Observe, Orient, Decide and Act Cycle and Pattern-Based Strategy: Characteristics and Complementation

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Abstract. *The aim of this paper is to provide an overview on pattern-based approaches. It introduces the pattern-based strategies and explores disciplines and technologies to enable business leaders to advance from traditional information disciplines to seeking patterns of change (from people, process and information) and acting on them.*

Also, it presents theories and frameworks and the properties available for the achievement of successful leading of the businesses during times of rapid and unpredictable change aiming at adaptive organization: Observe, Orient, Decide and Act (OODA) cycle and Pattern-Based Strategy (PBS) as well as explore their characteristics and complementation.

Finally, it discusses how senior executives, planners and architects can apply OODA and PBS to speed up organizational decision making and coordinated response to change in organizations that are striving to be adaptable and describes the underlying technology.

Keywords. adaptive organization, decision making, orient, decide and act (OODA) cycle, pattern-based strategy.

1 Introduction

In a world of patterns, where we live — competitive advantage and survival are about recognizing and acting on patterns before others. Previous strategic planning models were strained to seek changes, predict outcomes, adequately guide decisions and assist leaders in defining governance models that embrace change. Through a focus on pattern-based strategy organizations will move from being "reactive" to being "proactive" [6].

The adaptive organization takes immediate action to exploit opportunities or mitigate threats by sensitizing itself to changing patterns. Meanwhile, the reactive organization ponders and waits until all the facts are in, while fast-changing events or circumstances quickly overtake them. It then tries to calculate the impact on operations, customers and partners. Successful organizations are those that adapt to change faster than their competitors, through the appropriate use of information technology (IT).

The theories of strategist John Boyd — coupled with Gartner's Pattern-Based strategy — will provide leaders with the insight and actions they will need to transform their businesses into adaptive organizations. These two approaches complement each other in the following ways:

- Examining the specific challenges facing today's leaders and explaining how an adaptive organization meets such challenges
- Learning Boyd's strategic theories and frameworks — notably his OODA feedback loop — which organizations can use to make their decision-making processes faster and more implicit, empowering individuals on the front lines to adjust the tempo of operations – optempo – (either speed up or slow down) before competitors.
- Four phases of OODA loop can be mapped to Pattern-Based Strategy, which enables the adaptive organization to quickly transition to a more proactive, "seek, model and adapt" culture [12].

2 Basic notions

To become adaptive from today's organizations transition is required from reactive, "sense and respond" decision styles to more proactive "seek, model and adapt" environments. It is this ability to quickly find patterns, understand patterns and change patterns that becomes critical for success in today's highly competitive, highly interconnected environments, where risk and uncertainty often prevail [12].

Pattern-based strategy is defined as the discipline that enables business leaders to seek, amplify, examine and exploit new business patterns [6].

2.1 Business patterns

A business pattern is a set of recurring and/or related elements (business activities, events, weak or strong signals) that indicates a business opportunity or threat.

Pattern-based strategy is defined as the discipline that enables business leaders to seek, amplify, examine and exploit new business patterns.

A weak or strong signal is a piece of information, an activity, and/or an event that indicates an impending change that might have an impact on your business pattern.

The aim of business pattern recognition is to understand how elements (activities, events, objects and information) may form new patterns that represent an opportunity for innovation or a threat of disruption to business operations or strategies.

The term "business pattern framework" refers to an organization's focus on and its investment in a balanced diversity of business activities (in the defined, creative, collective and exceptions categories) that enable it to lead and respond to weak and strong signals of change (opportunity or threat).

Operational tempo is a focus on disciplines, activities, technologies and resources that gives organizational leaders the mechanisms and controls they need to understand how to enable consistent and repeatable organizational change in response to changing patterns [6].

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2.2 Adaptive organization

To become adaptive from today's organizations transition is required from reactive, "sense and respond" decision styles to more proactive "seek, model and adapt" environments. It is this ability to quickly find patterns, understand patterns and change patterns that becomes critical for success in today's highly competitive, highly interconnected environments, where risk and uncertainty often prevail [12]. Adaptive Organizations have the Following Characteristics [17]:

- Modular: Modular organizational units that meet top standards and plug in where and when needed. This enables the firm to introduce and quickly implement product and process variations, adjust resources where and when needed, and ensure that the firm's high standards are being met.
- Knowledge Flow: Organizations that are adaptive work towards having a culture that supports knowledge sharing and constructive debate needed for decentralized decision making to be successful. A free flow of knowledge is important for organizations to intelligently and quickly make changes.
- Guiding Principles: Detailed standard operating procedures (SOPs) are unmanageable for organizations needing to change and improve constantly. Instead, a few guiding principles outline how individuals and teams should interact with each other and make decisions.
- Leadership: Leaders no longer dictate from above. Instead, they provide the context needed to make decisions.
- Experimentation: Adaptive organizations encourage testing, refinement, and smart risk taking through experimentation rather than to simple avoid failure.

3 Data, events and technology

A critical factor in deriving benefit from Pattern-Based Strategy is having a corporate culture and strategy that facilitates innovation and change. Many organizations are fostering a organizational culture driven by performance that can facilitate improvement in organizations behavior in response to change. Speed and flexibility are label of most management strategies of today:

- Time-based competition.
- Real-time enterprise.
- Zero-latency enterprise.
- Agile enterprise.
- Adaptive enterprise.
- Predictive enterprise.

3.1 Big Data

"Big data" is rapidly becoming a recognized term for the growth in the volume of data in organizations. Understanding how to use Pattern-Based Strategy to seek, model and adapt to patterns contained in big data are a critical IT and business skill. It is a term generally used to acknowledge the exponential growth, availability and use of structured and unstructured information in the environment rich of data [5, 1].

Access to the information should lead to better, faster and more informed decision making and actions. Business leaders and technologists need a model to help with this cycle. For this reason, Gartner have introduced Pattern-Based Strategy, which explores the disciplines and technologies necessary to seek information from current and emerging sources (e.g., big data), model the impact of the findings, make decisions and adapt the organization. Many of the technologies and disciplines in PBS seek, model, adapt cycle cross large technology markets — business intelligence, analytics, context-aware computing, social media, business process management, performance management, complex-event processing, information management and other in order to perform a more efficient and more impactful information, decision and action cycle [5].

3.2 Event Processing

Companies that pursue PBS need to process event data in two different ways: Offline and ad hoc query business intelligence (BI) systems process events "at rest" in a file or database; Event-driven, continuous-intelligence systems process events that are "in motion" as arriving notifications. A continuous-intelligence application does more than receive information. It evaluates it, performs automated analytics, and either decides how to respond or passes information to a person for further analysis. Complex-events processing (CEP) is the underlying technology used to implement the sophisticated, event-driven pattern detection aspects of business activity monitoring (BAM) and security information and event management (SIEM) systems [14, 1].

Events are abstractions, so computers can't deal with them directly. A notification is a signal that informs the recipient that something happened. It may contain a large amount of detailed data or no data at all, depending on how the architect has designed the application. Notifications can take the form of e-mail messages, Short Message Service (SMS) messages, other kinds of messages, (remote) procedure calls or shared data. E. g. Really Simple Syndication (RSS) news feed message that informs a person about a hike in interest rates is a notification. An e-mail that contains data about hiring an employee is a notification that signifies i.e. signals a hire event. Hiring an employee is considered to be a "complex" event, because it encompasses multiple related activities, whereas a change in interest rates would generally be treated as a "simple" event, because it is a single, apparently atomic, fact. A company that is pursuing a Pattern-Based Strategy will generally need to process event data in two fundamentally different ways:

- Traditional application reports and most BI systems, including most performance management and other analytical systems, process events that are "at rest" in a database, file or some other structure on disk or in memory. The event data is received, stored and then processed at a later time. Computation is triggered by a request from a person or application program (for example, an ad hoc interactive query), or by a clock (for example, a dashboard that is refreshed every hour or a daily report). These request-driven and time-driven systems are appropriate when the response to new data does not have to happen immediately. BI systems discover previously unknown patterns and detect new instances of (matches to) known patterns.
- Event-driven, continuous-intelligence systems process events that are "in motion" as notifications. Computation is triggered by the arrival of event data. Every time a new notification is received, the system recalculates. Continuous-intelligence systems provide the situation awareness needed to make good decisions based on pattern detection in circumstances when a response is needed in minutes, seconds or milliseconds. Many continuous-intelligence systems are aimed at BAM. Both kinds of systems find pattern matches and apply other kinds of algorithms and rules to event objects, so both are "event-processing systems" in a general sense. However, the terms "event processing" and "complex-event processing" are generally applied only to the second kind of system: event-driven, continuous-intelligence systems. The two modes of operation are complementary. For example, SIEM systems provide both continuous monitoring on events in motion and offline, ad hoc query analytic capabilities on events at rest. The continuous-intelligence monitor may alert a security practitioner that a user did something odd. The practitioner then issues a look-back query into historical event data to investigate what else this person did in the past and who else has done something similar.

Pattern-Based Strategy uses events to address unforeseen, as well as foreseeable, threats and opportunities [14].

3.3 CEP Technology

Event processing is a multifaceted phenomenon. In the context of a Pattern-Based Strategy, the relevant facet of event processing is its event-driven BI (BAM) facet, in contrast to its orchestration or minimally coupled software engineering facets. BAM uses CEP in situations that require sophisticated pattern detection and low-latency computation. BAM applications do not need CEP when the calculations are simple or when the results are not needed quickly. Almost all of SIEM systems implement CEP for parts of their operation, because the event data is collected, parsed and analyzed in near real time (via cross-event-source correlation rules or statistical correlation). The response in a SIEM system is typically an alert.

Event processing in a Pattern-Based Strategy context uses CEP software to do the following:

- Read through the incoming notifications and discard those that are irrelevant to the task at hand (filtering or screening the data).
- Enrich the event data by adding data from other sources.
- Calculate totals, averages, maximums, minimums and other aggregate figures.
- Detect pattern matches in the incoming notifications (this requires saving sets of events that are partial matches to patterns for a period of time that may be measured in milliseconds, minutes, hours, days or longer).

CEP, as with other kinds of BI, is used for both descriptive and predictive analytics in Pattern-Based Strategy. Descriptive analytics describe things that have already happened, while predictive analytics

uses patterns and trends to foretell what will happen or might happen if nothing is changed.

One of the benefits of viewing all these things as events is that a model of one part of a company's operations can be understood in relation to a model of another part of its operations. The model in the example given considered the alert sent to the operator as the endpoint culmination of the computation. However, that alert might also be a simple base (input) event for another CEP model that predicts profit problems for the utility company that week by correlating this brownout with other brownouts, blackouts and increases in fuel prices. Because everything that happens is just an event, each event can be output, input or both for the purposes of the event modeling and event computation.

Causation is a major issue in Pattern-Based Strategy and in the design of CEP systems, although the discipline of event processing uses a mathematical concept of causation that differs slightly from the concept of causation in everyday life. In event processing, an Event A is said to have a causal relationship with Event B if A had to happen first in order for B to happen. In the example given, the substation failure was causal to the brownout event, and the high power demand event was also causal. Brownout, on the other hand, would not have occurred if the substation failed in the absence of high power demand; similarly, the brownout would not have occurred if the substation had not failed despite the high power demand. In event processing, causation implies necessary (it had to happen), but not always sufficient. This distinction is important when designing a CEP application. The pattern will only match if all the causal events occur. Nevertheless, CEP can accommodate circumstances where there are multiple possible ways to arrive at the same outcome by using multiple event templates or a template that includes "OR" operators. A brownout event could also occur if a tree falls on a power line — a separate pattern from the substation failure/high demand pattern [14].

CEP is also effective in Pattern-Based Strategy where the absence of an event is significant. E.g. CEP-based, process-monitoring tool can be used to monitor the loan process in a large bank. The tool has a model of how the loan process works. It runs continuously, listening to events that report loan application events, credit check events, loan approval events, disbursement request events and disbursement events [14, 9].

4 Characteristics and complementation of pattern-based strategies

Gartner's Pattern-Based Strategy is based on a set of disciplines and technologies for succeeding in environments dominated by rapid and unpredictable change. The core concept of "seek, model and adapt" complements Boyd's principles and practices. His theories on rapid decision making were derived from experiences and analysis of the split-second actions and survival tactics required of fighter pilots during aerial combat. His strategies were said to have revolutionized aerial combat and energy maneuverability. His teachings and theories on pattern recognition, rapid decision making and fast transitions greatly influenced military and government institutions, such as the U.S. Marine Corps (USMC) and the U.S. Department of Defense. Over the years, Boyd's teachings have been translated by leading business journals. Likewise, his models and theories for spotting patterns, using active feedback loops to speed up one's tempo, and promoting decision making at the edge of the enterprise have been applied by leading businesses when adapting to environments of rapid and unpredictable change [12].

4.1 OODA feedback loop

Originally developed by a United States Air Force Colonel, John Boyd, for aerial combat, OODA can be applied to competitive business scenarios where knowledge of an opponent's behavioral patterns can be exploited through fast and agile anticipatory action. For example, traders in capital markets use event-processing technology to evaluate competitors' trading strategies in the context of the market conditions and current economic data. They are able to modify their pattern-based trading strategies over night or, sometimes, even during the day. This style of trading implements many of the principles of OODA [14].

Boyd attempts to provide a philosophical foundation for his theories on warfare. In it he integrates Gödel's Incompleteness Theorem, Heisenberg's Uncertainty Principle, and the Second Law of Thermodynamics to provide a context and rationale for the development of the OODA Loop. He inferred the following from each of these theories:

- Gödel's Incompleteness Theorem: any logical model of reality is incomplete (and possibly inconsistent) and must be continuously refined/adapted in the face of new observations [2, 4].
- Heisenberg's Uncertainty Principle: there is a limit on our ability to observe reality with precision. The Indeterminacy Principle uncovered by Werner Heisenberg in 1927 showed that one could not simultaneously fix or determine precisely the velocity and position of a particle or body. Specifically he showed, due to the presence and influence of an observer, that the product of the velocity and position uncertainties is equal to or greater than a small number (Planck's Constant) divided by the mass of the particle or body being investigated [2, 5].

- Second Law of Thermodynamics: The entropy of any closed system always tends to increase, and thus the nature of any given system is continuously changing even as efforts are directed toward maintaining it in its original form [2, 5-6].

Boyd concluded from this set of considerations that to maintain an effective grasp of reality one must undergo a continuous cycle of interaction with the environment geared to assessing its constant changes [1].

Time is the dominant parameter. The pilot who goes through the OODA cycle in the shortest time prevails because his opponent is caught responding to situations that have already changed [9].

Boyd hypothesized that all intelligent organisms and organizations undergo a continuous cycle of interaction with their environment. Boyd breaks this cycle down to four interrelated and overlapping processes through which one cycles continuously:

- Observation: the collection of data by means of the senses.
- Orientation: the analysis and synthesis of data to form one's current mental perspective.
- Decision: the determination of a course of action based on one's current mental perspective.
- Action: the physical playing-out of decisions.

Large organizations such as corporations, governments, or militaries possess a hierarchy of OODA loops at tactical, grand-tactical (operational art), and strategic levels. In addition, he stated that most effective organizations have a highly decentralized chain of command that utilizes objective-driven orders, or directive control, rather than method-driven orders in order to harness the mental capacity and creative abilities of individual commanders at each level. Headquarters needs to know that the troops are perfectly capable of forming a good plan for taking a specific objective, and the troops need to know that headquarters does not direct them to achieve certain objectives without good reason [1].

A pilot is constantly going through OODA loops or cycles in a dogfight: he tries to observe the enemy as best he can, this observation being somewhat fluid, since nothing is standing still and all of this is happening at great speed. With a lightning-quick observation, he then must orient this movement of the enemy, what it means, what are his intentions, how does it fit into the overall battle. This is the critical part of the cycle. Based on this orientation, he makes a decision as to how to respond, and then takes the appropriate action. In the course of a typical dogfight, a pilot will go through maybe a dozen or so of these loops, depending on how complicated the fight, and how fluid the field. If one pilot can make faster decisions and actions, based on the proper observations and orientations, he slowly gains a distinct advantage. He can make a maneuver to confuse the enemy. After a few such maneuvers in which he is slightly ahead in the cycles, the enemy makes a mistake, and he is able to go in for the kill [7].

4.2 Observe

The first step in the Boyd loop, Observe, is the process of scanning the environment to find correlations, mismatches or disconnects to existing business patterns. It maps to the Seek phase in Pattern-Based Strategy, in which organizations spot strong or weak signals that could indicate new opportunities or threats. Signals can be found among machine readable sources (such as financial information, customer transactions and inventory data) or emerging sources (such as text, speech, video, social media, blogs, news feeds and context-aware devices). Examples of Pattern-Based Strategy processes and technologies to improve pattern-seeking include:

- Predictive analytics and fraud detection technologies that identify strong or weak signals, indicating possible patterns that could have a positive or negative impact on strategy or operations.
- Business activity monitoring (BAM) that provides real-time situational awareness, along with access to, and analysis of, critical business performance indicators. Using event-driven sources of data, BAM keeps track of what is happening now and raises awareness of issues as soon as they are detected.
- Social-network analysis tools that analyze patterns of relationships among people in groups.

4.3 Orient

During this step, teams put observations into context, combine signals with other information, form new perspectives, and generate new patterns for analysis and synthesis. Hypotheses are developed about emerging patterns, including the intentions of competitors.

The Orient step maps to the Model phase in Pattern-Based Strategy. Pattern generation and recognition activities analyze indicators of change based on prior models, lessons, insights or experiences. Since any new pattern could potentially signal new opportunities or threats, organizations must establish the appropriate governance mechanisms and metrics to quickly analyze and synthesize the impact of such patterns. This is a cultural change for many organizations. In Pattern-Based Strategy, decision cycles are accelerated through prospective and predictive analysis of leading indicators (for example, what is happening now and why). This organizational shift in mind-set is called the performance-driven culture.

For Boyd, the Orient phase is the most important part of the OODA loop because it shapes the way we observe, the way we decide and the way we act.

However, this is also the most-difficult portion of the OODA process for many organizations.

4.4 Decide

Decide is the process of knowing what to do. This involves developing the best possible action plan that can be carried out in a timely manner. Here, teams must incorporate any learning from past decisions. Knowing how successful (or not) previous actions were requires keeping track of past decisions and their outcomes. This step in the Boyd loop is the first part of the Adapt phase in Pattern-Based Strategy. Teams make decisions and take actions, which speed up or slow the tempo of operations. Their goal is to seize new business opportunities or counter new threats before competitors. The adaptive organization gains advantage by matching "pace" (how operations are run on a daily basis) to "purpose" (how operations support strategic objectives). Examples of techniques and capabilities within Pattern-Based Strategy that influence the tempo of operations are:

- Business pattern frameworks, which enable organizations to focus their decisions on a balanced diversity of organizational activities (in the defined, creative, collective and exceptions categories). This enables teams to decide which opportunity or threat is most critical.
- Collaborative decision-making platforms, which combine business intelligence with social networking, collaboration, decision tools and workflow. This enables teams to make and capture higher-quality decisions and actions.

4.5 Act

Act is the fourth element in the Boyd loop. This is the process of carrying out decisions — decisions that have buy-in and accountability generate actions that are easy to align with specific decisions made. The opposite is also true: If a decision is made, but not followed, the problem must be traced back to earlier OODA steps.

Act is the second part of the Adapt phase of Pattern-Based Strategy. The following tools and disciplines enable organizations to implement actions to drive adaptive change:

- Operations planning and modeling tools analyze new patterns to determine potential outcomes, shifts in resource demands and the accompanying financial transformations. These tools help to simulate and implement changes in business conditions, allowing them to dynamically optimize their resource allocations (personnel, materials, financial capabilities and organizational design).
- Business process management (BPM) is a discipline and set of technologies that treats processes as assets, which can contribute directly to enterprise performance. BPM achieves operational excellence through process effectiveness and other measures of agility and adaptability.

Once the result of the action is observed, the cycle is repeated again and again in a continual process of proactively monitoring the environment for new opportunities or threats. Through the ongoing process of finding patterns, understanding patterns and changing patterns, adaptive organizations achieve advantage over their competitors — who can only react to conditions after they occur, and may lack a shared awareness about emerging patterns.

4.6 Appliance of OODA and PBS

The concept of "implicit guidance and control" is shown in Figure 1 at each step in the OODA loop. Boyd pleaded for decentralized form of management, even though he was a product of the military's command-and-control organizational structure.

Figure 1 maps Boyd's OODA loop to Gartner's Pattern-Based Strategy. Reviewing this mapping will help organizations gain insight into the underlying processes required to transition from reactive, "sense and respond" decision styles to more proactive "seek, model and adapt" environments. It is this ability to quickly find patterns, understand patterns and change patterns that becomes critical for success in today's highly competitive, highly interconnected environments, where risk and uncertainty often prevail.

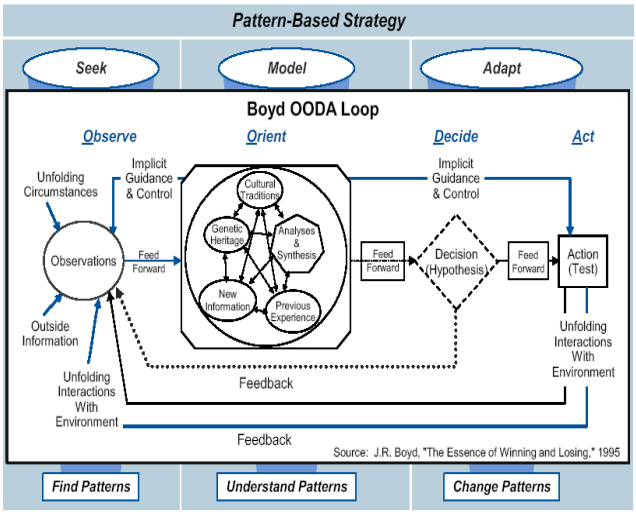

Fig. 1 OODA steps and PBS phases mapping

By examining the phases of Boyd's loop in the context of Seek (finding potential patterns), Model (understanding and generating new patterns) and Adapt (changing patterns through right actions), organizations will gain a deeper understanding of how his teachings and theories complement Gartner's Pattern-Based Strategy.

4.7 Examples of OODA and PBS

The influence of choosing the right time frame for each phase in OODA cycle and the organization capability to influence on these phases are described as follows [15, 2-3]:

- Observe — ingesting information from the environment.
- Orient — understanding the incoming information by putting it in context with previous experiences and knowledge.
- Decide — determining the best response from among the possible responses.
- Act — implementing the decision.

The observe phase of OODA intersects with the world outside of the decision maker by listening to what is happening. The act phase reconnects to the outside world by doing something to change it. The basic OODA framework applies to all business operations, but some aspects of Boyd's work are less applicable in business.

Boyd focused on using speed and unpredictable behavior to confuse and overcome an enemy fighter pilot. In most business situations, the enemy is inefficiency, waste or poor customer service; speed counts, but there is no single opponent and no attempt to confuse anyone [15, 3].

Processes are sets of interacting OODA loops. Major decisions are composed of minor decisions, each progressing through the four phases. Different kinds of processes require more effort at different phases. For example, supply chain management is mostly about observe and orient, because the hard part is understanding where the goods are, and when they will arrive. After those questions are answered, it is relatively easy to know what to do. By contrast, the observe and orient phases are trivial in a routine order-to-cash process. When a customer submits an order for goods, the decision to initiate a new instance of the order-to-cash process is automatic, so the transaction passes quickly to the act phase to process the order. However, within the order-to-cash act, an inner OODA loop to check the customer's credit history may occur before the goods are shipped.

Analysts, working with subject matter experts and business managers, can use the OODA loop to develop an understanding of the kinds of decisions that will be required, and to determine which, if any, of the three kinds of real-time operational intelligence are relevant. OODA-based decision analysis complements business process modeling, data modeling, event modeling, and other analysis and application design disciplines — it does not replace them [15, 3].

The following two are examples from the business world that illustrate optempo advantage in action. These examples highlight how such organizations achieve advantage by adjusting the pace of their operations by sensing, interpreting and acting on emerging patterns better than competitors. These organizations succeed through coordinated efforts and coherent guidelines that target information shareability, power to the edge and just-in-time process adjustments. Such coordinated approaches enable these organizations to shift their optempo, or use multiple tempos, to achieve competitive differentiation:

- Dell: Well-known for its supply chain and manufacturing tempo (among the fastest in the industry), which enables it to keep costly inventories to a minimum. What is less well understood is how central information sharing between Dell and its suppliers is to sustaining the right tempo in the face of volatile demand. Dell not only shared customer demand information directly with its primary suppliers, but it also collaboratively plans with its suppliers the technology road maps for key technologies — for example, when Dell will stop shipping PCs with diskette drives.
- Microsoft: To keep pace with the more rapid tempo of cloud-based office productivity services (for example, Google Apps), the Microsoft Office team did not try to speed up the "release cadence" (its term) for Office. Instead, it uses the Office Labs team to develop and offer downloadable "beta" extensions and enhancements for Office using a different — faster — cadence (optempo advantage) [13, 7].

Optempo is the relative speed with which an organization performs its day-to-day functions. It is to the military what competitive rhythm is to business. Optempo advantage is a coherent management philosophy for improving an organization's competitive rhythm, so that it can consistently and dynamically respond to patterns of change. To achieve such advantage, organizations must reduce fog (information uncertainty and overload) and friction (process complexity and inefficiency) [13, 1].

5 Conclusion

In their breakthrough book "Competing Against Time," authors George Stalk and Tom Hout summed it up best: "A time-compressed company does the same thing as a pilot in an OODA loop. … It's the competitor who acts on information faster who is in the best position to win [16].

Gartner agrees with Boyd's teachings that being time-competitive is critical to success when operating in environments of rapid and unpredictable change. As Boyd noted several times, doing things at the right time is more important than doing them at the right place. For organizations implementing Pattern-Based Strategy, there are many lessons to learn from Boyd's work.

One of the most sophisticated techniques for applying event processing to operational behavior is the observe, orient, decide, act (OODA) loop [14]:

- Observe is comparable to the seek and listen stages of Pattern-Based Strategy.
- The combination of orient and decide is comparable to the model and compute stages.
- Act maps to the adapt and response stages of PBS.

Pattern-based approaches enables business leaders to seek, model and adapt to new and emerging business patterns that could represent opportunities and threats. Pattern detection is not new. Because of its event-driven nature, event processing is particularly relevant to Pattern-Based Strategy that deals with short-range operational decisions that are carried out in minutes, seconds or milliseconds. Event processing is less relevant to tactical and strategic PBS where decisions are made and put into action over days and weeks. Traditional performance management and other BI approaches are more appropriate for those kinds of issues [14].

The ability to quickly find patterns, understand patterns and change patterns is critical in today's highly competitive, highly stressful environments, where risk and uncertainly often prevail.

OODA feedback loop makes the decision-making process implicit: Empowered individuals adjust the tempo of operations (either speed up or slow down) faster than their competitors.

Pattern-Based Strategy enables organizations to quickly recognize and generate patterns, and it provides the disciplines and technologies for doing so.

Boyd's theories on strategy, including OODA loop, complement Pattern-Based Strategy's seek, model and adapt cycle of change. Pattern-Based Strategy complements Boyd's emphasis on the need to quickly identify, analyze and synthesize patterns to gain competitive advantage.

Trust and accountability are essential for an adaptive organization. Leaders who empower individuals with implicit guidance and control will establish organizations that proactively seek, model and adapt to patterns of change better than their competitors.

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