

Aligning Analytics Strategy with Business Strategy

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ABSTRACT

As more and more organizations are adopting analytics, organizational strategic planning activities need to keep pace with the evolving business needs to include analytics function and data analytics in its strategic planning design. Strategic planning approaches (for example, Hoshin Kanri or Balanced Score Card) adopted need to exploit analytics capabilities of the organization for successful strategy implementation. Hoshin Kanri is a well-known strategic planning methodology implemented by Toyota® Motor Corporation, Bridgestone® Corporation, Hewlett-Packard Enterprise (HPE or HP®) and many others. Analytics function is critical in any organization specifically during strategic plan deployment. It is imperative to align analytics strategy with business strategy to ensure an organization achieves its tactical and strategic objectives while fulfilling the needs of its stakeholders. The intent of this paper is to familiarize Hoshin Kanri Strategic Planning Methodology to analytics professionals to provide them with the tools, techniques, and know-how to use in establishing a sound analytics strategy that is integrated with the organizational business strategy.

Keywords: Strategic planning, Hoshin Kanri, Balanced Score Card, Analytics, Business Strategy

INTRODUCTION

Analytics and related knowledge areas are growing at a rapid pace in the 21st century. As these disciplines are growing, educational institutions and commercial businesses are adopting analytics and data science functions as strategic priorities to compete in the global marketplace. In order to embrace the strategic priority to adopt analytics by organizations, it is imperative to study the landscape in which they operate. This strategic planning effort includes organizations' Strengths and Weaknesses, Opportunities and Threats (SWOT) analysis, employee skills and infrastructure capabilities, aligning the vision, mission, core values, and objectives. Per Womack (2018), external factors such as changes to global trade policies need to be considered if applicable to the business.

Hoshin Kanri is a strategic planning methodology originally adopted after World War 2 in Japan and became popular during the 1960s. Some of the pioneers of Hoshin Kanri planning include Toyota® and Bridgestone®.

What is Hoshin Kanri anyway?

Per Jacobson (2017), Hoshin means “direction” or “compass needle” and Kanri means “control or management”. This implies that the strategic objectives act as organizational compass to drive the business direction.

What does adoption of Analytics have to do with Hoshin Kanri in an organization?

Everything.

Hoshin Kanri helps in aligning multiple business priorities, functions, and provides an avenue to establish clear business priorities, and connecting business objectives with individual objectives (from CEO to employees at various hierarchies in an organization). It also helps in drawing a clear line of sight between organization vision, mission, objectives, and brings together the projects needed to achieve the tactical and strategic business objectives. This is the primary reason to discuss Hoshin Kanri planning in the analytics ecosystem backdrop.

PURPOSE

The purpose of this paper is to demonstrate the use of Hoshin Kanri planning for an organization in developing strategic business objectives and aligning these objectives with analytics adoption, so the organization in question can be the frontrunner in today's market place.

This paper demonstrates Hoshin Kanri activity for a manufacturing company to demonstrate the alignment of analytics strategy with business strategy, however the methodology could be applied in any industry. The following schematic illustrates the Enterprise Strategy for Robot One. (a fictitious manufacturing company).

Vision

To be the most successful and respected robot manufacturer in America



Fig 1. Business Strategy Alignment with Enterprise Vision
(Modeled after Jacobson (2017))

METHOD

This section includes the Hoshin Kanri strategic planning process steps for Robot One organization that includes business strategy, from which analytics strategy is derived. In addition, it provides the breakdown of organizational objectives into sustainable objectives and breakthrough objectives; includes SWOT analysis, capability analysis, and project prioritization from business perspective and uses *catch ball* concept to establish functional area objectives and individual objectives. This would include a clear line of sight between organizational strategy, strategic and tactical objectives, project prioritization, and assimilation of business strategy with analytics strategy.

Per Boisvert (2012), Hoshin planning starts with leadership team understanding current state of business by reviewing current and past performance data with objectives that cover wide gamut of business such as revenues, profitability, effectiveness of deployment of projects, current and future market share, customer portfolio, SWOT analysis, capability analysis (people, equipment/tools, processes, and organization as a whole against requirements and customer needs), financial position of the business, and market position. Typically, analytics department assumes ownership in providing the data and visualizations regarding current state, SWOT analysis, and capability analysis for the organization.

The above review of the business by leadership team leads into generating breakthrough objectives (for future), and sustainable objectives (to pay current bills and to provide stability). These are brainstorming sessions that include subject matter experts, influencers, and participants are selected by leadership team for creating strategic objectives. These objectives range from three to five years from concept to completion. Typical tools used during brainstorming session include: Affinity Diagram, Interrelationship Digraph and other brainstorming tools. In addition, leadership team uses Plan Do Check (or Study) and Act cycle to ensure a structured methodology is adopted to arrive at optimal objectives for the business that push the business towards vision and its mission.

Per Jacobson (2017) and Waldo (2015), the following steps are required to implement Hoshin Kanri Planning for Robot One:

- Vision: To be the most successful and respected robot manufacturer in America by putting a robot in every house and in every business.
- Mission: To accelerate global transition to sustainable robotics.
- Values: Employees of Robot One will act ethically, follow the organizational procedures, laws of Local, State, Federal, and follow the laws of countries in which they operate, with integrity and professionalism to achieve organizational vision.
- Define and document Current State: Current state of Robot One is displayed through its accomplishments, current fiscal year's (fiscal year ends on 31-Dec-2019, and data through Aug-2019) actual performance vs. organizational objectives (Appendix A)-sample objectives shown.
- 3-5-year Strategic Objectives (Breakthrough Objectives)
Typically, three to four key initiatives the organization pursues to accomplish to secure future business and move closer to organization's vision compared to the current state; Called the "What" conditions for Breakthrough: In order to be considered as a Breakthrough Objective:
 - It must demonstrate substantial improvement;
 - Must require the organization to stretch itself;
 - Usually requires cross-functional effort;
 - Does not have existing standard or system;

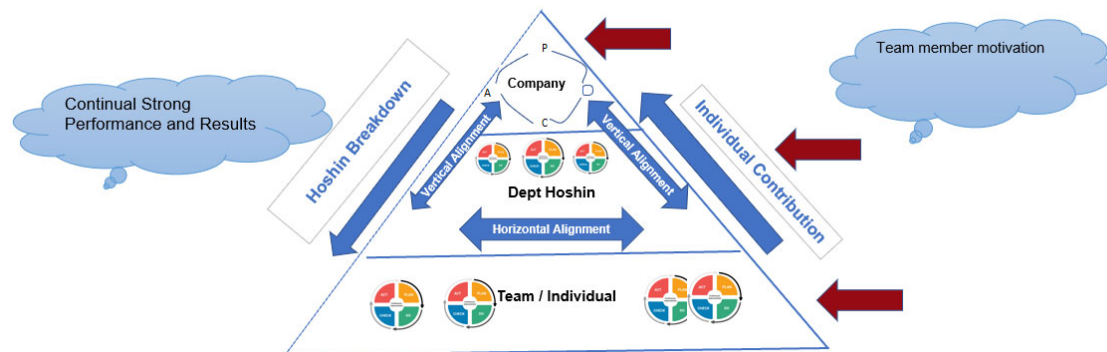
HOSHIN PLANNING MATRIX (X-MATRIX)									
*				Pilot culturally diverse focus groups to drive ideation and disruption			*	*	
*	*			Develop new distribution channels for new returnable packaging		*			
*	*			Engage customer during critical milestones of product design, production, & testing					
	*			Increase overall market share in Southeast Zone				*	
	*			Increase number of new returnable packaging customer accounts		*	*		
	*			Improve customer loyalty					*
			*	Reduce customer complaints			*		*
		*		Deploy performance excellence improvement methodologies		*		*	*
<div> <div> <p>Develop at least 3 new products with the viability index of 60%</p> <p>Achieve 25% market share in Southeast zone in Robot One Dukt</p> <p>Grow total revenue by \$75 M</p> <p>Reduce process waste by 50% through lean implementation</p> </div> <div> <p>How</p> <p>Top Level Improvement Priorities</p> <p>How far</p> <p>Annual objectives</p> <p>How much</p> <p>Targets to Improve</p> <p>What</p> <p>3-5 Year Breakthrough Objectives</p> </div> </div>					<p>Implement performance excellence in all 3 business units</p> <p>Increase active distribution channels by 5</p> <p>Achieve 25% incremental revenue growth in new customer account</p> <p>Increase customer accounts (<5 years) w/long term contracts by 45</p> <p>Reduce customer complaints by 50%</p> <p>Reduce PD team number by 15%</p> <p>Establish 3 successful ideas from focus groups</p> <p>Increase market share in the Southeast zone by 20%</p> <p>Murali Sastry Director of Quality</p> <p>Fred Smith VP of Marketing</p> <p>Jim Gardner VP of Manufacturing</p> <p>Dennis Miller (VP of Sales)</p>				
<p>Achieve world class lean six sigma process in production by 2024 Fiscal Year End (FYE)</p> <p>Create empowered culture of collaboration resulting in 200% increase in new products by 2023 FYE</p> <p>Grow total revenue by \$250M with an EBIT of 20% by 2024 FYE</p> <p>Achieve 60% market share of Robot One Deluxe in USA by 2023 FYE</p>					<p>Resources</p> <p> </p> <p> * = Primary responsibility ○ = Secondary responsibility </p>				

Annual objectives are derived from strategic objectives. Depending on the strategic planning horizon, strategic objectives are further divided into feasible chunks of annual objectives to clearly communicate organization's commitment to achieving the strategic objectives to honor company's vision and mission. As shown in Fig.1, annual objectives provide further granularity into strategic objectives. Top level improvement priorities provide further intuition and motivation to implement successful strategy. Resources indicated in Fig.1, provides the senior leadership support to the implementation of strategic and annual objectives.

Periodic reviews of strategic plan and annual plan are essential to the successful realization of breakthrough objectives and annual objectives. Periodic reviews range between weekly, monthly, quarterly depending on organization's commitment to the achievement of strategic objectives. A3 is the primary tool used to assess and understand the progress of projects contributing to the realization of strategic objectives. When the actual performance does not meet objectives laid out, problem solving A3 is used to bring the objectives back on track.

The Hoshin Planning matrix is the end product of several “Catch Ball”, SWOT analysis, capability analysis, conducted through brainstorming sessions with teams throughout the company. Hoshin Planning sessions are hierarchical in nature i.e., at the organizational level-Company Hoshin, Department Level-Dept. Hoshin objectives are derived from Company Hoshin , and Team/individual Hoshin for individuals or teams are derived from Department Hoshin as shown in Fig.2. This process lends itself to alignment both vertically (hierarchically between leadership teams, departments, teams and individuals) and horizontally (across departments). Refer to Appendix A for glossary of terms including Catch Ball, SWOT Analysis, and Capability Analysis.

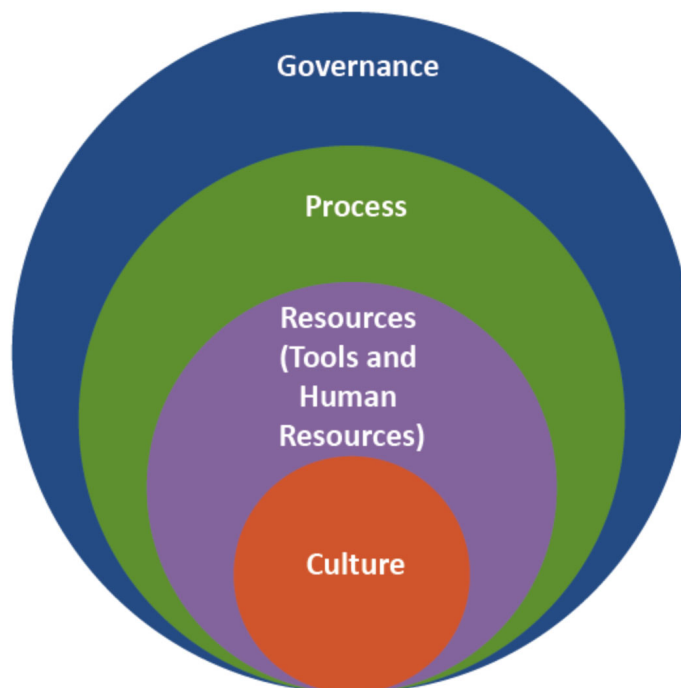
Fig.2 Breaking Down Business Problems into Smaller problems and solving through Plan Do Check Act (PDCA) Cycle(s) –(Adopted from Marchwinski & Mohan, 2015)



Analytics Strategy based on Organizational Vision, Mission, and Strategic Objectives:

Analytics department is in existence at Robot One since Jan-2019 headed by Chief Analytics Officer (CAO) who reports directly into Robot One Chief Executive Officer (CEO). CAO is part of the Breakthrough Objectives planning at the company level and has deep understanding of company's vision, mission, and strategic objectives. His role is to ensure his department and teams reporting into him aligns horizontally with other departments, and vertically to the company level strategic objectives as well as cascades the resulting departmental strategic objectives to analytics teams and individuals working in analytics department.

Fig 3. Role of culture in aligning analytics with business strategy (Adopted from Johnson, 2016)



As Management Guru Peter Drucker had quipped, “Culture eats strategy for breakfast”, per Johnson (2016), getting into the “data driven culture frame of mind” is key to integrating data and analytics into its business strategy. Organization culture is at the core of any organizational change. CAO should influence the organization in adopting data driven approach to making business decisions. This is best exemplified

at Robot One by CAO in supporting Hoshin Kanri Strategic planning effort. Data Governance, analytics roadmap for the organization (culture), and providing the needed resources (finding top talent in analytics, state of the art tools) to ensure organization is adequately supported in its journey to realize its vision.

Sample Analytics metrics charts (actual vs. target performance metrics) for (Financial Analytics, and Production Analytics related charts are provided) Robot One are provided for reference in Appendix B.

In Appendix C, common tools used during Hoshin Kanri planning session including SWOT Analysis template, Capability Analysis template, and A3 for strategic planning, A3 for managing strategic and annual projects, and problem solving A3 are provided for reference as well.

DISCUSSION

Alignment and Engagement on Strategic objectives from all areas of business.

PDCA applied at each level (both horizontal and vertical), Catch ball is applied (like playing catch between two people (plans and strategies and discussed between management and employees with alignment and engagement at each level. Per Bach (2018), the strategic objectives are discussed with next level (e.g., from leadership team, CEO or designee reviews strategic objectives with all departments) and provides them time to review and provide feedback. When department objectives that are derived from strategic objectives are accepted by departments/company, the department head owns the department objectives. Similarly, department objectives are reviewed with teams and individuals and they get time to review them and the team/individual objectives derived from department objectives after approved by the department needs to be owned by the team/individuals. So, when we say, “Catch Ball”, the objectives (figuratively, “The ball” gets passed down from company to department and subsequently from department to teams/individuals) get assigned after acceptance of objectives to the leaders, departments, and teams/individuals and they need to take ownership of the objectives respectively. Per Bach (2018), this is the most difficult part of the process.

The atmosphere should be open to all individuals with ideas to execute objectives without fear. All individuals are encouraged to participate. Typically, in my experience, when objectives are reviewed and the objectives that are derived by individuals, when accepted will be accomplished more readily from teams/individuals as they are engaged in the entire process. This is the main reason for the successful application and implementation of Hoshin Kanri in deploying organizational objectives and alignment between and within departments are ensured before deployment.

After the Hoshin Strategic Objectives are approved by leadership team, departmental objectives are approved by the department heads, and the team/individual objectives are approved by teams, organizations use A3 (please see Appendix A for definition, and Appendix C for examples of Strategic planning A3, Project A3, and Problem Solving A3) to communicate and demonstrate their understanding of objective, project, and problem and periodically communicate using this tool until the objective, project, or problem solving effort is completed. This is a one-page tool highly effective and simple to use. Strategic Ae, Project A3, and Problem Solving A3 are hierarchical in nature, first organizations use Strategic A3, then projects listed in Strategic objectives individually are managed through project A3, and if there are issues with projects (timeliness, scope, budget, or quality), problem solving A3 is used for problem resolution.

CONCLUSION

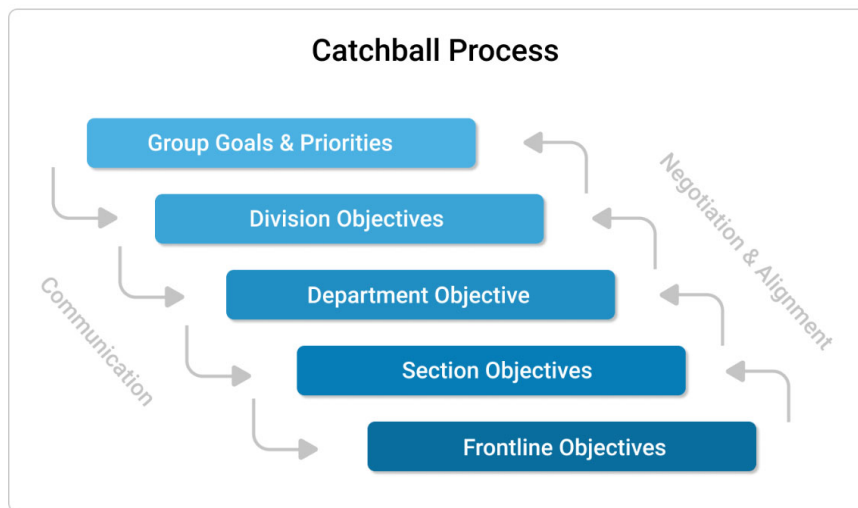
In summary, Hoshin Kanri planning process is robust and highly effective and is used by global organizations such as Toyota Motor Corporation, Bridgestone and many others. An attempt has been made in this paper to provide a flavor for the entire Hoshin Kanri planning process with an example manufacturing company (Robot One). However, this methodology could be used by any organization that is interested in aligning different areas of the business towards “True North” (organization’s vision, mission, and strategic objectives).

Hoshin Kanri methodology provides an opportunity for employees to effectively communicate their ideas using Catchball concept, through X-Chart, with A3, and strategy maps to communicate intent of the organization, department, and/or team or individual objectives and a methodology to track the progress of objectives from all areas of business. Analytics discipline could exploit this opportunity across the industry to align itself with the business to contribute and engage in productive realization of organizational objectives to effectively assist in achieving company's vision and mission. Organizational culture should be studied with intent by analytics team in order to influence the organization towards data driven culture to make decisions. Strategic planning activity is one of the best ways to demonstrate the use of analytics during business strategy formulation.

APPENDIX A (GLOSSARY OF TERMS)

Catchball: It is a practice in organizations deploying Hoshin Plans to establish and maintain two-way communication between hierarchies in an organization (Company leadership teams to department heads and departments to teams or individuals). Figure 3 below illustrates the process.

Figure 4: Catch Ball Process ((Adopted from No Author (No Date) -What is Hoshin Kanri Catchball?))



A3: A3 is a metric equivalent of 11" X 17" paper which is used as a one-page communication tool whether it is to communicate the strategy, project status, or to communicate about the status of a business problem. Many organizations use A3 to demonstrate the work involved in a strategy, project, or a problem.

Capability Analysis: The organization's capabilities are recorded during the brainstorming session in a Hoshin Kanri planning process. Capability analysis includes skills and capabilities of employees, leadership team, departmental managers and directors, capabilities of equipment, tools, and infrastructure. Consideration is given to capability requirements needed for achieving the strategic objectives and the gaps are identified if the organization does not currently possess the capabilities needed.

Hoshin Kanri: Per Jacobsen (2017), Hoshin (Compass or direction) and Kanri (means management or control). This is construed as Hoshin Kanri process directing every action or activity in the business to move towards its vision and mission.

PDCA: The Plan, Do, Check, and Act cycle is a methodology used by many organizations as a project planning tool to bring about change to the current state. First the planning of change is documented and understood, then during the Do part of the cycle the change is checked or tested, then during the Check phase of the cycle, the test results are analyzed, and the Act cycle is carried out to act on the difference

identified during check phase. As it is natural basic process and all humans follow this PDCA cycle in their daily activities, PDCA is easy to follow and use. In some literature, PDCA could be replaced with PDSA, S being for Study instead of Check. For further information, please refer to the ASQ reference.

Strength, Weakness, Opportunity and Threat (SWOT) Analysis: In SWOT Analysis, Strengths and Weaknesses are internal to the organization while, Opportunities and Threats are external to the organization. During the brainstorming session as part of Hoshin Kanri planning process, Strengths demonstrate company's expertise, what it is really good at, etc. These are matched with Opportunities. Similarly, Weaknesses represent what aspects of the business are the weak links which contributes to sub-optimal performance, and the actions needed to correct them, and Threats are matched with Weaknesses. This provides the 360 view of the business from SWOT analysis standpoint.

APPENDIX B (ACTUAL VS. TARGET PERFORMANCE CHARTS SAMPLES)

Production Analytics Chart Samples for Robot One

Figure 5: Production Units vs. Cost Per Unit

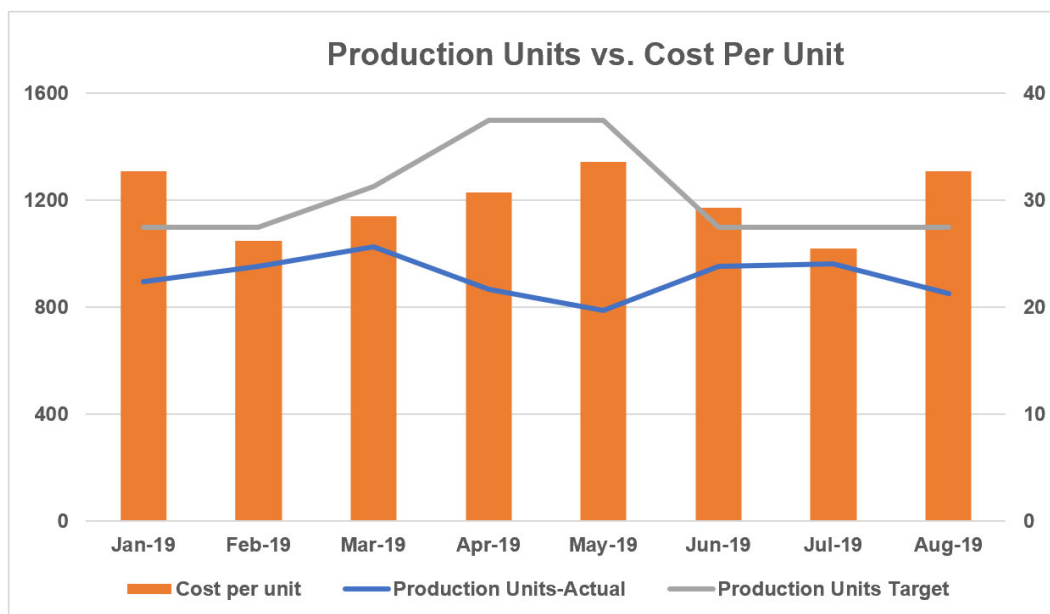
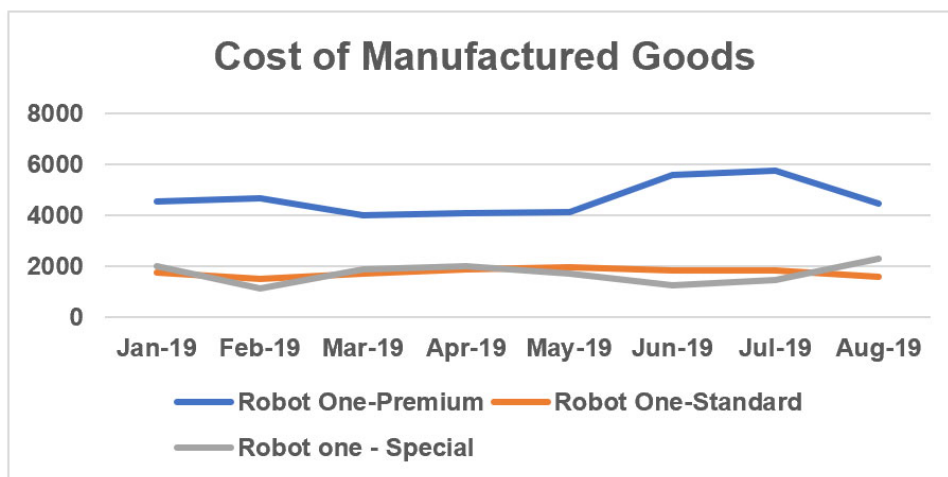


Figure 6: Cost of Manufactured Goods



APPENDIX C (HOSHIN KANRI PLANNING TOOL SAMPLES)

Figure 7: Strategic Planning A3


(Adopted from <https://ianjseath.wordpress.com/2015/06/08/a3-thinking-a-tool-to-support-strategic-planning/>)

<p>Objective: This is a high-level purpose statement. Objectives are likely to be long-term, broad and address "what do we need to achieve as a business?".</p> <p>Goals:</p> <ul style="list-style-type: none"> x.1 x.2 x.3 <p>The Goals are necessary and sufficient to achieve the Objective. They should be aspirational, but achievable in the timescale of the Strategic Plan. They should be expressed in outcome-oriented language, rather than as activities or deliverables. The language should convey a sense of "improvement", "achievement", "increase", "reduce". The language should (ideally) not "create", "deliver", "produce" or "develop".</p> <p>Start State: This should be one or two paragraphs. It should summarize where the organisation is now in performance terms against the Objective. Aspects of all the Goals should be reflected in the statement. It may include KPI data to illustrate current performance and to give a sense of the amount of improvement that may be needed. It may also express the urgency/pressure for change. It should be written in the present or past tense (e.g. "the organisation has achieved..." or "customers have..." or "the brand is...").</p> <p>End State: This should be a "mirror image" of the Start State that reflects what will have been achieved by the end of the planning period. The Strategies from the section below describe the choices the business has made about "how" the end state will be achieved. Aspects of all the Goals should be reflected in the statement. It may include KPI data to illustrate performance at the end of the period and to give a sense of the amount of improvement that has been achieved. It should be written in the present or past tense (e.g. "the organisation has achieved..." or "customers are saying..." or "the brand is...").</p> <p>Strategies: These should describe "how" the organisation will move from the Start-state to the End-state. There should be strategies that address all the Goals within the Objective. They are more likely to be descriptive statements of what will be done than a list of activities as bullets (they should "tell the story"). They should be written in the present tense and be action/outcome oriented, for example: "We will... do / implement / adopt / revise...". Avoid more passive action language such as "consider", "review", "develop". Strategy statements should also not "create plans" (which aren't actually the ultimate actions that will create the necessary changes) or "launch" (which implies something else will be needed to follow-on). Readers may get a sense that the action was chosen (from a range of options) and has an underlying rationale; i.e. there is evidence that there will be a cause and effect relationship between the action and the end state (as measured by the KPIs).</p>	<p>Roadmap: This should capture the choices the business has made about the main strands of work that will be required (beyond business as usual) in order to achieve each of the Goals. The timeframes are Business/Financial years. The level of detail should be:</p> <ul style="list-style-type: none"> More detailed than "implement the XYZ Plan" Less detailed than "refurbish ABC location" (unless this happens to be a critically important activity) <p>Activities will include the strategic choices made by the business. They should be expressed in Verb + Noun format (e.g. "Roll-out XYZ system to customers" or "Implement social media campaigns to channels A, B & C") so that the reader can understand what will be done (not "Leadership Development" or "Procurement").</p> <p>The Roadmap won't include Milestones (which are typically start-points or end-points) because it needs to show when the work will need to be done in order to get to particular milestones. Knowing when the work will be done will help to identify potential resource requirements, gaps and conflicts.</p> <p>Key Performance Indicators & Targets:</p> <table border="1"> <thead> <tr> <th>KPI</th> <th>Target Year 1</th> <th>Target Year 2</th> <th>Target Year 3</th> </tr> </thead> <tbody> <tr> <td>This is "what" will be measured. It is the indicator, or metric.</td> <td>These are the levels of performance that will be achieved by the end of the year.</td> <td>Include targets for all three years.</td> <td>Include targets for all three years.</td> </tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table>	KPI	Target Year 1	Target Year 2	Target Year 3	This is "what" will be measured. It is the indicator, or metric.	These are the levels of performance that will be achieved by the end of the year.	Include targets for all three years.	Include targets for all three years.																												
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Figure 8: Project A3 (Adopted from https://mn.gov/admin/assets/A3%20Project%20Charter_tcm36-316033.pptx)

A3 PROJECT CHARTER: < TITLE>		Date: <date> Sponsor: <sponsor>	DEPARTMENT OF ADMINISTRATION COMMUNITY IMPROVEMENT																																								
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Figure 9: Problem Solving A3 (Adopted from: <https://www.ashnha.com/wp-content/uploads/2018/10/A3-Problem-Solving-Oct-2018.pdf>)

																									
BACKGROUND / BUSINESS CASE <ul style="list-style-type: none"> What issue or problem do we need to solve? Why is this issue important to solve now? What benefits do we anticipate from solving the problem (e.g., quality, timeliness, cost, customer/employee satisfaction)? 	SOLUTIONS <p>What solutions will solve the root causes? (Tools: Brainstorming and Affinity Diagram)</p> <ul style="list-style-type: none"> What solutions are best and we should recommend? <ul style="list-style-type: none"> Tool for a few primary options: Impact/Difficulty Matrix Tool for many options: Criteria Decision Matrix Consider including an evaluation of the status quo (no change) option What impacts (positive and negative) may result from implementing the solutions? (Tool: Impact Wheel, FMEA) How will we mitigate or resolve negative impacts? What communication or stakeholder engagement is needed? (Tool: Communication Plan) What training is needed? 																								
STAKEHOLDERS <ul style="list-style-type: none"> Who are internal and external customers? Who are team members that will complete the A3 Problem Solving Tool? 	ACTION ITEMS <table border="1"> <thead> <tr> <th>Task</th> <th>Owner</th> <th>Proposed Date</th> <th>Actual Date</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table> <ul style="list-style-type: none"> What tasks or actions do we need to take? Who will be responsible for the task? When should the task be completed? (Tools: Action Plan, Gantt Chart) What support and resources are needed for each task? 	Task	Owner	Proposed Date	Actual Date																				
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CURRENT CONDITION <ul style="list-style-type: none"> What do we know? What customer, process, program data/measures do we have on the problem (location, patterns, trends, frequency, factors)? Answer questions like: What errors are occurring? Who is making the errors? Where are the errors occurring? When are the errors occurring? How are the errors occurring? What don't we know and need to find out? We may need to develop a Data Collection Plan that includes: The information/data we need to collect, who will collect the data, data sources, who will prepare the visuals (bar chart, trend, pie chart), when and who will be sent the data. What is the Problem Statement? What specific performance measure needs to improve? We need to understand the scope and nature of the problem before we can create a problem statement. More analysis may be needed if the team cannot write a problem statement. <ul style="list-style-type: none"> Example: Reduce/Increase the number/percent of <?> from <current level> to <desired level> by <date>. 	METRICS/FOLLOW-UP <ul style="list-style-type: none"> What metrics will we use to track progress and performance? How will we validate results? How and when will we check progress and performance (e.g., daily, weekly, 30, 60, 90-days)? What processes will we use to enable, assure, and sustain success? How will we communicate results and share what we learn with others? 																								
ANALYSIS/ROOT CAUSES <ul style="list-style-type: none"> What are root causes? Why are the errors occurring? <ul style="list-style-type: none"> If the root cause is not obvious, use a root cause analysis tool. Use the simplest tool to show cause-and-effect down to the root cause(s). The root cause should be specific – not vague like “poor communication”. Tools: 5 Whys, Fishbone diagram, or Affinity and Relations diagrams Does our data verify the root causes? – a team may need to collect additional data to verify the root cause(s) 																									

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I appreciate SAS Institute for considering this paper and the motivation for the paper is to demonstrate the power of aligning Analytics Strategy with Business Strategy to optimize business position in the market place.

RECOMMENDED READING

Liker, Jeffrey & Convis, Gary L (2011) Toyota Way to Lean Leadership

Soliman, Mohammed Hamed Ahmed (2016) Hoshin Kanri: How Toyota creates a culture of continuous improvement to achieve lean goals.

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