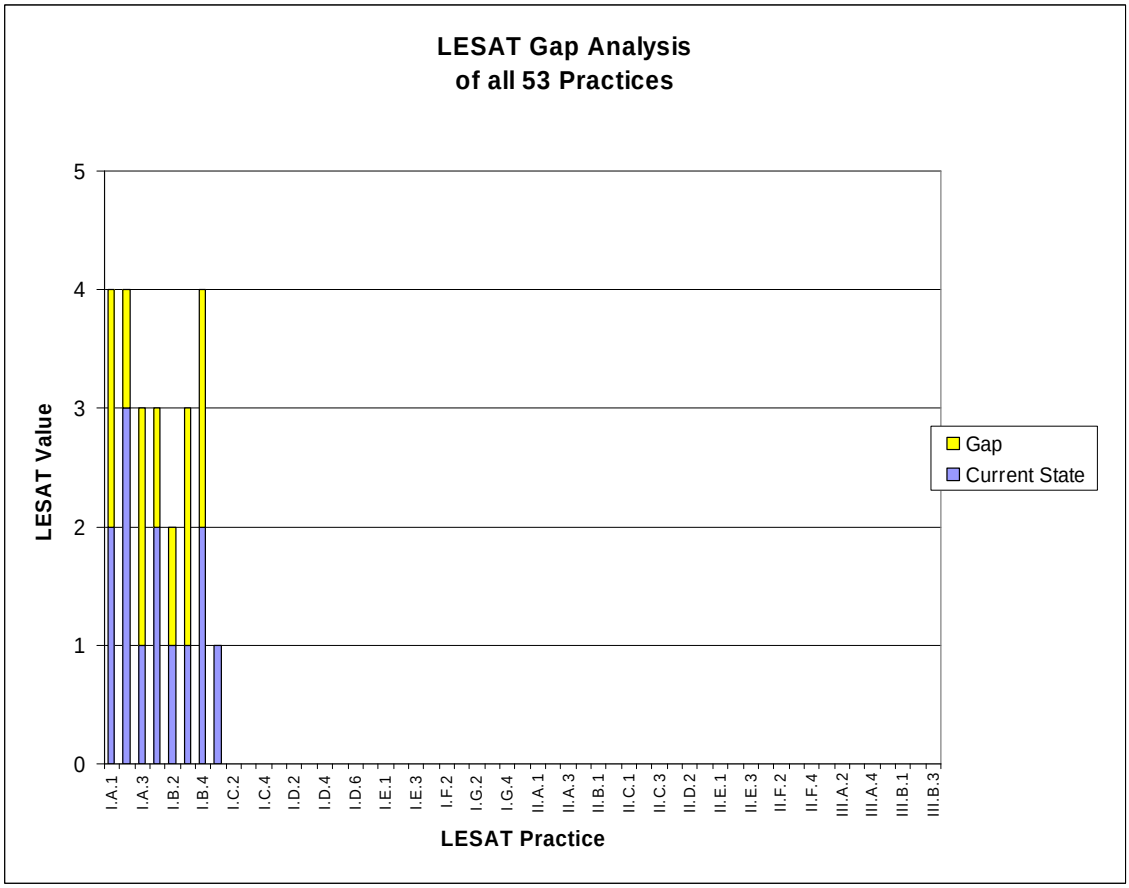


Fig 3.24: Visualizzazione dei risultati per pratica.

Un altro grafico, identico nella struttura al primo, mostra invece il risultato per ogni categoria (Fig 3.25).

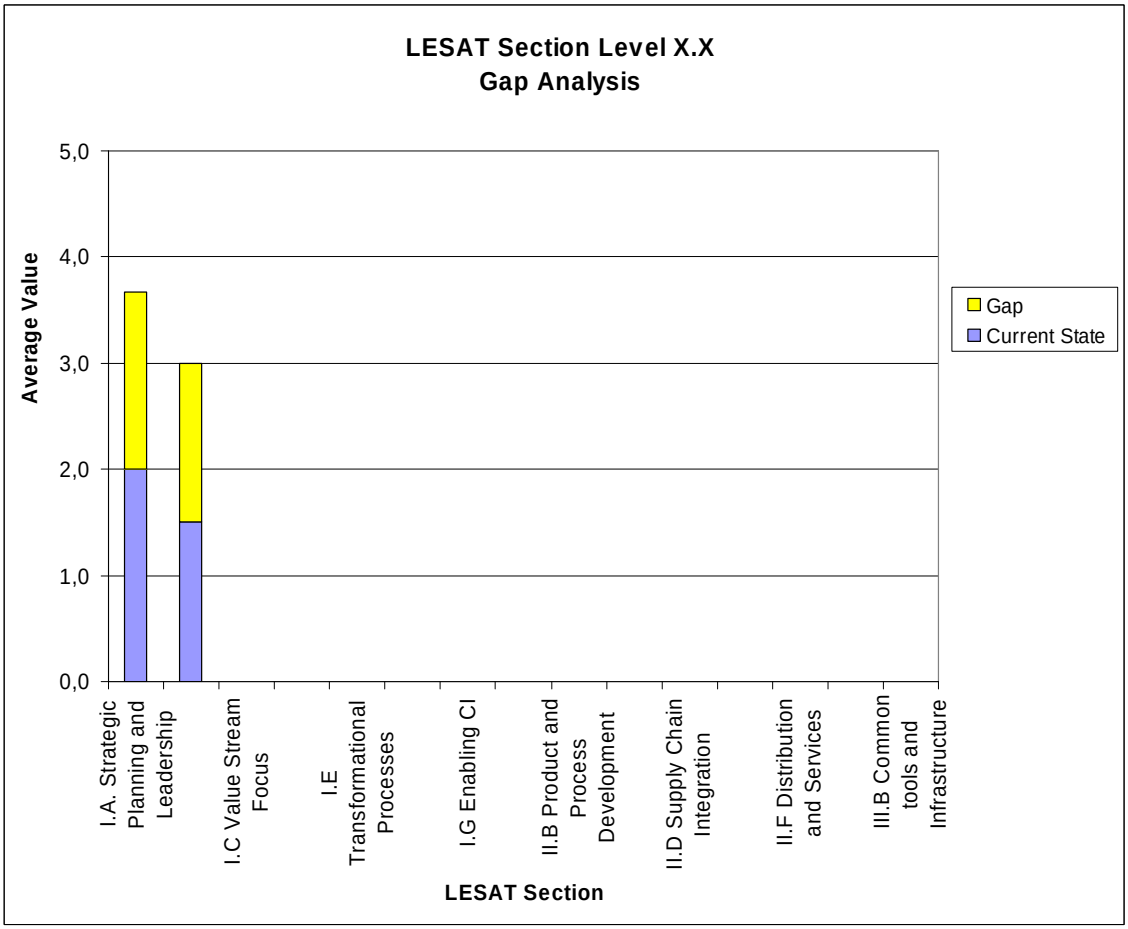


Fig 3.25: Visualizzazione dei risultati per categoria

L'ultimo grafico considera solamente le tre sezioni che raggruppano le varie categorie (Fig 3.26).

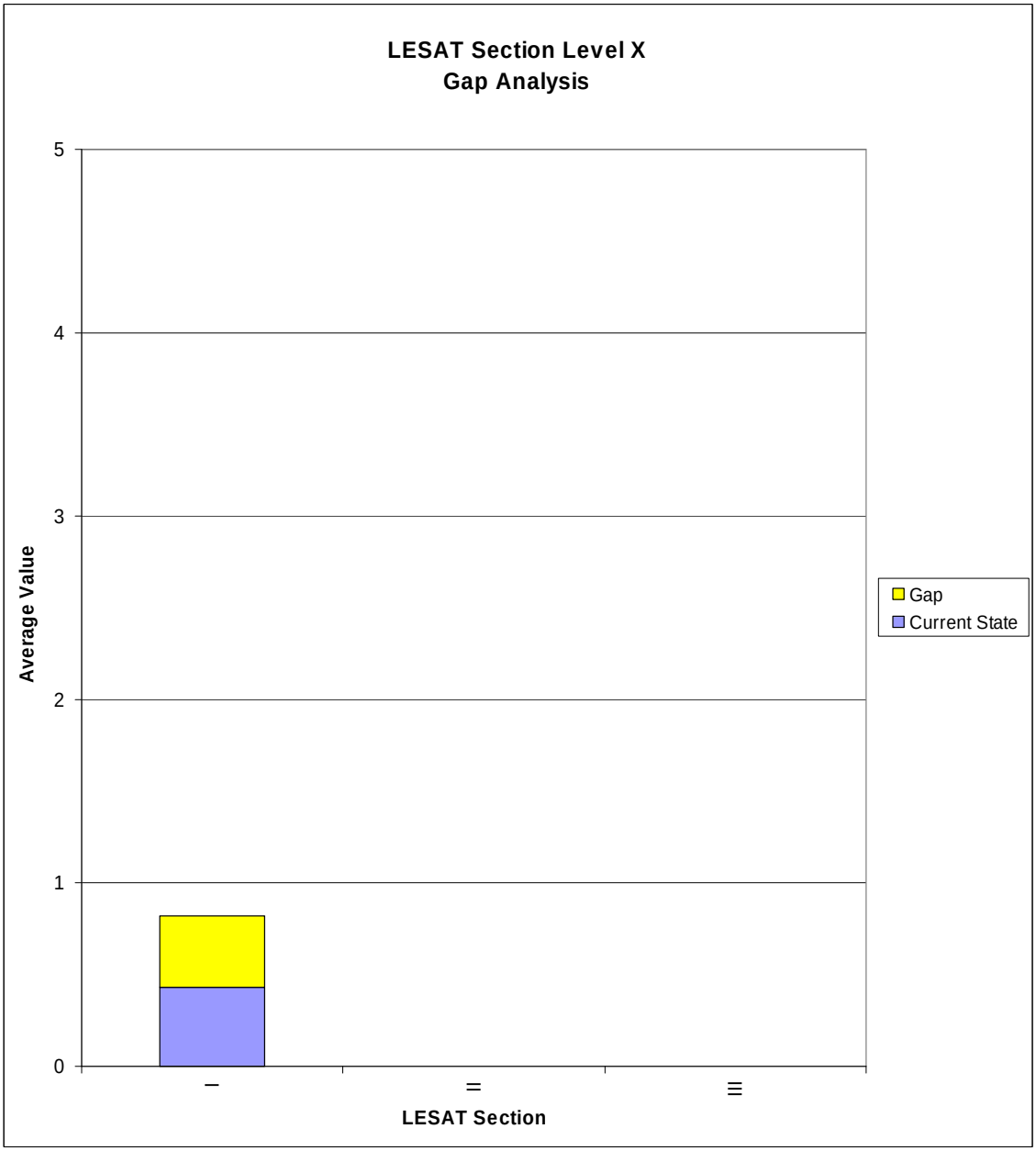


Fig 3.26: Visualizzazione dei risultati per sezione.

Tutti i risultati per sezione vengono riassunti nella tabella 3.10.

LESAT Section X.X	Current State	Gap
I	0,428571	0,392857
II	0	0
III	0	0

Tab 3.10: Risultati per sezione

Il valore calcolato nella tabella 3.10 si ottiene dividendo il punteggio totale risultato dalle risposte al current state della prima sezione con il numero totale delle domande della medesima.

Per ogni sezione viene visualizzato un radar chart nel quale sono riportati i risultati ottenuti per ogni categoria riguardanti la situazione attuale e quella desiderata, mostrando il gap (Fig 3.27, 3.28, 3.29).

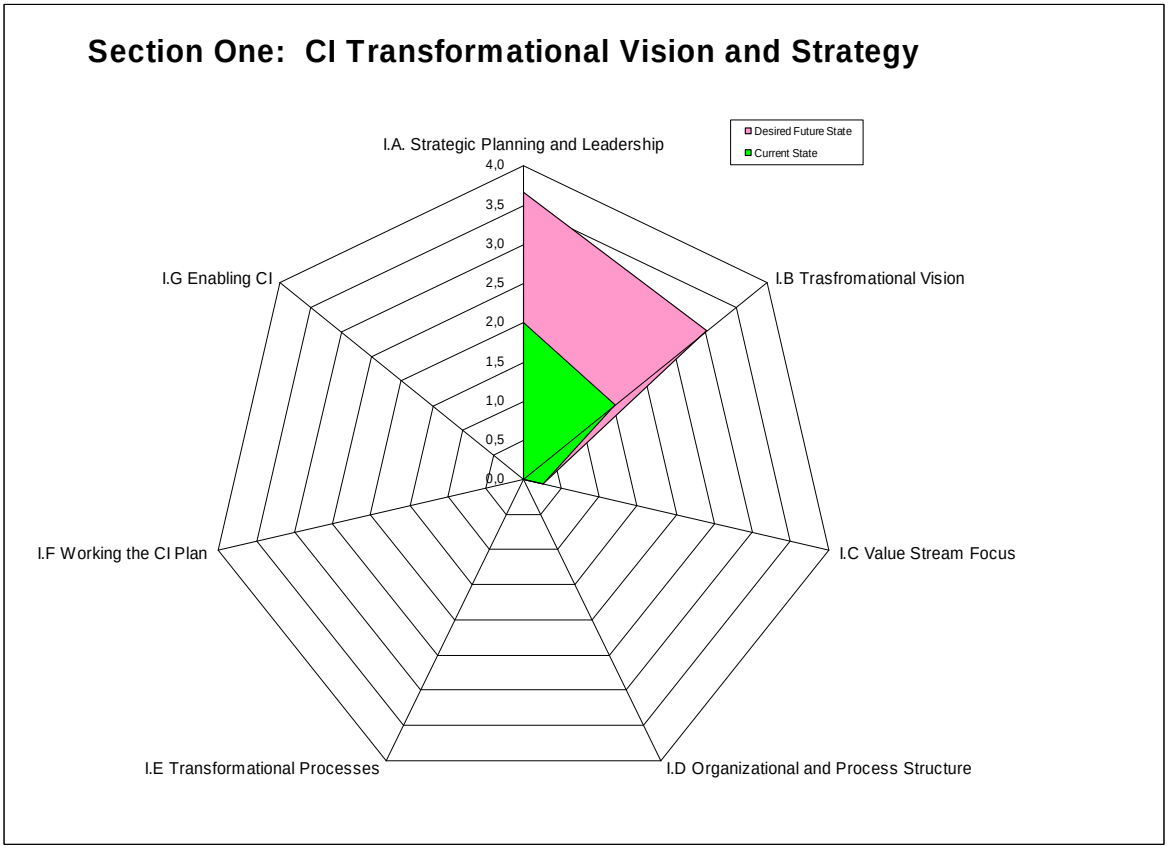


Fig 3.27: Radar chart dei risultati della prima sezione

Nella fig 3.27 viene mostrato come come si vanno a posizionare nel radar chart i risultati ottenuti (nei radar chart successivi non è mostrata questo ma accade l'identica cosa).

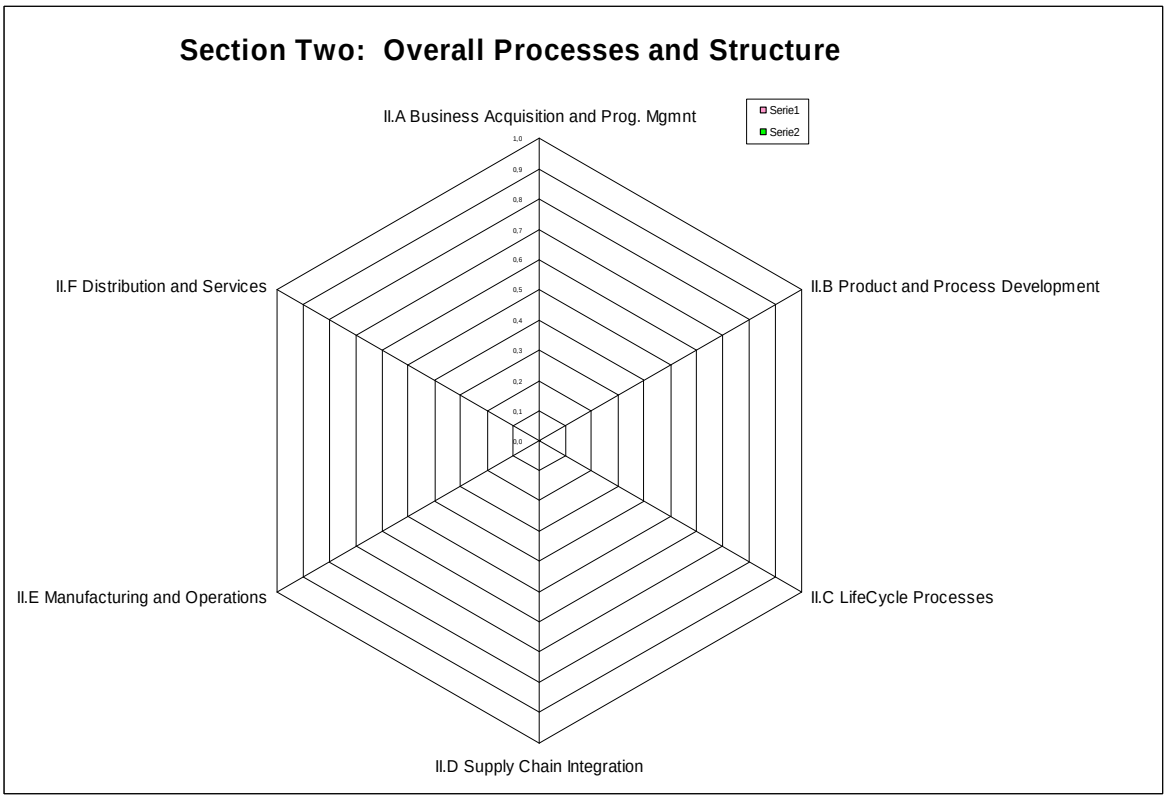


Fig 3.28: Radar chart dei risultati della seconda sezione

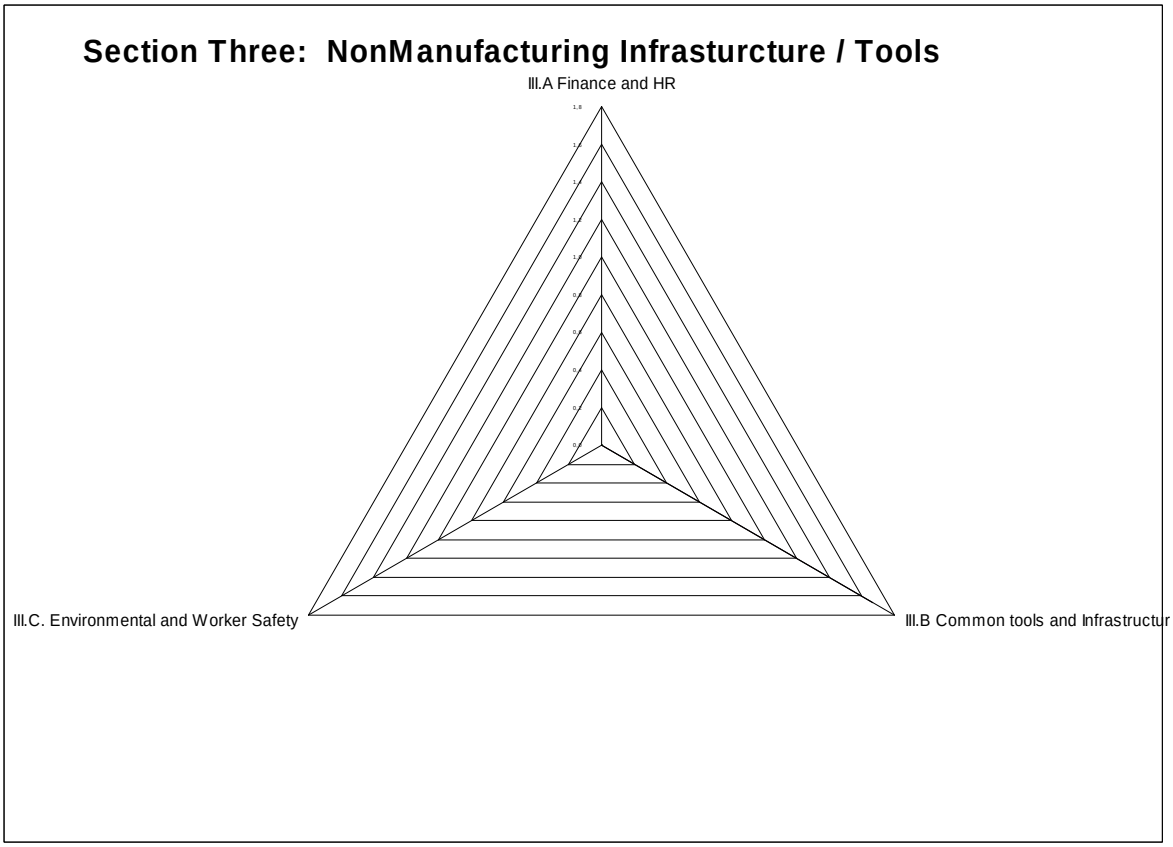


Fig 3.29: Radar chart dei risultati della terza sezione

CAPITOLO 4

ANALISI DELLE PRATICHE LEAN

In questo capitolo andremo a prendere in esame i diversi modelli di assessment, analizzati nel capitolo tre, considerando le diverse variabili, pratiche o categorie lean che vengono inserite nei tool per verificare l'implementazione della lean o valutare a quale livello è lo stato attuale dell'azienda o del processo.
Nel seguito considereremo due tabelle o matrici. Nella prima metteremo a confronto le diverse aree o categorie lean che si trovano nei tool e si verifica quali di queste è più presente nei diversi assessment valutati.
Esaminate quali siano le più usate, andremo a considerare ognuna di esse e costruiremo una tabella nella quale si andrà a accertare quali siano le variabili, considerate all'interno della categoria, più presenti nei vari modelli di assessment.

4.1 – ANALISI DELLE AREE

Quando viene organizzato un tool ciò che deve fare chi si mette all'opera nel realizzarlo è pensare, in base al processo, prodotto o struttura dell'azienda da valutare, quali sono le aree adatte da inserire per poter poi somministrarlo a chi di dovere. Dagli assessment analizzati nel capitolo tre si nota che solitamente le categorie considerate vanno da dieci a quindici.
Di seguito andremo a realizzare una tabella (Tab 4.1) nella quale andremo a verificare quali aree sono più presenti nei diversi assessment. Nelle colonne trovano posto i tools, nelle righe tutte le aree valutate nei modelli visti nel capitolo tre. In rosso vengono segnate le categorie che hanno un numero di "x" pari a sei, cinque o quattro.

Modelli / Aree	Bok	Isi Lean Value Stream Assessment	Lmr Assembly Assessment Tool	Lean Assessment Strategos	The Cip Assessment	Ame Lean Assessment	Lean Manufacturing Assessment	The Power Lean Assessment	Lean Assessment Tool (Process Coaching)	Lesat
Continuous Improvement	X	X				X		X	X	X
Maintenance				X						
Jidoka			X							
Value Stream						X		X		X
Supply Chain		X		X		X		X	X	X
Six Sigma								X		
Pull Systems		X				X				
Just in Time			X				X			
Standard Work		X	X			X		X		
Quality		X		X			X		X	
Culture	X				X	X				
Quick Changeover		X	X				X			
Tpm		X	X			X	X	X		
Strategy					X			X		X
Workplace Organization		X	X			X		X	X	
Set Up Reduction				X		X		X		
Training							X	X		
Performance Measurement		X								
Team				X	X		X			
Plant Layout				X		X				
People			X				X			
Develop Product and Process Design				X		X				X
Operator Flexibility		X								
Participation					X				X	
Poka Yoke		X								
Material Flow						X	X		X	
Accounting Support for Lean		X				X				
Scheduling				X						
Produce Product										X
Management Support						X				
Metrics								X		
Manufacturing Excellence							X			
Dynamic Leadership					X					
Organizational Learning					X					
Lean Process Enablers										X
Commitment								X		
Visual Control							X	X	X	

Tab 4.1: Presenza delle aree nei diversi modelli di assessment

4.2 – ANALISI DELLE VARIABILI

Delle aree che sono state considerate nella tabella 4.1 andremo a considerarne cinque più presenti. La prima che viene esaminata (Tab 4.2) è la Workplace Organization (Organizzazione del posto di lavoro). In essa si trovano alcune delle variabili che analizzano l'organizzazione delle postazioni di lavoro, dalla pulizia all'ordine.

La seconda area più presente (Tab 4.3) nei diversi assessment è la Supply Chain (Catena di Fornitura). Questa categoria riguarda la fornitura di materiale, i fornitori e il rapporto con essi. E' fondamentale aver ben presente la propria rete di fornitori e come vengono coinvolti nel processo di produzione di un dato prodotto. Nell'ottica di "creazione di valore" per il cliente finale è bene che le materie prime e i materiali acquistati siano di buona qualità. Un'azienda lean coinvolge i propri fornitori nel miglioramento della produzione del prodotto.

La terza categoria (Tab 4.4) è quella del Continuous Improvement (Miglioramento Continuo). Un'azienda che vuole essere lean o che si reputa essere lean non deve mai pensare di aver raggiunto la perfezione ma deve continuare sempre a migliorare e migliorarsi. Questo perché non c'è mai fine al processo di riduzione di costi e sprechi, con l'obiettivo di realizzare i desideri del cliente finale e creare valore per esso. Il miglioramento non deve essere solo sul processo ma anche sul modo di pensare dei manager e dei dipendenti che "ruotano" attorno al prodotto.

La quarta categoria (Tab 4.5) che viene di seguito analizzata è quella del Total Productive Maintenance (Manutenzione Totale). In essa viene valutata come avviene la manutenzione dei macchinari, in quale maniera e in quale momento viene fatta.

E' un'area molto importante: un'azienda che vuole essere lean deve ridurre o eliminare i tempi derivanti dal blocco di una macchina nella fase di produzione e quindi effettuare una preventiva manutenzione di tutto ciò che serve alla realizzazione del prodotto finale. Quindi un'azienda lean progetta un programma di manutenzione al fine di evitare rotture ed interruzioni e far proseguire il flusso del valore.

La quinta area analizzata (Tab 4.6) è quella dello Standard Work (Lavoro Standard). Standardizzare e soprattutto mostrare come si deve operare per un dato lavoro aiuta i dipendenti alla realizzazione del prodotto e a ridurre i tempi e i costi. In questo modo un'azienda lean può migliorare la propria produttività. Nello Standard Work vengono incorporati tutti gli aspetti della sicurezza e della qualità richiesti per supportare i

dipendenti e il cliente finale. Inoltre permette alle squadre di lavoro di gestire meglio le operazioni giornaliere.

La sesta e ultima categoria più presente nella tabella 4.1 è quella della Qualità (Tab 4.7). Essa interessa i processi, la qualità dei prodotti, il raggiungimento di "zero difetti". Un'azienda deve cercare di realizzare prodotti che siano di ottima qualità, in modo tale da non avere poi problemi di ritorno dello stesso da parte del cliente finale. Quindi all'interno dell'impresa dovranno esserci controlli di qualità sul materiale in entrata e sui processi di produzione dell'azienda stessa.

WORKPLACE ORGANIZATION

Modelli / Variabili	Isi Lean Value Stream Assessment	Lmr Assembly Assessment Tool	Ame Lean Assessment	Lean Manufacturing Assessment	Lean Assessment Tool (Process Coaching)
Cleanliness	X	X		X	X
Visual Factory		X			
Safety		X			X
Politics				X	
Order	X	X		X	X
Lighting/Brightnesss					X
Responsibility of Workers	X	X		X	
Placement of Materials	X			X	
Visual Control		X			
Display Board	X				
Audits Evident		X			
5s Principles		X	X		

Tab 4.2: Presenza delle variabili all'interno dei diversi modelli

SUPPLY CHAIN

Modelli / Variabili	Isi Lean Value Stream Assessment	Lesat	Lean Assessment Strategos	Ame Lean Assessment	The Power Lean Assessment	Lean Assessment Tool (Process Coaching)
On-Time Delivery	X		X		X	
Pull Systems				X		
Acquisition Team Formation	X					
Communication with Suppliers	X				X	
Involvement of Suppliers	X					
Innovation with Suppliers		X				
Supplier Quality			X			X
Knowledge of Cost				X		
Number of Suppliers		X	X			
Quality Performance of Suppliers	X				X	
Suppliers Certification				X		
Price Benchmarking						X
Material delivered Directly			X			
Input to the Suppliers	X					
Cost Management						X
Define and Develop Supplier Network		X				

Tab 4.3: Presenza delle variabili nei diversi assessment.

CONTINUOUS IMPROVEMENT

Modelli / Variabili	Lean Assessment Tool (Process Coaching)	Isi Lean Value Stream Assessment	Bok	The Power Lean Assessment	Ame Lean Assessment	Lesat
Waste Culture/Elimination	X	X				
Kaizen Projects/Events		X		X		
Presence of a Champion/Leader		X		X		
Involvement of Employees	X	X			X	
Use of Outside Eyes					X	
Training and Education		X		X	X	
Continuous Improvement Teams	X					
PRC and Process Change Implementation	X					
Monitoring Lean Progress						X
Operators and Office Personnel Meetings	X					
Nurturing the Process						X
Principles of C. I.			X			
C.I. Process Systems			X			
Capturing Lessons Learned						X

Tab 4.4: Presenza delle variabili nei diversi assessment

TOTAL PRODUCTIVE MAINTENANCE

Modelli / Variabili	Isi Lean Value Stream Assessment	Lean Manufacturing Assessment	Lmr Assembly Assessment Tool	Ame Lean Assessment	The Power Lean Assessment
Planned Maintenance		X	X		X
Autonomous Maintenance			X		
Maintenance Records	X	X		X	X
Safety	X				
TPM Training	X	X	X	X	
Communication of Stops or Breakdowns		X			
Preventive Maintenance	X			X	X
OEE (Overall Equipment Effectiveness)			X		

Tab 4.5: Presenza delle variabili nei diversi assessment

STANDARD WORK

Modelli / Variabili	Isi Lean Value Stream Assessment	Lmr Assembly Assessment Tool	Ame Lean Assessment	The Power Lean Assessment
Takt Time	X	X		X
Standard Procedures	X	X	X	X
Regular Audits		X		X
Value Added/Non Value Added Operation Displayed	X	X		

Tab 4.6: Presenza delle variabili nei diversi assessment

QUALITY

Modelli / Variabili	Isi Lean Value Stream Assessment	Lean Assessment Strategos	Lean Manufacturing Assessment	Lean Assessment Tool (Process Coaching)
Supplier Quality	X			X
Fmea	X			
Quality Control			X	
Overall Defect Rate		X		
Spc Training		X		X
Returned Material	X			
Documentation for Production, Measurement			X	
Zero Defects Policy	X			X
Operations Controlled with Spc		X		
Quality of work			X	
Root Cause Problem Solving				X

Tab 4.7: Presenza delle variabili nei diversi assessment

Come si può vedere, le aree e le variabili considerate nei diversi assessment e che si sono qui analizzate sono più o meno le stesse. Quindi quello che viene preso in considerazione nell'organizzare i vari tools sono i diversi aspetti strutturali e ciò che gira attorno al processo di produzione e al prodotto stesso: pensiamo ai fornitori e alla manutenzione ad esempio. Sono comunque tutti aspetti che a suo tempo (e ci si riferisce a circa cinquant'anni fa) Ohno aveva intuito che bisognava cambiare e renderli adeguati a quello che deve essere il risultato finale: il valore per il cliente finale.

L'obiettivo per un'azienda che vuole essere snella resta sempre e comunque di eliminare gli sprechi e far fluire il flusso di valore senza interruzioni, coinvolgendo i dipendenti nel miglioramento del prodotto.

4.3 – ANALISI DEI RISULTATI

Analizzando i diversi assessment nella loro struttura e valutando le aree e le variabili che vengono utilizzate per verificare l'andamento in logica lean di un'azienda o di un processo, si evince che sono molteplici gli aspetti considerati.
Nella tabella 4.1 e nel paragrafo 4.1 si sono valutate le aree più presenti all'interno dei diversi tools, alcune più importanti di altre in questi. Dalla ricerca effettuata sulle aree si potrebbe proporre un assessment "minimo", cioè un assessment nel quale inserire almeno le categorie qui trovate.
Quindi in un possibile progetto di Lean Assessment si potrebbero inserire le seguenti aree:

1. Workplace Organization;
2. Supply Chain;
3. Continuous Improvement;
4. Total Productive Maintenance;
5. Standard Work;
6. Quality.

Sono tutti aspetti fondamentali e adatti allo scopo finale della fase di Lean Assessment: considerare quanto distanti ci si trova dall'eccellenza.
Quello che viene qui proposto è una possibile scelta delle aree da inserire, potrebbe risultare una possibile idea da cui sviluppare un modello di assessment.
Quindi lo si può considerare come un punto di partenza: naturalmente deve essere analizzata l'azienda nel suo complesso e verificare se queste aree, all'interno della stessa, sono possibili identificatici di questioni o problemi da risolvere per poter raggiungere i livelli di un'azienda Lean Top Class. Di certo rappresentano una buona parte delle "fondamenta" su cui si basa un'impresa o un processo produttivo.
All'interno delle categorie che sono state analizzate e considerate come facenti parte di un modello ideale per il Lean Assessment sono state poi ricercate quali sono le variabili più accreditate su cui poter porre delle domande e un criterio di valutazione.
Delle sei aree che sono state analizzate certamente alcune sono più importanti di altre e sulle quali ci si può concentrare di più. Ad esempio, la Supply Chain è fondamentale in quanto riguarda i rapporti con i fornitori e di conseguenza la qualità delle materie prime o dei semilavorati.

Dalla tabella 4.1 comunque ci si può fare un'idea di quali sono le categorie lean più esaminate e più usate nell'impostare un assessment e quindi essere un aiuto per chi si appresta a ideare un modello da proporre ad un'azienda.
Di seguito viene presentata una tabella riepilogativa (Tab 4.8) nella quale viene fatta la distinzione delle aree in classi: classe A (presenze nella tabella 4.1 nei diversi assessment maggiore o uguale a 4), aree di classe B (presenze nei modelli uguale a 3), aree di classe C (presenze minori o uguale a 2).

	CLASSE A	CLASSE B	CLASSE C
Presenze	6	9	22

Tab 4.8: Suddivisione in classi della presenza delle aree

CONCLUSIONI

Ciò che si è voluto mostrare in questa tesi è il modo in cui viene impostato solitamente il lavoro da effettuare nella fase di Lean Assessment, i modi di operare, come gestirne i risultati ed approntare il piano d'azione.

E' fondamentale poter misurare la propria azienda e verificare a quale livello ci si trova: tramite i tools si riesce ad avere un'idea della propria situazione. Questo è quello che si prefigge chi ha intenzione di iniziare un percorso lean. Sono ormai diversi gli assessment che vengono utilizzati dalle aziende, gestiti e implementati da diverse società di consulenza. Nel web si sono trovati diversi esempi di assessment di cui alcuni sono stati illustrati ed analizzati nel capitolo tre.

Come si è visto sono molte le pratiche lean che vengono considerate all'interno dei tools, essenziali ai fini della ricerca degli sprechi da eliminare e delle carenze nello sviluppo e nei processi di prodotto. Si è pure evidenziato come il lean assessment sia utile anche per capire come prosegue l'applicazione della logica lean all'interno dell'azienda, andando a sottoporre lo stesso tool dopo un certo periodo di tempo. Infine dalla ricerca effettuata nell'ambito delle categorie lean è stato proposto un possibile modello di assessment "minimo" dal quale partire e cominciare a sviluppare un'idea.

Da quello che è stato esposto in questa tesi si evince come al centro della valutazione ci sia sempre e comunque il cliente finale, la sua soddisfazione, creare valore per esso: è l'unica maniera perché un'azienda possa cercare di prendersi una quota del mercato, ma soprattutto restarci dentro.

"You can't manage what you don't measure, and you can't succeed if you don't manage" (Roger Kremer, 2010). Questa frase racchiude quello che è lo scopo principale del Lean Assessment: misurare, valutare lo stato della propria azienda per rendersi conto in quale modo e in cosa bisogna migliorare per poter riuscire ad avere succeso nel mercato globale. Ormai negli ultimi tempi la logica lean è entrata a far parte del modo di gestire e di pensare di un'azienda, mettendo in gioco molte risorse economiche e non solo. Più che una filosofia sta diventando una vera e propria cultura che si sta diffondendo sempre più velocemente, soprattutto dovuto al periodo di crisi mondiale che si sta vivendo negli ultimi anni.

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