Prohibido detenerse

¿Qué impulsa a Toyota? La obsesión institucional por las mejoras y la falta de complacencia de sus empleados. Mientras GM, Chrysler y Ford están en problemas, la automotriz de origen japonés prospera sin descanso.

Por Charles Fishman

En el interior de la planta fabril de Toyota —en Georgetown, Kentucky, la más grande de la automotriz fuera de Japón— está el taller de pintura, al que llegan las carrocerías de acero de los automóviles para recibir varias capas de pintura, antes de volver a la línea de montaje donde se colocan los interiores y el motor. Cada día, 2.000 modelos Camry, Avalon y Solara desfilan ante una serie de robots cuidadosamente programados, que son los encargados de pintarlos.

El taller es amplio y está abarrotado, pero hay dos grandes superficies de piso de hormigón a cielo abierto, cada una de las cuales con el tamaño de una cancha de básquet. La historia sobre cómo se desmantelaron y retiraron toneladas de equipos para dejar esos espacios libres es, en realidad, la historia de la manera en que Toyota dio nueva forma al mercado automotor de los Estados Unidos.

Es, en esencia, la historia de la competitividad insaciable de Toyota, que no parecería estadounidense si no fuera por la cantidad de estadounidenses que la hacen posible. Una competitividad interna y autocrítica, que tiene sus raíces en la obsesión institucional por las mejoras, preocupación que la empresa infunde en cada uno de sus trabajadores; una ausencia absoluta de complacencia con todo lo que fue logrado ayer.

El resultado es un contraste asombroso con el sector automotor. En una época en la que las Tres Grandes (GM, Ford y DaymlerChrysler) están en dificultades, Toyota prospera. Durante el año 2006, Ford y GM despidieron a 46.000 empleados estadounidenses. En conjunto, anunciaron que en el transcurso de los próximos cinco años cerrarán 26 fábricas en América del Norte. Por el contrario, Toyota jamás cerró una fábrica en la región, y hasta abrirá una nueva en Texas en 2007, y otra en Ontario en 2008. No son las importaciones las que están venciendo a Detroit: el 60 por ciento de los automóviles que Toyota vende en América del Norte se fabrican en ese territorio.

Sin curvas peligrosas

Toyota no registra convulsiones corporativas; es más, nunca las tuvo. Se reestructura poco a poco con cada cambio de turno. Resultado de ello son los espacios abiertos del taller de pintura de Georgetown.

Con su delicado acento sureño y su extrema amabilidad, Chad Buckner ayudó a despejar el lugar. Buckner llegó al departamento de Pintura sin escala previa desde la Universidad de Kentucky, hace 13 años. Hizo toda su carrera en la compañía.

En 2004, pintar la carrocería de un auto demandaba 10 horas. Los robots hacían buena parte del trabajo, al igual que ahora, pero recibían la pintura a través de largas mangueras conectadas a los tanques de almacenamiento. "Si estábamos pintando un automóvil de color rojo, antes de pintar el próximo de color blanco debíamos hacer un intervalo, eliminar la pintura roja de las líneas y del pico aplicador, y luego cargar el siguiente color", detalla Buckner. Con ese método, la planta de Georgetown desperdiciaba el 30 por ciento de la costosa pintura que compraba.

Ahora, cada robot —ocho por automóvil— selecciona un cilindro de pintura del tamaño de una botella grande de agua. Un disco giratorio, colocado en el extremo del brazo del robot, arroja un vapor de pintura de acabado. Y el vehículo se pinta en sólo dos segundos. A continuación, el cartucho desciende y el robot selecciona otro con pintura fresca.

Ya no es necesario alimentar mangueras, ni hace falta limpieza entre un auto y otro. Toda la pintura está en los cartuchos, que se rellenan de manera automática desde los tanques. Tampoco hay que separar los automóviles en lotes según el color, un sistema que ahorraba pintura pero ocasionaba constantes demoras. Ahora, los vehículos pasan ocho horas en el taller, en vez de 10.

"Estamos muy orgullosos de lo que logramos. Pero no hay que detenerse. No hay que detenerse."
—Chad Buckner, gerente del área de pintura.

Además, siempre hay un 25 por ciento menos de autos que en el pasado. ¿Cuánta pintura se desperdicia? Casi nada. Lo que antes requería 378 litros, ahora se redujo a 265.

Los beneficios se multiplicaron. No sólo se necesita menos pintura, sino también menos solvente para limpiar, y los costos de eliminación de ambos productos se redujeron. Por otro lado, una nueva programación, destinada a acelerar el trabajo de los robots, mejoró la eficiencia de las cabinas de pintura de 33 a 50 automóviles por hora.

"Hoy, con dos cabinas conseguimos el mismo volumen para el que antes necesitábamos tres", destaca Buckner. Desmantelaron la Cabina de Pintura de Acabado C y dejaron espacio disponible para futuras tareas.

¿Qué hacen Buckner y su personal con una mejora operativa tan exitosa? A modo de respuesta, el ejecutivo camina hacia el siguiente espacio abierto, donde estaban los robots de aplicación de selladores. También se los consolidó. Buckner señala otra cabina de pintura de base que el personal de ingeniería se propone eliminar.

De hecho, cerrar la Cabina de Pintura de Acabado C liberó a un grupo de ingenieros de Mantenimiento, que desde entonces se dedicaron a acelerar la próxima ronda de cambios. El éxito, en este sentido, se convierte en la plataforma hacia nuevas mejoras. Para fines de 2007, Buckner espera reducir casi a la mitad el espacio que ocupa el taller,

Charles Fishman es escritor senior de *Fast Company* y autor de *The Wal-Mart Effect.*

Toyota hace un uso prudente de la automatización. Los robots se encargan de soldar las carrocerías, pero los interiores aún se instalan de manera manual.

sin dejar por ello de pintar 2.000 automóviles diarios.

Para Buckner, las mejoras no son "proyectos" ni "iniciativas". Son trabajo, su trabajo, día tras día y semana tras semana. Esta es una de las sutiles pero distintivas características de una fábrica de Toyota. Los supervisores y gerentes no son "jefes" en el sentido tradicional. Su tarea consiste en encontrar la forma de ser más eficientes y efectivos. "Estamos muy orgullosos de lo que logramos —recalca Buckner—. Pero no hay razón para estar satisfechos."

El proceso del proceso

Lo más sorprendente de la fábrica de Georgetown es que, de hecho, sólo se parece a una planta automotriz. Produce un vehículo cada 27 segundos, pero en realidad es como un gran cerebro; una especie de laboratorio focalizado en una única misión: no cómo fabricar automóviles, sino cómo fabricarlos mejor.

En verdad, el proceso es esencial; tan importante, que "Toyota también tiene un proceso para enseñar a mejorar el proceso", dice Steven J. Spear, profesor del MIT que estudia a Toyota desde hace más de una década. La labor es triple: producir autos, fabricar mejores autos y enseñarles a todos cómo hacer mejores autos. Pero Toyota añade un nivel más a su récord olímpico: siempre busca perfeccionar el proceso con el cual perfecciona los demás procesos.

Hay una especie de sensibilidad zen en la empresa, pero también una implacable calidad, capitalista y competitiva. Es más, sin bombos ni platillos, Toyota está echando por tierra las creencias convencionales sobre la fabricación estadounidense. En lugar de hacer outsourcing, está creando puestos de trabajo. No tiene problemas para fabricar productos complicados: abre plantas tan rápido como se lo permiten sus sistemas y estándares de calidad. Paga salarios compatibles con los convenios sindicales y un buen seguro de salud (para evitar la sindicalización), y vende los productos de manera rentable y a menos costo que sus competidores estadounidenses. Sin embargo, la verdadera causa por la que prospera es que en la empresa hay gente como Buckner, quien asegura que "no hay razón alguna para sentirse satisfechos".

Esta manera de pensar dista mucho de ser novedosa: la producción ajustada (lean manufacturing) y la mejora continua son sistemas que ya tienen más de 25 años. Pero la incesante y casi mecánica repetición de esas frases oculta el verdadero poder que hay detrás de las ideas. Mediante el cuestionamiento constante de la manera de hacer las cosas no se aventaja a la competencia en el siguiente trimestre, sino en la siguiente década.

Toyota está lejos de ser infalible, por supuesto. En los últimos dos años, el retiro de productos del mercado por problemas de calidad y seguridad creció sustancialmente, prueba fiel de los contratiempos que genera el crecimiento rápido, incluso en los sistemas más aceitados. Los problemas de calidad llamaron la atención del equipo directivo de la empresa. En un contexto más amplio, cuando la estrategia no es fabricar automóviles sino fabricar mejores automóviles, lo que se crea es una ventaja competitiva perpetua. Para cuando Toyota derrota a sus competidores, ellos ya no están pisándole los talones; necesitan una reorganización y más ventas a fin de recuperar el liderazgo. Están una década detrás, sólo que todavía no se dieron cuenta.

Detalles de importancia

Howard Artrip está parado delante de la línea de montaje, junto a una estantería que alberga cajas organizadoras de plástico azul, llenas de viseras parasol y cinturones de seguridad. Detrás de Artrip se ve pasar una línea de autos Camry y Avalon, con pintura todavía fresca pero sin motores, tableros ni asientos.

Artrip, gerente del área de montaje, cuenta que las cajas organizadoras —comunes, marca Rubbermaid— solucionaron un problema de toma de decisiones. "Aquí había ocho ar-

marios con piezas, que ocupaban mucho lugar en la estación de trabajo —explica—. El operador observaba el automóvil que ingresaba por la línea de montaje, se dirigía a los armarios con viseras parasol y cinturones de seguridad, tomaba las piezas adecuadas, corría hacia el vehículo para colocar los cinturones y viseras parasol, y luego de hacerlo volvía a correr hasta su puesto para repetir el procedimiento." Todo en 55 segundos; el tiempo que le lleva a un auto pasar por cada estación de trabajo.

El problema era que había 12 combinaciones posibles de viseras parasol y nueve variedades de cinturones de seguridad. Decidir qué pieza tomar era, en sí mismo, un trabajo. En cada turno pasaban 500 automóviles, y cada vehículo necesitaba cuatro piezas específicas. En otras palabras, había 2.000 posibilidades de cometer un error. Incluso con una perfección del 99 por ciento, cinco automóviles por turno estarían equipados con las viseras parasol o los cinturones incorrectos.

Entonces, un equipo de empleados de montaje tomó una decisión efectiva: liberar a los operarios de la elección de las piezas, a fin de que se concentraran sólo en instalarlas. La idea, así considerada, parecía obvia: entregar un conjunto de viseras parasol y cinturones de seguridad preclasificados por automóvil, cada uno con las piezas correctas. El equipo apeló a la tecnología disponible más simple: la caja organizadora Rubbermaid azul. "Fuimos a Wal-Mart y las compramos", cuenta Artrip. Ahora, el operario no tiene que decidir. Se limita a tomar la caja azul e instala las piezas en el automóvil.

A menudo se dice que una típica línea de montaje de Toyota en los Estados Unidos realiza miles de cambios operativos en un año. La cifra es llamativa y abrumadora. ¿Cuántas veces cambió usted su rutina de trabajo durante la última década? Los empleados de Toyota lo hacen docenas de veces al año.

Howard Artrip, gerente de montaje, ha pasado 19 años en Georgetown; no haciendo autos, sino buscando maneras de hacer mejores autos.

En el caso del organizador azul, el cambio surgió de un análisis rutinario de las docenas de tareas de la línea de montaje de Georgetown. Hace tres años, cuando empezaron los esfuerzos de simplificación, el equipo de Artrip descubrió 44 tareas en las que el personal tenía que tomar una o dos decisiones a medida que instalaba las piezas. Y encontró que 23 estaciones de trabajo exigían entre siete y 11 decisiones.

Cualquier tarea que demandara esa cantidad de decisiones en 55 segundos causaría problemas. Por eso, muchas sufrieron pequeñas modificaciones: tomar el organizador azul en lugar de elegir cada pieza. Ahora, 85 tareas de la línea requieren entre una y dos decisiones. Ninguna necesita más de siete.

Este es el tipo de trabajo al que Artrip dedicó más de la mitad de su carrera en la compañía automotriz: buscar la forma de acelerar, simplificar y garantizar la seguridad de la línea de montaje, a fin de que sea más sencillo hacer un trabajo a la perfección. La mejora continua no es algo añadido al trabajo real, ni un proyecto especial que Artrip suma a sus responsabilidades de rutina. Cada día, cuando llega a la fábrica, piensa en cómo lograr la mejora continua.

Artrip ha pasado 19 años en la planta de Georgetown. La forma de hacer su trabajo es tan exigente que ya forma parte de su vida personal. "Cuando corto el césped, pienso en cómo puedo hacerlo más rápido", comenta. Y lo mismo ocurre con sus hábitos matutinos, que ha estandarizado. "Tengo que estar aquí a las 6 de la mañana, y sé que la ducha y la caminata hasta la planta me llevan 19 minutos", dice sonriendo.

Los problemas primero

James Wiseman recuerda el momento en que se dio cuenta de que Toyota no era un lugar de trabajo más, sino una manera diferente de pensar en el trabajo. Antes de unirse a la organización había sido gerente de fábrica, primero para una empresa de trajes de baño y luego para un fabricante de tubos de acero. Ingresó a la planta de Georgetown de Toyota en 1989, como gerente de Relaciones con la Comunidad. Hoy

es vicepresidente de Asuntos Corporativos del sector Fabricación de Toyota para América del Norte.

"En mis anteriores empleos había, siempre, una tendencia a buscar la 'bala de plata', la solución única y grandiosa —dice Wiseman—. Y yo creía que cuando uno logra algo, lo disfruta. Tenía la arraigada cultura estadounidense de no admitir, y hasta de no discutir los problemas, en especial durante reuniones de trabajo."

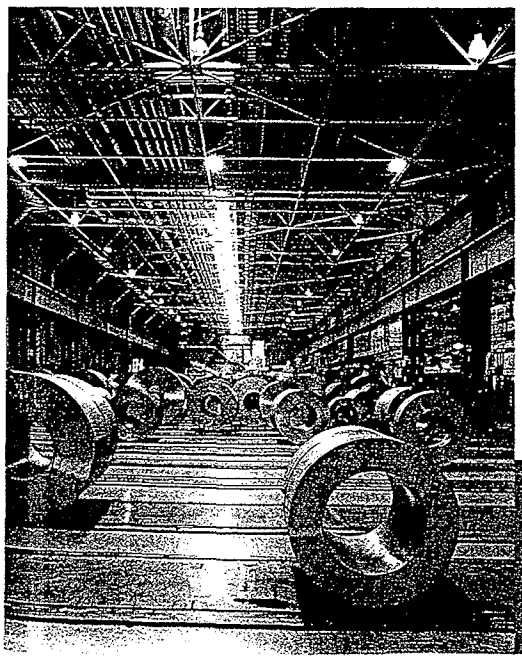
Durante los primeros años de Wiseman en Toyota, al frente de la planta de Georgetown estaba Fujio Cho, hoy presidente del directorio de la compañía, y todos los viernes se llevaba a cabo una reunión del personal senior. "Empecé a asistir para comentar algunos de mis pequeños éxitos —recuerda Wiseman—, y cierta vez presenté un informe sobre una actividad que habíamos estado realizando, a la que califiqué como muy positiva. Fujio Cho me miró de una manera rara y dijo: 'Todos sabemos que usted es un buen gerente; de otra manera no lo habríamos contratado. Ahora preferiría que nos contara qué problemas tiene, a fin de que podamos resolverlos juntos'." Wiseman asegura que esas palabras fueron como un rayo de luz. "Incluso con los proyectos que tienen gran éxito —añade—, la pregunta habitual es qué podríamos haber hecho para que fueran aún mejores. En definitiva, logré entender el verdadero significado de la frase 'los problemas primero'."

En Toyota rige la presunción de imperfección. La perfección es el fin último; las mejoras, en cambio, son mucho más realistas, más humanas. No se busca una mejora del 15 por ciento al final de cada trimestre, sino del 1 por ciento cada mes.

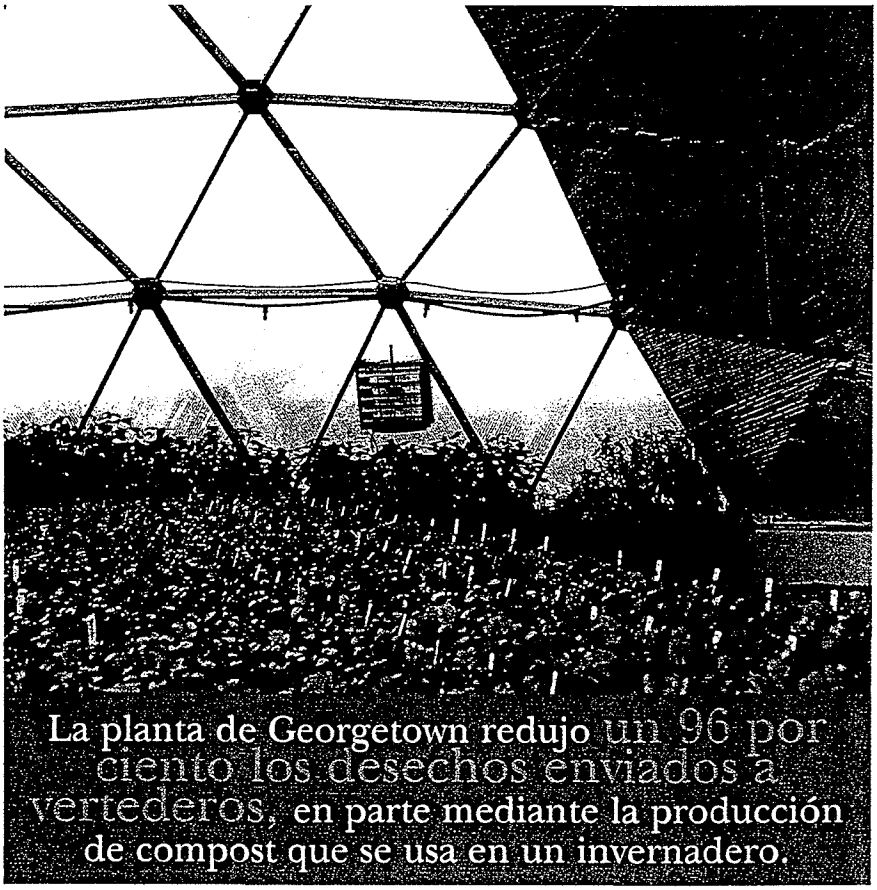
El desafío, por supuesto, reside en transformar la retórica en realidad; en hacer de la presunción de imperfección un componente vital de la manera de pensar y trabajar. Pete Gritton —vicepresidente de Recursos Humanos en la planta de Georgetown— sabe mejor que nadie cómo llegar a ese punto. "Queremos que la gente solucione problemas", apunta. Los empleados recién contratados participan del proceso de mejora de procesos de Toyota. Hay reuniones diarias del grupo de trabajo, un programa de sugerencias escritas y equipos que buscan soluciones de largo plazo. Pero todo está fundado en dos realidades indiscutibles. Primero, como es obvio, "tenemos que fabricar 2.000 automóviles por día. No podemos votar para decidir cómo hacer cada uno —dice Gritton—. No podemos detenernos cada cinco minutos y cambiar el proceso". Y también hay una regla básica: la mejora continua no es una cuestión de carácter, de cultura nacional o de fuerza de voluntad, sino un tipo de línea de montaje. "La regla es que la mejora empieza después de entender el estándar; es decir, cómo lo estamos haciendo ahora —explica Gritton—. Porque si no entendemos lo que intentamos mejorar, ¿cómo sabemos que una sugerencia es una mejora?"

Nadie en Toyota Georgetown puede hablar de su trabajo sin explicar cómo ha cambiado o cómo está por cambiar. Chris Gentry, supervisor de montaje del panel de instrumentos, muestra la manera en que se rediseñará su área. Fue creada en 2006 para ocuparse de los Camry modelo 2007, pero después de casi un año de funcionamiento se detectaron ciertas ineficiencias. Algunas tareas volverán al sector de ensamblado, en tanto que siete nuevos robots de transporte se ocuparán de mover determinadas piezas. Se eliminarán dos puestos de trabajo, y los empleados serán transferidos a otros sectores. Como resultado de tales medidas, en el proceso de montaje se ahorrarán 18 segundos. "Primero lo estandarizamos, y ahora lo estamos mejorando —subraya Gentry—. No me refiero al panel de instrumentos, sino a la forma de hacerlo."

En el Camry 2007 hay una pequeña modificación que los conductores no advertirán. La barra de soporte del radiador —un tirante de acero que atraviesa la parte inferior del compartimento del motor— no se instaló en el momento de fabricar la carrocería del automóvil. Solía hacerse así, pero bloqueaba el acceso a ese compartimento. Por lo tanto, los operarios tenían dificultades para instalar el cableado y los componentes del motor. En cambio, al posponer la colocación de la barra hasta la fase final del montaje, pueden ingresar con más facilidad al área del motor. La idea, surgida en la planta de Georgetown, pasó



La planta de montaje de Toyota en Georgetown, Kentucky, es la más grande de la empresa fuera de Japón. De allí salen medio millón de autos al año; uno cada 27 segundos.



La planta de Georgetown redujo un 96 por ciento los desechos enviados a vertederos, en parte mediante la producción de compost que se usa en un invernadero.

al equipo de diseño de Toyota, y de allí a las plantas de montaje del Camry en todo el mundo.

Pero lo más interesante es comparar la forma de pensar el trabajo de la gente de Georgetown con la de otras empresas. Es entonces cuando surgen innumerables preguntas. ¿Por qué las filas frente a las cajas de Wal-Mart nunca se acortan? ¿Por qué el servicio al cliente de nuestra compañía de telefonía móvil nunca mejora? ¿Por qué motivo, tras cada nueva actualización del software, es más difícil operar una PC? Parecería que los empleados de Toyota ven el mundo con anteojos especiales de cuatro dimensiones, mientras que los demás seguimos aferrados a lo bidimensional.

Al final, no hay final

Muchas empresas han tratado de aprender y usar los métodos que Toyota convirtió en una rutina, una ciencia, una forma de ser y pensar. Entre ellas están, como es lógico, GM, Ford y Chrysler. De hecho, durante más de 20 años, Toyota y GM operaron juntas una planta en California —el proyecto NUMMI—, lo cual le permitió a GM estudiar de cerca los métodos de Toyota.

Y las Tres Grandes lograron avances: en la última década, GM y Chrysler redujeron en un tercio la cantidad de horas necesarias para armar un vehículo. Sin embargo, todavía están a la zaga de Toyota. En general, esas compañías adoptan un enfoque demasiado estadounidense respecto de la idea de mejora; un enfoque episódico, orientado a las metas, pálida imitación del que rige en Georgetown. "Si uno visita las Tres Grandes, encontrará proyectos como los de Georgetown", dice Jeffrey Liker, profesor de ingeniería de la Universidad de Michigan y autor de *The Toyota Way*. "Pero están dirigidos por algún grupo de ingeniería, un cinturón negro de Six Sigma o un gurú de la producción ajustada —añade—. Un par de veces al año presentan el proyecto a los directivos de la empresa, y dicen: '¡Miren lo que hicimos!'. En Toyota los encaran en cada departamento, todos los días, sin cinturones negros y con regularidad."

De modo que uno puede comprar libros, contratar consultores, implementar el programa, predicar la transformación del negocio y, con el tiempo, perder el entusiasmo, no entender por qué fracasó, archivar las pesadas carpetas en el armario de una sala de conferencias y volver a la forma habitual de trabajar.

Lo que sucede a diario en Georgetown —y en toda Toyota— puede enseñarse y aprenderse. Pero no se trata de un conjunto de metas, porque las metas implican una línea de llegada, y en Toyota no hay línea de llegada. Es una forma de ver el mundo. Por lo tanto, resulta imposible perder el interés, encogerse de hombros y abandonar un proyecto, del mismo modo que a cualquier persona le resulta imposible dejar de interesarse por su futuro.

"Para la gente que se suma a las filas de Toyota es un gran cambio", revela John Shook, miembro del equipo académico de la Universidad de Michigan, ex empleado de Toyota y reconocido experto en cómo aplicar sus ideas en otras empresas. "Al principio se comportan igual que los demás gerentes —añade Shook—: tratan de alcanzar sus objetivos de gestión. Avanzan, mejoran y buscan una gran meseta de estabilidad; una etapa en la que no habrá cambios. Mientras se está en esa búsqueda, la lucha es constante, difícil y frustrante. Parece no haber 'solución'. Pero cuando se entiende que se trata del proceso en sí, no de la búsqueda de estabilidad, es posible relajarse. Entonces, hacer la tarea y hacerla mejor se convierten en una sola cosa. En eso consiste el trabajo." ●

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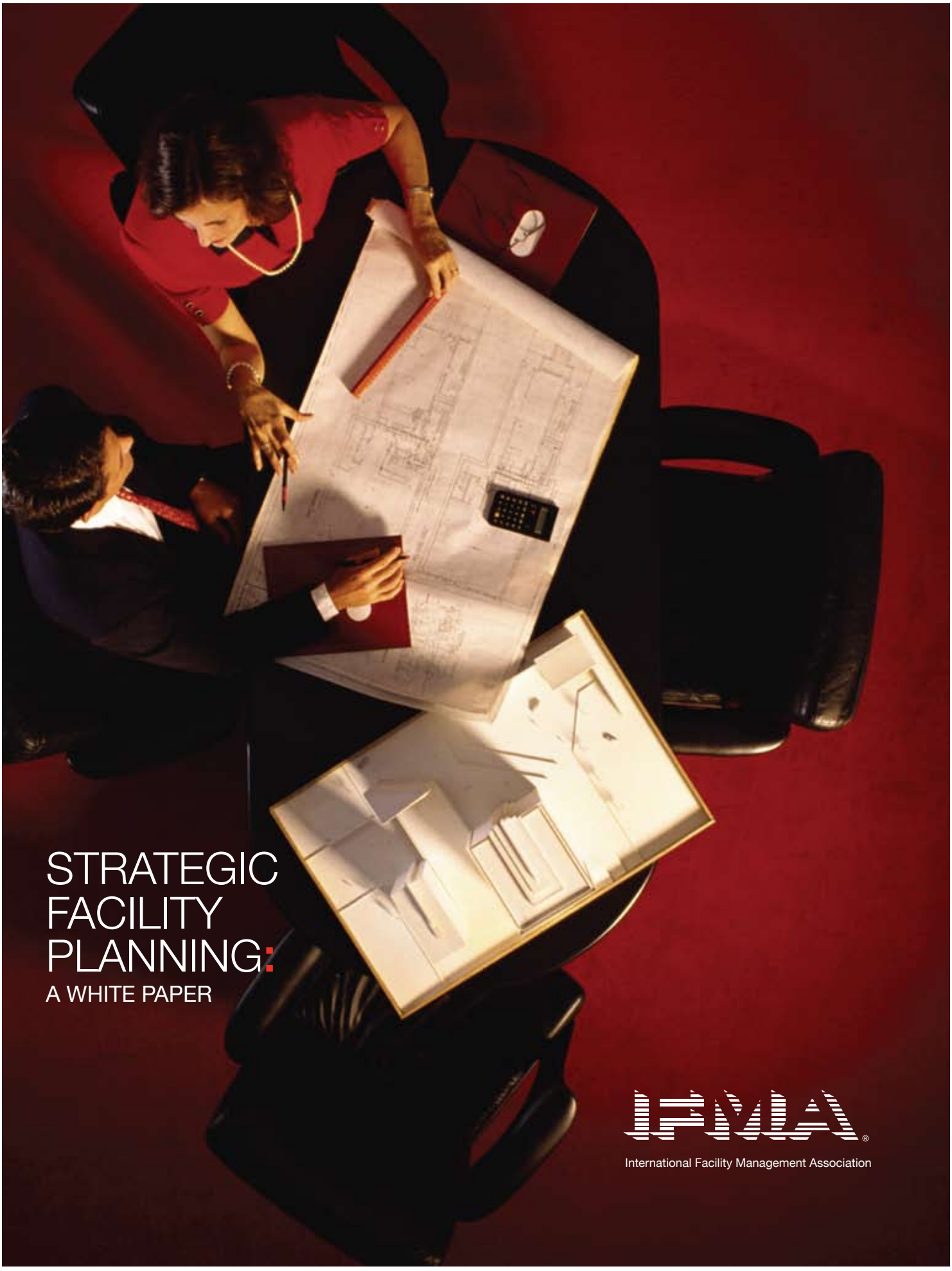

STRATEGIC FACILITY PLANNING:

A WHITE PAPER

IFMA®

International Facility Management Association

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A White Paper on Strategic Facility Planning

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Strategic Facility Planning:

A White Paper

International Facility Management Association

PREFACE

In the real world of facility management (FM), a plethora of activities fall under the facility manager's responsibility, causing frequent lapses into a reactive mode in order to respond to all the requests, orders, regulations, deadlines and demands of the organization. Facility managers know that the need to become more proactive and strategic is important, but finding the time to devote to strategic planning is often a struggle. As Stephen Covey teaches, we need to prioritize what is important rather than simply urgent in order to gain maximum effectiveness.

Strategic facility planning (SFP) is a process that can lead to better, more proactive delivery of services from a facility management organization to its stakeholders. The time taken to carry out SFP is well spent in that it helps to avoid mistakes, delays, disappointments and customer dissatisfaction. It can actually allow facility plan implementations to run more quickly and smoothly.

Since SFP is not a daily task, many facility managers are unfamiliar with the best way to accomplish this type of planning, or perhaps have been asked by senior management to quickly provide a strategic facility plan and are not sure where to start. Facility managers may still be unsure how to initiate the SFP process and need to obtain information on methods and techniques useful for successfully implementing a SFP to correspond with their organization's needs.

While every organization is different, all organizations strive to become more competitive, effective and provide the best workplace possible for its employees. This is the role facility managers fulfill and SFP is an exercise that is considered another tool to add to the "FM tool belt" needed for success.

This white paper provides information on the SFP process, its requirements and benefits, and gives a facility manager the basic tools to launch and successfully complete a SFP for the supported organization. Definitions are provided in an appendix to help clarify terms quickly or for reference. A process model is also provided to support visual thinkers and learners.

Professor Kathy O. Roper, CFM, CFMJ, LEED® AP, IFMA Fellow and associate professor of Integrated Facility Management at Georgia Institute of Technology in Atlanta, Ga., and Ph.D. Candidates Jun Ha Kim and Sang-Hoon Lee, of Georgia Tech, assembled this white paper for the International Facility Management Association (IFMA). We would like to thank IFMA Chair John McGee for his input and review, and IFMA President and CEO David J. Brady for his support on this project and allowing Georgia Tech to participate in this work. Mark Sekula, CFM, LEED AP and William Rodgers were also part of the task force to review, amend, gain IFMA board of directors approval and finalize this document.

EXECUTIVE SUMMARY

This white paper outlines the key principles of strategic facility planning and details the key stages of the entire SFP process, which consists of understanding, analyzing, planning and acting. Facilities are the critical components of an organization's SFP since they are the outcome of business decision-making processes and have a long-term impact on the support for achievement of the organization's mission and vision. Linking facilities to core business strategies is one of the imperatives of refined facility management now and in the future. Even greater importance will be given to SFP in coming years as budgets continue to be squeezed and worker performance and productivity are key factors in the knowledge age. SFP facilitates the organization's strategy by optimizing facilities to satisfy the strategic relationships between the organization, products/services and facilities.

The SFP is a two-to-five year plan encompassing the entire portfolio of owned and/or leased space that sets strategic facility goals based on the organization's strategic objectives. SFP helps facility managers do a better job and ensures that all employees are working toward the same goals and objectives. A flexible and implementable SFP based on the specific and unique considerations of your organization needs to be developed through a four-step process. The first step, understanding, requires thorough knowledge of your organization's mission, vision, values and goals. Second, exploration of the range of possible futures and triggers is needed to analyze your organization's facility needs using analytical techniques—such as systematic layout planning (SLP), strengths, weaknesses, opportunities and threats analysis (SWOT), strategic creative analysis (SCAN), or scenario planning. Third, once analysis is completed, plans for potential responses and periodic updates to existing plans in response to changes in the market need to be developed to meet the long-range needs of your specific organization. Fourth, take actions as planned to successfully implement the SFP.

The SFP identifies the type, quantity and location of spaces needed by the organization and contains two main components—the first being an in-depth analysis of existing facilities, and the other an achievable and affordable plan to meet the organization's needs. Using the organizational business plan, the differences should be identified between the current situations and analyzed needs. Gap analysis—a business resource assessment tool enabling an organization to compare its actual performance with its potential performance—is an appropriate tool to be used. Financial analysis is also required to determine the yield on highest return at the lowest risk. A proactive approach to benchmark practices and services of leading organizations in the industry will be helpful for SFP and serves as a mechanism to understand, analyze and improve the current facilities operation. Since differences in organizational type, culture and processes strongly influence how SFP is accomplished, the recommended SFP will need to be adjusted in accordance with the different type, culture and processes of your specific organization.

OVERVIEW

Strategic facility planning recognizes that every decision made in business planning has a direct impact on an organization's real estate assets and needs. The purpose of the SFP plan, therefore, is to develop a flexible and implementable plan based on the specific and unique considerations of the individual business. A four-step process, shown in Figure 1, provides the general format to accomplish this mission.[1]

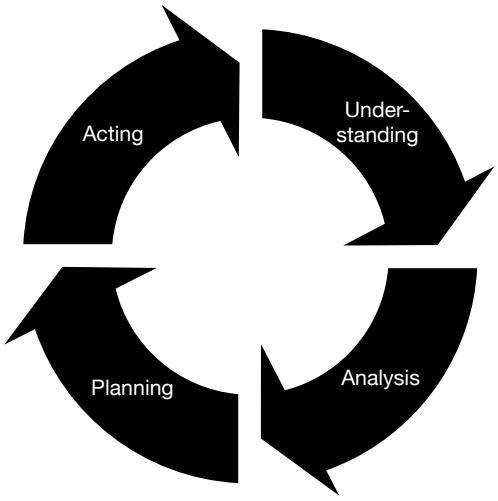


Figure 1. SFP Four-step Process

Understanding

Thoroughly understand the organization's mission, vision, values and goals. Many organizations follow a balanced scorecard of four key measurements: financial performance; customer knowledge; internal business processes; and learning and growth.

Analyzing

Use analytical techniques, such as SWOT analysis, SCAN, SLP or scenario planning, to explore the range of possible futures and the triggers used to analyze an organization's facility needs.

Planning

Develop plans that meet the long-range needs of the organization. At minimum, the SFP should be reviewed annually and further updated periodically as conditions require.

Acting

Take actions as planned and implement the SFP. Feedback from actions taken can be incorporated into the next plan and/or project to provide continuous improvement to future SFPs. The cyclical nature of constant planning for the changing future and adopting plans along the way are normal events. These changes and updates must be managed to ensure they are achievable.

[1] John R. Glagola (2002) An Introduction to Strategic Facilities Planning, *Real Estate Issues* 27(1): 13-15.

DEFINITION OF STRATEGIC FACILITY PLANNING WITHIN THE OVERALL CONTEXT OF FACILITY PLANNING

The strategic facility planning process can be defined as the process by which a facility management organization envisions its future by linking its purpose to the strategy of the overall organization and then developing goals, objectives and action plans to achieve that future. The result of the strategic facility planning process is the strategic facility plan.

IFMA, in its "Project Management Benchmarks Survey 2002," defines the strategic facility plan:

> "A strategic facility plan (SFP) is defined as a two-to-five year facilities plan encompassing an entire portfolio of owned and/or leased space that sets strategic facility goals based on the organization's strategic (business) objectives. The strategic facilities goals, in turn, determine short-term tactical plans, including prioritization of, and funding for, annual facility related projects."

This definition provides the timeline and alignment needs for a SFP, and gives the focus on the entire portfolio for any given organization. However, some organizations utilize different nomenclature for different planning tools. This generic definition aims to provide a standard definition and a standardized timeframe for review and update of SFPs that meets the need of most facility management professionals.

Master Plans Versus Strategic Facility Plans

Since facility management is still considered an emerging field, one goal of this document is to avoid confusing terminology and set a standard for the facility management profession to move forward. One area of confusion for many facility managers concerns the questions: How does a master plan differ from a strategic facility plan? Is a campus plan part of a master plan or something else? Currently, architects, consultants, builders and different organizations define these terms differently.

The three key outputs of facility planning are the strategic facility plan, the master plan and the annual facility plan (often referred to as an approved budget or generically as a tactical plan). However, confusion exists between master plans and SFPs since they may both answer the same question: What building, buildings and space are needed to support our strategic goals?

Strategic Facility Plan

The SFP identifies the type, quantity and location of spaces required to fully support the organization's business initiatives and should be framed within the organization's vision. The SFP includes three primary components: an understanding of the organization's culture and core values and an analysis of how existing and new facilities must manifest that culture and core values within the physical space or support their change, an in-depth analysis of existing facilities—including location, capability, utilization and condition; and an achievable and affordable (approved) plan that translates the goals of the business plan into an appropriate facility response. To ensure new facility projects are business-driven and further the overall mission of the company, it is critical that the

DEFINITION OF STRATEGIC FACILITY PLANNING WITHIN THE OVERALL CONTEXT OF FACILITY PLANNING

first component—the in-depth analysis—precedes the second. Furthermore, to ensure that the SFP is not prepared in a vacuum and that it fully supports the business initiatives of every other department in the organization and the work performed by the organization's employees, it must be developed holistically with input from all department heads in the organization and end users. Caution is needed to avoid planning to a specific outcome since analysis may provide various new or previously unknown potential plans. Although human nature may have managers suggesting solutions, it is critical to keep a clear, unbiased viewpoint in order to be open to unexpected possibilities.

Traditionally, companies had a reasonable understanding of the location, capacity and general condition of their facilities. However, in today's climate of mergers and acquisitions, rapid technological change and increased pressure on available capital, more detailed information is typically required. A rigorous analysis of existing facility assets and a results presentation that is simple to understand are now critical to a company's ability to plan and react to changing facility needs.

Once the organization's business plan has been established, and a clear understanding of assets and capabilities has been gathered, it is possible to identify which strategic business goals require a facility response. Gap analysis is an appropriate tool to use for this comparison. Essentially, the difference, or gap, is established between the current situation and the analyzed and verified needs. This gap is the area requiring more detailed planning. Gap analysis is a business resource assessment tool which enables a company to compare its actual performance with its potential performance. For facility planning, this gap analysis compares existing space and its condition to the needs of the organization. At its core are two essential questions: Where are we? Where do we want to be?

The SFP can then be formulated to identify the types of facilities needed, the best geographic location for these facilities, the expected costs and a timeline for bringing them consistently in line with the business plan goals. Components of the strategic facility plan may include: facility portfolio analysis and documentation; condition surveys; building and site usage, and capacity analysis; industry benchmark studies; staff and technology projections over time; project identification; cost projections; presentation materials for board approval; and a facility development schedule.

The strategic facility plan guides a master plan by adding long-range strategic analyses of project drivers and restrainers. The facility manager does not make these assumptions in isolation, but rather brings in detailed analyses from all units in the organization. A gap analysis of current versus future requirements can be aided through data collection prior to any analysis. These analyses might be of labor pools, market conditions, transport geographies, logistics and operational requirements, information technology plans and analysis, organizational or personnel structure plans, as well as other input from marketing, sales or brand evaluations.[2]

[2] Robert T. Hodgson (2007) Strategic facility planning, *View on Biotechnology*, May 2007.

DEFINITION OF STRATEGIC FACILITY PLANNING WITHIN THE OVERALL CONTEXT OF FACILITY PLANNING

Master Plan

The master plan, facility master plan or campus master plan provides a framework for the physical environments that incorporate the buildings. Master planning develops the site-specific integration of programmed elements, natural conditions and constructed infrastructure and systems at the functional, aesthetic and temporal levels. The nature of the plan will influence, and be influenced by, the context of the project location beyond the property lines. Alignment with community needs and expectations is a critical factor of this phase.[3]

The development of a master plan starts with alternative organizational configurations, often referred to as scenarios, to accommodate the needs that are identified in the strategic facility plan. These scenarios or alternatives represent differing priorities and criteria, and present choices for organizational and site/facility models.

The master planning process is best accomplished with input from a number of experts and stakeholders. Components of a master plan include: regulatory analysis; infrastructure and transportation planning; amenities and support planning; corporate image; security strategies; phasing plans; cost projections; and environmental design. Expert planners need to ensure the outcome is achievable, yet flexible enough to preserve future options.[4]

Master plans can include varying levels of detail but usually include some or all of these space-use analyses:

- Zoning, regulation, covenant assessments
- Space standards/benchmarks descriptions
- Program of space use
- Workflow analyses
- Engineering assessment and plan
- Block, fit or stacking plans
- Concept site plan or campus plan
- Architectural image concepts
- Long-term maintenance plan
- Construction estimates
- Phasing or sequencing plan (the sequence of projects)[5]

The master plan is often summarized as a colored site drawing or a timeline of projects which, in some cases, is referred to as the master plan.

The three types of facility plans and some of their major components are shown in Table 1 to help distinguish between them. Items in each row are not comparative, but each cell stands on its own.

[3] Robert T. Hodgson (2007) Strategic facility planning, *View on Biotechnology*, May 2007.
[4] Robert T. Hodgson (2007) Strategic facility planning, *View on Biotechnology*, May 2007.
[5] Van Mell Associates (2005) What is a Facility Plan?, June 2005.

DEFINITION OF STRATEGIC FACILITY PLANNING WITHIN THE OVERALL CONTEXT OF FACILITY PLANNING

STRATEGIC FACILITY PLAN	MASTER PLAN	TACTICAL PLAN
Existing condition analysis	Site-specific physical plan for buildings	Maintenance schedules/plans
Organizational needs statement (linking FM to strategy)	Infrastructure and systems within the site	Operational plans
Gap analysis	Aesthetics of buildings and grounds	Building floor plans/ stacking plans
Recommendations for new spaces/buildings	Phasing plans for building	Architectural design/configurations
Facility cost projections/ life cycle cost analysis	Construction estimates	Operating budget
Capacity analysis and use recommendations	Engineering assessments	Floor plans or occupancy charts

Table 1. Comparison Table for Master Plan, SFP and Tactical Plan

Additional Considerations

The financial impact is an additional consideration for all SFPs. With the tremendous long-term cost and impact of facility decisions, the financial analysis is an extremely critical component of any SFP. A number of financial tools are available to evaluate scenarios, options or alternatives; however, two components are critical to provide the complete business case for any SFP. First, the SFP must demonstrate that the facility supports the organization's core mission and strategy, and the financial analysis must demonstrate that the recommendations will yield the highest return at the lowest risk. Tools used to demonstrate these two critical considerations include:

- A statement of facility objectives;
- Risk analysis of options;
- Sustainability analysis;
- Sources and uses of funds;
- Operating expense analysis;
- ROI, NPV, IRR, and payback period analysis;
- Life cycle cost analysis/whole life cost analysis;
- Cost/benefit rating of alternatives; and
- Recommendation with clearly stated assumptions[6].

It is important to note that an executive council, i.e. board of directors, will make their decision from the executive summary or one-page rating analysis, so this is the critical document to spend time developing. Approvals usually hinge on the brief CEO presentation to the board and his/her recommendations. Time spent explaining these analyses and recommendations is time well spent in preparing for the final approval phase of the process.

[6] Van Mell Associates (2005) What is a Facility Plan?, June 2005.

SPECIALIZED ANALYSES

Organizations often require specific or specialized analyses of facility issues. These studies may be done separately or more frequently than a complete SFP, but the list below provides some typical facility analyses and ones that often are incorporated into an SFP.

- Feasibility analysis
- Lease versus own analysis
- Buy/build/expand/renovate analysis
- Merger/acquisition facility study
- Analysis of highest and best use
- Consolidation study
- Decentralization study
- Space optimization plan (restacking plan)
- Project estimating and scheduling
- Stay/move analysis[7]

For clarification, it is sometimes easier to understand through the process of elimination. The list below helps illustrate what strategic facility planning is not:

- **Facility planning:** Facility planning focuses on tactical day-to-day issues and not the more macro topics of SFP; it solves problems related to specifics, such as where individuals sit or the type of equipment required accommodating a specific situation.
- **Facility management:** The practice of coordinating the physical workplace with the people and work of the organization integrating the principals of business administration, architecture and the behavioral sciences. Facility management encompasses multiple disciplines to ensure functionality of the built environment by integrating people, place, processes and technology.
- **Programming:** An architectural design program sets forth the criteria that allow an architect or interior architect to design the building or space. A design program is not required to make SFP decisions. On the other hand, a macro or strategic program is an important tool for the strategic facility planner; it is typically developed using standards or metrics (i.e. square foot per person) to generate order-of-magnitude space needs.
- **Workplace design**: While workplace types and standards are relevant and have an impact on the quality, quantity and cost of space, workplace design is not synonymous with SFP. It is one of numerous variables that needs consideration and is useful in supporting the strategic solution.[8]
- **Site and facility design:** Facility planning and detailed design are triggered by the identification and funding of specific projects through the capital planning process. This is the implementation phase of the planning spectrum—the translation of business needs into tangible facility and environmental responses. The design of a facility gives a public face to the organization. Components of the detailed facility plan include: detailed programming of user space and equipment needs; conceptual site, architectural and engineering design; detailed systems design; materials selection; and construction documentation.[9]

[7] Van Mell Associates (2005) What is a Facility Plan?, June 2005.
[8] Robert A. Klein (2003) Strategic facilities planning: Keeping an eye on the long view, *Journal of Facilities Management* 2(4): 338-350.
[9] Robert T. Hodgson (2007) Strategic facility planning, *View on Biotechnology*, May 2007.

ORGANIZATIONAL APPROACHES TO SFP

Differences in organizations' culture and processes will strongly influence how the SFP is accomplished. Different types of industries, profit, non-profit, and government organizations, will have similarities and dissimilarities between business units, growth or reduction of business, and other factors—including management preferences for specific formats and data. Classification for this analysis is taken to three primary types of organizations: service business, manufacturing business and governmental/academic institutions. There are significant commonalities and preferences found within each type.[10]

In a service business, there is a consistent focus on people and facility design. Most of these businesses have centralized information-gathering and interpretation methods, as well as established processes to utilize the data. Similarities in setting and achievement of business and facility goals are found among service organizations, as well as relatively short planning horizons.

In manufacturing businesses, a SFP is usually accomplished more on a site-by-site rather than company-wide basis, since each location serves to support different equipment, personnel and manufactured products. Also, many organizations in this category use decentralized information-gathering and decentralized methods for interpretation and utilization. Many manufacturing facilities have significant independence in setting and achieving business and facility goals, which results in relatively shorter-range planning.

Governmental and academic institutions are organizations sensitive to changes in politics, economic budgets, desired levels of service and public opinion. These organizations utilize both centralized and decentralized information-gathering, which makes long-range planning the norm for organizations in this category.

Due to the wide variation in these three types of industries, the proposed SFP, to some extent, will need to be adjusted to these differing types of organizations to consider the above-mentioned factors affecting their planning horizons. The process of creating this customized SFP, therefore, starts with the identification of the types of organization. Once the organizational type is identified, it will be easier to gather more relevant information and utilize SFP techniques, such as scenario planning modeling, SLP and SWOT analysis, to effectively analyze gathered information.

[10] Stuart Pertz (1995) "Redefining strategic facilities planning." Facilities 13(1): 16-24.

THE SFP PROCESS

A four-step process of understanding the situation, facilities, conditions and expectations, analyzing the needs and changes required, planning, and then executing an approved plan will be explained. Numerous tools for each step of the four-step process will also be suggested; links for more-detailed information are provided for specific tools too broad or detailed to be covered in this SFP document.

Understanding

The strategic plan focuses on the longer-term, big picture needs and vision of the organization. Because the SFP meshes with the strategic business plan of each unique organization, alignment is critical for success. Facility mangers must begin the development of the SFP by thoroughly understanding the needs of the organization. Through existing internal analysis and business imperatives, the work that an SFP team completes is entirely dependent upon the organization's specific needs, and should address both strategic and long-range planning. Conversely, it should also address the evaluation of current facilities and the conceptualization, planning and implementation of new facilities. A thorough understanding of the current situation is necessary in order to properly analyze the needs and compare existing conditions to those needs.[11]

Commonly, strategic plans provide a combination and range of recommendations to maximize the value of a corporation's assets. The facility manager considers factors such as: the organization's mission, vision, culture and core values; the current position of the business and its current real estate asset base; its overall direction and the projects currently underway within the corporation; how the business may change; and how those changes may affect the real estate needs of the corporation. Once these considerations are well understood, a business-driven approach is taken to analyze the organization's facilities and to set tangible goals and plan targets.

Often, organizations take a strictly cost-driven approach to their facilities. Although they are quick to implement and are often cost-effective, this approach is nevertheless lacking in vision, fails to adequately address the actual delivery of the business goods and/or services, and has only a moderate long-term impact on improving the overall performance of the business as a whole.

In contrast, a business-driven approach—despite necessitating a longer timeframe—delivers a clear vision for the future, earns employee support and enhances performance, which strengthens the business competitively. Using this business-driven approach, the team studies the real estate assets that the corporation currently holds using gathered data, modeling tools and scenario alternatives. This data often includes lease and ownership data, building assessments, square footages, space utilization standards and location characteristics.

To provide a comprehensive plan, the facility manager and SFP team explore the various business goals of each unit in the business, and integrate these goals into the facility plan analyses. This input defines future space and real estate needs based on overall corporate goals—starting with anticipated services, expected staffing changes and potential new technologies. The team uses these needs to predict future headcounts, demographics, space utilization, maintenance requirements, capital investment and operating costs.

At this stage, a clear understanding of the goals of the SFP, as well as the approval process and measures for success, will be complete and have the second stage follow.

[11] John R. Glagola (2002) An Introduction to Strategic Facilities Planning, *Real Estate Issues* 27(1): 13-15.

Analysis

Once a clear definition of the business' situation has been established, the facility manager, planners and designers begin to consider how to balance current facility needs with long-term needs and issues. These needs and issues may include workforce demographics, manufacturing processes, organizational structure and culture, community and government regulatory requirements, market position, and capacity rates and volumes. All of these combine to define the individual elements of the SFP.

The comparison of the current inventory and conditions with the future needs provides the gap that the SFP will address. A number of tools (see Analysis Tools section) may be used to compare, analyze, coordinate and clarify this gap and the alternatives, scenarios and recommendations that are made.

Analysis Tools

Scenario Planning
Scenarios are tools for thinking ahead to anticipate the changes that will impact your organization. Scenarios can be considered instructive simulations of possible operating conditions. This approach might be used in conjunction with other models to ensure planners truly undertake strategic thinking. Scenario planning may be particularly useful in identifying strategic issues and goals.

1. Select several external forces and imagine related changes that might influence the organization, such as the global marketplace, technology, change in regulations, demographic changes, etc. Scan newspapers and Internet sources for key headlines to suggest potential changes that may affect the organization. Utilize IFMA's and other association's trend reports.
2. For each potential change, discuss three different future organizational scenarios (including the best case, worst case and all right/reasonable case), which may arise within the organization as a result of each change. Reviewing the worst-case scenario often provokes strong motivation for needed changes.
3. Suggest what the organization might do, or potential strategies, in each of the three scenarios to respond to each change.
4. Planners soon detect common considerations or strategies that must be addressed in order to respond to possible external changes.
5. Select the most likely external changes to affect the organization, over the next three to five years, for example, and identify the most reasonable strategies the organization can undertake to respond to these changes.[12]

The product of this process is not a final, cut-in-stone document, but provides insight into how different decisions will affect the organization's return on investment, cash flow, debt load, work processes and productivity of its employees. Scenarios will guide decision makers and provide advance consideration of potential impacts of different facility decisions.

[12] Carter McNamara (2006) Basic Overview of Various Strategic Planning Models, *http://www.managementhelp.org/plan_dec/str_plan/models.htm*

Systematic Layout Planning (SLP)
The SLP method was developed by Muther (1973) to create conceptual block layouts. The method successively adds complex data categories until a block layout has been generated, making it a strategic to tactical tool.

1. Document the present operation (Deliverable: flowcharts)
2. Define the activities and planning horizon (Deliverable: table)
3. Develop activity relationships (Deliverable: relationship diagram)
4. Develop a square footage requirements spreadsheet (Deliverable: spreadsheet)
5. Develop block plan layouts (Deliverable: block plan layout)
6. Development an equipment layout (Deliverable: equipment layout)[13]

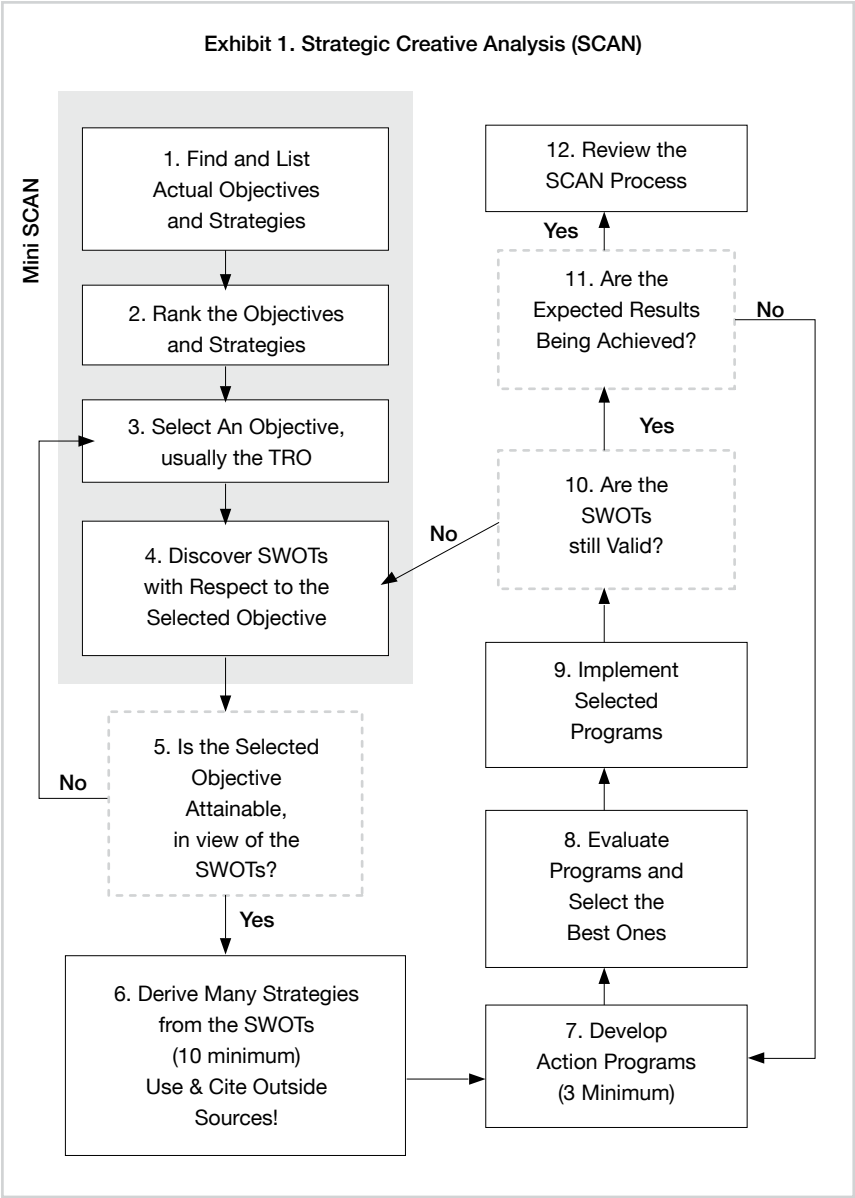
SWOT Analysis
SWOT Analysis is another planning tool used to strategically evaluate the strengths, weaknesses, opportunities and threats in a project or in a business venture. SWOT uses business objectives and identifies both internal and external factors that are either favorable or unfavorable to achieving that objective. The four areas considered are:

- **S**trengths: attributes of the organization helpful to achieving the objective and describing how they can be leveraged.
- **W**eaknesses: attributes of the organization harmful to achieving the objective and how they can be minimized or neutralized.
- **O**pportunities: external conditions helpful to achieving the objective.
- **T**hreats: external conditions harmful to achieving the objective.

Brainstorming (AGIR-a gang in a room)
This technique better ensures that various views and aspects are represented, particularly if the individuals are chosen well. The downside may be too much input, which may yield inconsistencies.[14] However, done properly, brainstorming provides opportunity for creative, innovative concepts that might otherwise be overlooked. As such, it is suggested that a professional facilitator should conduct these types of sessions.

Strategic Creative Analysis (SCAN)
Strategic Creative Analysis is a process for strategic planning, decision making and analyzing case studies. An example of a strategic planning technique that incorporates a SWOT analysis is SCAN analysis. The process of SCAN is described in Exhibit 1. (Step 3. Includes the Top Rated Objective – TRO)[15]

[13] Bodi Engineering LLC (2003) Facility Planning Methodology, Oct. 2003.
[14] David G. Cotts (1999) *Facility Management Handbook, AMACOM*.
[15] Winer, Leon (2008) MBA Toolbox, Chapter 1.2, access online: *http://mbatoolbox.org/stories/storyReader$19*



Benchmarking

Benchmarking is a very useful SFP tool for comparing and measuring your organization against others, anywhere in the world, to gain information on philosophies, practices and measures that will help your organization take action to improve its performance. In summary, benchmarking is the practice of being humble enough to admit that others are better at something and being wise enough to learn how to match, and even surpass, them at it.

Benchmarking utilizes much of the organizational understanding gained in the first step of SFP to compare practices and metrics to recognized leaders. Networking with peer organizations, competitors, and especially for facility organizations, visiting award-winning service organizations provides insight to bring back and adapt to your operations. Adaptation is the key—recognizing a good process or practice and use it in your own specific way within your organization is the essence of successful benchmarking.

In order for SFP to serve as the right mechanism to analyze and improve current facility operations, a proactive approach to benchmarking practices and services of those organizations recognized as industry leaders is needed. Benchmarking may be undertaken as part of a broader process reengineering initiative, or it might be conducted as a freestanding exercise.[16]

Organizational Simulation
Organizational simulation is a prominent method in organizational studies and strategic management. This tool aims to understand how organizations operate. The organizational simulation can describe the coordination of facility operations based on understanding and analyzing the impact of interrelated facility alternatives and activities. This method can measure organizational performance and support strategic thinking.[17]

Planning

As a result of the analyses performed, decisions will become apparent or recommended courses of action can be supported by the completed analysis. These recommendations will become the essence of the SFP. In order to be organizationally mandated, most facility managers will need to present the recommendations to senior management, obtain buy-in (often involving some negotiation and adjustment to the plan), and get final approval and funding for the proposed plan. IFMA uses and recommends the balanced scorecard methodology for integrating planning into the organization's objectives, but recognizes that every organization has selected methods for business processes and facility management conforms to align with the organization's methodologies.

The following are major steps in setting up the plan:

- Document the primary objectives to be addressed (the gap) in the SFP;
- Evaluate sites, zoning, costs, labor, competition and all factors critical for success;
- Conduct financial and risk analysis to focus on finding the maximum value;
- Develop alternatives with recommendations and priorities;
- Develop a process for marketing the recommended SFP to gain management approval; and
- Obtain financial and other approvals needed to launch the action phase.

It is important to note that once approved, the SFP may continue to evolve and adapt to changing conditions within and outside the organization. The flexibility of a good SFP will accommodate most minor adjustments.

16 Steiss, Alan Walter (2004) Strategic Facilities Planning: Capital Budgeting and Debt Administration, Lexington Books.
17 William B Rouse and Kenneth R. Boff (2005) *Organizational Simulation, John Wiley & Sons*.

Action

After approval, the SFP is then ready for implementation. Implementation of an SFP typically requires development of a specific project or projects to deliver new, altered or reconfigured space to meet the organizational need. This specific project is a unique process which is supplemental to the SFP. This becomes the tactical plan mentioned earlier in Table 1. Specific project planning with take place outside the SFP to fulfill the detailed implementation phase. Some projects, especially large new space projects, may be managed by specialty or contract groups. It is critical in these cases that facilities stay involved as a core team member, in order to ensure integration of the planning and operational phases of the specific project.

Regardless of the tools used in the development of an SFP, the SFP should be viewed as a living document that reports findings and makes considered recommendations for implementing the plan within a realistic time frame, yet maintains flexibility to adapt as business requires. While implementation is in progress, flexibility to adapt to changed conditions may be required. It is prudent to view a SFP as the “current SFP” since any major change in market conditions, economic outlook or other forces could require varying degrees of change to the original document. This is another reason that scenarios are very helpful—since they anticipate some of these potential changes. The SFP is a major facility management tool used to support the organization—alignment with the organizational vision, mission, goals and objectives is always critical for success of the SFP.

Documentation of especially successful or problematic portions of the SFP, if noted, can provide valuable feedback for the next iteration of planning. The cyclical nature of planning and continuous improvement provides opportunities to learn from each process.

SFP PROCESS MODEL

The following diagram (on page 18) is a process model developed for SFP accomplishment. This process model integrates the sequential activities, participants, deliverables and inter-relationships for an individual organization to be successful when implementing the four-step SFP process. The process model includes three layers of participants (executive management, facility manager and staff) and roles illustrating who actually implements each of the tasks in the SFP development process.

The SFP team needs to be closely connected to implement activities from the project launch through to the final implementation phase and hand-off for development of the tactical facility plans to support the organization's business planning. Major activities are aligned with the four-step process and include tasks such as data gathering/benchmarking, analysis/synthesis, scenario development/forecasting and SFP implementation.

The process model ends with the hand-off to a tactical facility plan, which often is the facility management annual plan or budget. Feedback through all phases for continuous improvement is shown with arrows in reverse. It should also be noted that there are no hard and fast lines indicating when one phase ends and the next starts. Plans flow at different rates, due to differing organizational requirements and managerial direction. The precise transitions are unimportant but need to follow your own organization's requirements.

Next Steps - The Building Life Cycle

Although the SFP process model ends with the hand-off to a tactical facility plan, the reality is that the process of strategic planning should be neverending. Seldom does a building go untouched after it is built. A facility may be evaluated several times during its lifetime. The cost of the original planning, design and construction of a building is only a small percentage of its total cost of ownership (TCO). As the reiterative process of strategic facility planning continues over the lifetime of a building, it is imperative that the facility manager take into account it's life cycle cost (LCC). LCC is the cost of the building over its lifetime, in present value-terms, which includes all costs associated with the planning, design, construction, operations, maintenance and capital improvements over time and ultimately the cost of disposition. This is especially true in a multi-building setting. With multiple buildings, there will always be buildings in different states of condition, from new to end of useful life. To properly develop an all-encompassing SFP, the facility manager must consider the total cost of each building—taking into account all of the sunk costs to date, as described above, as well their current functionality.

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Strategic Facility Planning:
A White Paper on Strategic Facility Planning

SFP Process Model

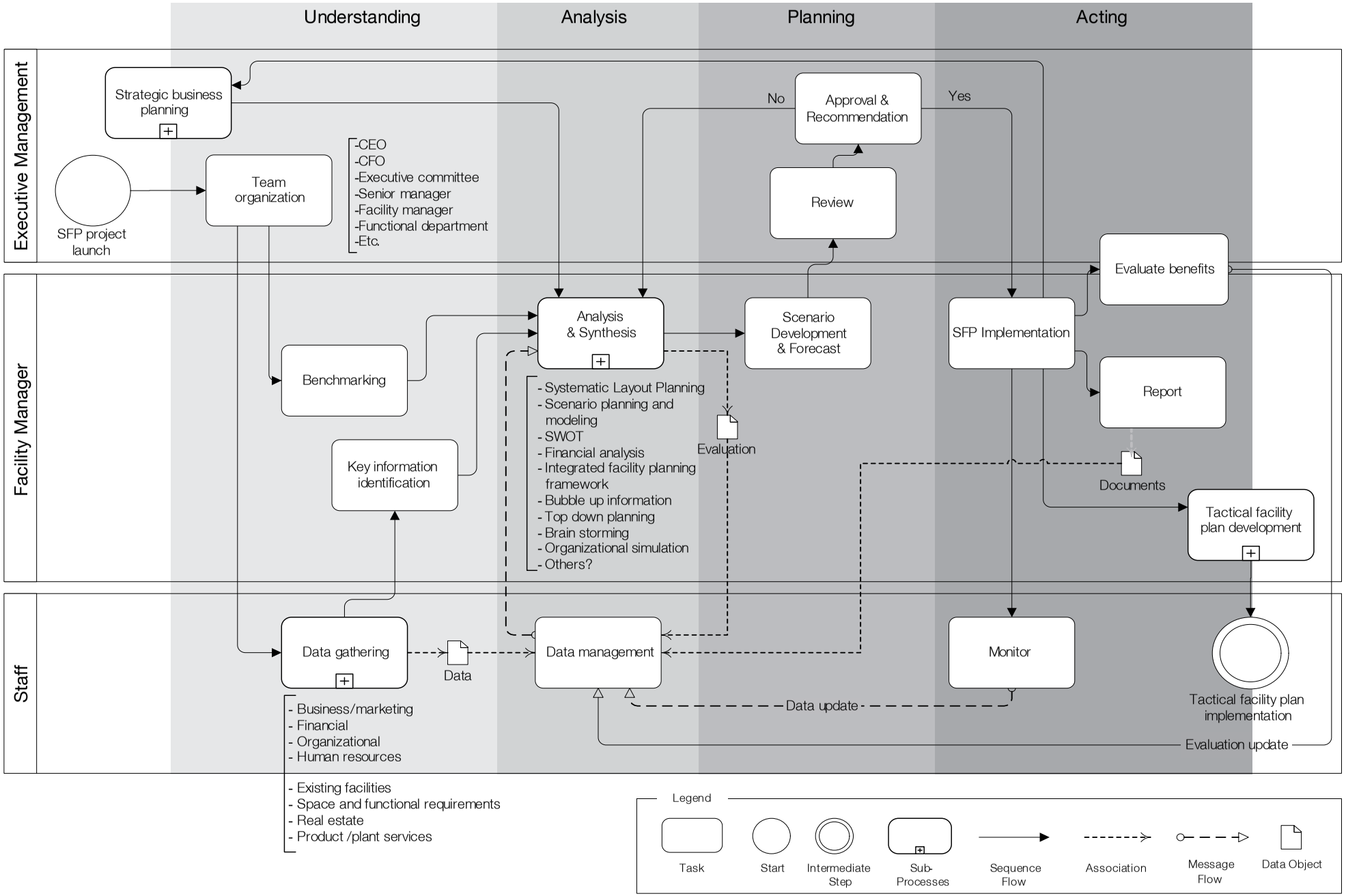

Figure 2. SFP Process Model

Winer, Leon (2008) MBA Toolbox, Chapter 1.2, access online: *http://mbatoolbox.org/stories/storyReader$19*

DEFINITIONS

Analytical tools –
Any process used to evaluate some aspect of an item. Each tool is used for a specific purpose. Several tools are outlined in this white paper.

Balanced Scorecard –
A business performance measurement system developed by Robert S. Kaplan and David P. Norton that provides a method to align business activities to its strategy, and monitor performance of strategic goals over time. The balanced scorecard is a top-down method of translating an organization's mission and strategy into tangible linkages, interrelationships, specific activities, and measures necessary for success. A good balanced scorecard may take into consideration employee satisfaction, cost metrics, productivity metrics, etc.

Building Condition Assessment –
A complete review of the current state of a building to determine their current condition and estimated cost to correct any deficiencies. It is provided in a report format, often including photographs and diagrams outlining problem areas, needed updates or improvements and problems.

Capital Improvement –
A structure or major piece of equipment built or installed to permanently add value and/or capacity to property.

Gap Analysis –
Technique for determining the steps to be taken in moving from a current state to a desired future state.

IRR – Internal Rate of Return –
The discount or interest rate at which the net present value of an investment is equal to zero.

LCC – Life Cycle Costing –
The process of determining the cost of a building over its lifetime, in present value terms, which includes all costs associated with the planning, design, construction, operations, maintenance and capital improvements over time, less any residual value and ultimately the cost of disposing of it.

NPV – Net Present Value –
An analytical tool used to evaluate the costs of a project using projected cost of money (interest or hurdle rate) over time.

ROI – Return on Investment –
The ratio of money gained or lost on an investment relative to the amount of money invested. ROI does not indicate how long an investment is held.

Payback Period Analysis –
An analysis tool used to calculate the period of time required for the return on an investment to repay the sum of the original investment.

TCO – Total Cost of Ownership –
A financial estimate designed to help facility managers assess the total cost of planning, designing, constructing, operating and maintaining a building.

Scenario Planning –
The testing of business strategies against a series of alternative futures.

Strategic Facility Plan –
A two-to-five year facility plan encompassing an entire portfolio of owned and/or leased space that sets strategic facility goals based on the organization's strategic (business) objectives. The strategic facility goals, in turn, determine short-term tactical plans, including prioritization of, and funding for, annual facility related projects.

Strategic Facility Planning –
The process by which a facility management organization envisions its future by linking its purpose to the strategy of the overall organization and then developing goals, objectives, and action plans to achieve that future. The result of the strategic facility planning process is the strategic facility plan.

TEN GUIDELINES FOR IMPLEMENTING MANUFACTURING SYSTEMS

By William J. Sawaya, William C. Giauque, Sam G. Taylor and Steven F. Bolander

Wickham Skinner teaches that successful operations focus on a single product, process or competitive advantage. He suggests that the skills and technology needed to compete in one arena are usually incompatible with competition in different arenas (see Skinner). This important principle needs to be applied in the design and operation of manufacturing systems. Consider the following examples.

A manufacturer of plastic resins used a process technology and production systems that were focused on supporting a low-cost, high-quality strategy. The systems scheduled production by sequencing products according to their molecular weights. This resulted in lower grade switching costs and improved product quality. However, at times this company lost its focus by accepting a number of rush orders, which required producing many resins out of the desired sequence. Acceptance of these orders suggested that the company was trying to reposition itself as a flexible producer with fast delivery times — but their process technology and manufacturing systems were not focused for these new objectives.

In contrast consider a manufacturer of metal products. This company was very successful in converting a single raw material into many different final products. It then acquired a company that accumulated a large number of components and assembled a single final product.

Management recognized the incompatibility of these operations. Consequently, even though both companies are now housed in the same location, the two companies exist with totally separate managerial, production scheduling and inventory control systems. While the corporation is now less focused, each division is narrowly focused and very competitive — both divisions command premium prices because of reputations for very high quality.

Asking "why?"

The Japanese have been reported to ask "Why? Why? Why? Why?" and " Why?" This repeated questioning forces one to examine the assumptions on which systems are based. Following are three brief examples of false assumptions.

The first company used a wide variety of colored printing inks to produce wallpaper. They mixed printing inks in 55 gallon drums and used a minimum production quantity of one drum. In most instances one drum far exceeded requirements for a printing run. Hundreds of partially filled drums overflowed the warehouse and were stored in a field adjacent to the plant. The assumption of a fixed-lot-size equal to the capacity of a drum resulted in hundreds of thousands of dollars of very-slow-moving or obsolete inventory. If they had asked "Why," the right answer would be obvious.

The second company challenged conventional wisdom. A common principle for maintaining records accuracy is that inventories and production workers should be kept separate. A recreational products manufacturer asked "Why" and concluded otherwise. They decided to hold production workers personally responsible for inventory accuracy, cycle counting and other inventory functions. The warehouse and production facility were combined, with each worker responsible for a zone, which included his or her production station and all related parts and components. Material handling was reduced, kitting was eliminated and complete mixed-model assembly became possible.

The third company looked at product classifications and asked "Why?" This manufacturer of building materials classified products as standards or specials. Separate planning and control systems were used for each product group. Investigation revealed that the labor content was identical, as the specials involved minor changes in size, color and components. In addition, set-up times were almost negligible. Consequently, a single, more efficient planning and control system was developed that treated all products as specials. The result has been a significant decrease in planning, scheduling and tracking costs. In addition, implementation of a JIT system was greatly simplified.

The technique zealots

It is truly amazing how technique zealots can assemble a significant number of disciples who believe that any planning and control problem can be solved with a particular technique. This was particularly true of MRP, especially in these two cases of attempted misapplication of good tools.

A paper manufacturer produces multiple grades of paper on high volume, capital intensive machines. Efficiency and quality considerations require production of paper in a natural sequence based on the grade of paper, color and basis weight. Their information systems group proposed the use of MRP to schedule the paper machines. This idea was discarded because MRP schedules production based on need dates rather than on the least-cost, natural production sequence. MRP simply did not fit with the process technology and competitive priorities.

Another company, a large chemical company with a network of field warehouses and bulk liquid terminals, used a reorder point system that was developed for use in all locations. While this worked quite well for locations replenished by truck and rail, it did not work for marine shipments. Their barges operated on reasonably fixed cycles. Thus, when the reorder point tripped, a vessel was generally not available to carry the shipment. The reorder point system did not fit their transportation technology. The solution was simple — use a fixed period inventory model which fit the operating cycles for the barges.

Multiple techniques

Bacteriologists use the word "polytrophic," to describe an organism that derives nourishment from more than one source. Manufacturing systems are also

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living organisms that are continually adapting to a changing environment and often must derive nourishment from more than one technique. Many savvy companies have selectively applied multiple techniques within a single facility — using the technique that best fits a particular situation. A few of these are:

- An assembler of many simple products uses JIT for assembly; but uses forecasts and MRP to order long-lead-time materials.
- A consumer products company uses MRP to plan production, JIT to execute final assembly schedules, and process flow scheduling (see Taylor and Bolander) to coordinate parts fabrication and final assembly stages.
- A repetitive manufacturer producing high volume, consumer products uses process flow scheduling to schedule production lines and MRP to plan material and component purchases.
- A polymer manufacturer uses process flow scheduling to schedule resin production and a reorder point system to manage field inventories.
- A food processor uses linear programming to allocate demand among plants, a custom system to schedule the plants, and MRP to plan material purchases.
- A window manufacturer has only minor set ups and effectively controls assembly with JIT. However, to minimize waste associated with glass and metal cutting, the front of the process is driven by coordinated batch manufacture of metal and glass components.

Integration

Manufacturing planning and control systems contain modules for subfunctions such as forecasting, planning, scheduling and control. These modules need to be linked to each other as well as integrated with other internal business systems, supplier systems and customer systems. Suboptimization and poor communication are common integration problems that are illustrated by the following two examples.

The production planning group of a medium size manufacturing company released a prioritized list of orders to be filled each day by two subassembly divisions and a final assembly division. The subassembly divisions ignored the priorities to suboptimize production within their facilities. It was often mid-morning before the final assembly division had sufficient compatible parts from the two subassembly divisions in order to begin production.

A major chemical company discovered that one of its divisions was using five separate forecasting systems — one for sales and marketing, and one each for budgeting. While a novice might think this is somewhat unusual, experience suggests that multiple, inconsistent forecasts are common. A careful inspection of the formal and informal forecasting systems in your company may be revealing.

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Databases

The most powerful and elegant systems will be brought to their knees for lack of accurate, timely and complete data. Much has been written about the need for absolute integrity in the use of MRP systems. Let us briefly review two examples.

A check of one company's inventory database revealed that one-fourth of the items had a negative on-hand balance. Production workers had terminals on the shop floor for reporting transactions, but then did not take the time to do it. Moreover, all lead times in the system had been arbitrarily set to two weeks. Small wonder the MRP system did not work!

A purchasing agent in a truck manufacturing facility complained that he always had to place orders for sheet metal between the orders planned by the MRP system. An examination of the bills of materials revealed that when engineering determined the square footage of sheet metal required, this design number was used in the manufacturing bill of materials with no allowance for the scrap losses in cutting. This logical error in the bill of materials database resulted in a failure to calculate the true material requirements.

Training

Training may be the single most important factor in successful implementation. Workers need to know not only how to do their jobs, but also how their work affects the overall system. Most workers want to do the right thing, but often do not understand the implications of their actions. Consider the following company.

A job shop manufacturer attempted to cause the workers did not recognize the importance of entering accurate data into the system. The previous manufacturing system did not require the discipline of an MRP system, and a sloppy culture had taken root that was difficult to change.

Another company had several months' supply of cut aluminum parts in WIP. A JIT system was implemented and response improved. Worker productivity increased by over 60 percent, but inventories stayed at the previous levels. The workers did not want to give up the security of full part bins. They kept the bins full, even though parts actually used in production were produced according to JIT principles. The full benefits of JIT were not obtained because the "hoarding" culture had not been adequately addressed through training.

Yet another company fell into the "retraining" trap. This chemical company developed a sophisticated planning and scheduling system, which resulted in large documented savings in operating and inventory costs while improving customer service. In time, the system originators were transferred to new jobs and replaced with persons not familiar with the system details. The system slowly deteriorated and was finally replaced by simple, but less effective, systems that the new planners could understand and maintain.

It is vital to identify whose power base will be affected by a new system. These persons must be converted or the system will fail. Key personnel must be convinced that they personally will be better served by the new system than by any other alternative.

Several years ago two of the authors were asked to develop a combined inventory/quality management system for a food products distributor. Working closely with the person who hired us, we developed an elegantly simple, effective system. The person who hired us was very pleased with the final product. When we presented the final report, he took us down the hall to another office where he threw our report on the desk of a colleague and announced "these people have solved all of your problems." The person who had hired us had no responsibility for inventory or quality management. Not surprisingly, our work was not implemented.

Performance measures

People generally act in their own self interest. If the performance measures that are used in determining compensation and promotion do not adequately address materials management, then no system in the world can significantly improve the situation. Manufacturing systems and their associated performance measurement systems need to address the conflicting materials management objectives of (1) low operating costs,

service. Consider the following examples, which illustrate common behaviors.

A chemical company measured its plants on manufacturing costs, product quality and on-time delivery. Not surprisingly, the plant filled its warehouse and two leased warehouses with inventory.

A polymer manufacturer was plagued with high inventories, which were a direct result of poor forecasting by the field sales force. The problem was easily corrected by reporting forecast accuracy for each sales person to their district sales manager and to the marketing manager. They, in turn, used this information for performance appraisals.

Management support

Management must treat manufacturing systems implementation as an important activity, allocate sufficient resources and monitor progress. Indeed, much has been written about the necessity of management support. This support must be in both word and actions.

A consumer products manufacturer undertook the design and implementation of a new distribution system with a part-time project manager from the user group. With little time to devote to implementation, the manager effectively allowed the computer systems group to take over project direction. While well intentioned, the systems group never received a needs identification from the users and designed the system as they saw it. During the pilot run the users requested significant modifications, which rendered the system overly complex and suspect. After two years the project was abandoned.

These 10 guidelines should stimulate you to think about your manufacturing systems:

- Is your system focused?
- Are your assumptions sound?
- Do the techniques fit your environment?
- Should you be using multiple techniques?
- Are your systems integrated?
- Are your databases accurate, timely and complete?
- Do you provide your people adequate training and retraining?
- Have you considered how politics will affect implementation?
- Are your performance measures consistent and complete?
- Do you have management support in both word and deed?

"The credit belongs to the man who is actually in the arena; whose face is marred by dust and sweat and blood; who strives valiantly; who errs and comes short again and again; who knows the great enthusiasms, the great devotions, and spends himself in a worthy cause; who at the best knows in the end the triumph of high achievement; and who at the worst, if he fails, at least fails while daring greatly ...."

—Theodore Roosevelt

For further reading

Skinner, W. "The Focused Factory," *Harvard Business Review*, May-June 1974.

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