

# Strategic Alignment Maturity Model (SAMM) in a Cascading Balanced Scorecard (BSC) Environment: Utilization and Challenges

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**Abstract.** SAMM is a useful tool for measuring the maturity of business/IT alignment in an organization at the macro level. However, at the micro level, organizations use several frameworks including cascading BSC, ITIL, COBIT, etc. to align business and IT processes. The complexity of alignment increases with the existence of more than one tier of cascading and usage of different tools or frameworks. Studies have shown that measuring business/IT alignment at the micro level is difficult. Therefore, in order to accurately measure outcomes, mapping between metrics at all levels is required. It is also important to establish metrics that are aligned with those prescribed by SAMM. Using a multi-level cascading BSC that was previously published in BUSITAL by this author, this study attempts to apply the underlying components of SAMM and to establish relevant alignment metrics. It also highlights some applicability problems and suggests appropriate solutions for future implementations.

**Keywords:** Balanced Scorecard, cascading BSC, Strategic Alignment Maturity Model, COBIT, metrics, Key Performance Indicators, Key Goal Indicators, Business Alignment, IT Alignment, aggregated metrics dashboard.

## 1 Introduction and Background

Organizations constantly strive to maximize use of resources and obtain higher returns on IT investment, by optimizing the integration of IT and business with respect to processes, functions, technologies, systems, and human resources. The traditional view has been that IT is a support function of the business organization. With the advent of globalization and popularity of e-commerce, this paradigm has started shifting significantly. Furthermore, IT is now increasingly integrated with the business functions of the organization. In many sectors, IT has evolved into a strategic differentiator and has transformed into a primary driver of the business. This scenario has provided organizations with an opportunity and an incentive to further integrate and align IT with business. Thus, business/IT alignment is moving towards alignment of IT functions with business functions, in order to enable the organization to derive strategic advantages.

Although the benefits of business/IT alignment significantly outweigh the costs, several studies [1], [2], [3] indicate that organizations still lack in the successful implementation of business/IT alignment in terms of both business-to-IT and IT-to-business alignment. The primary reasons for low success rates in business/IT alignment are lack of a uniform definition of business/IT alignment, pursuit of a unilateral strategy for alignment, and lack of an appropriate tool to measure success of business/IT alignment [2]. In order to provide a tool to measure business/IT alignment maturity in an organization, the Strategic Alignment Maturity Model (SAMM) [1] [2] was developed.

In contrast, due to the complexity of aligning business and IT, organizations use a multitude of tools, frameworks and processes in order to best align business and IT functions according to their requirements. As a result, there is an emphasis on the organization-wide implementation of processes for aligning business and IT. Depending on the structure of the organization, such a process may consist of one or more tiers. Balanced Scorecard (BSC) [1] is a widely used tool for business/IT alignment purposes. However, using a standalone BSC for business/IT alignment is almost never sufficient to achieve success with business/IT alignment. BSC can be used at a strategic level in order to align business and IT, but it is also used in conjunction with tactical frameworks such as COBIT and with operational frameworks such as ITIL [17]. Therefore, organizations choose to use a combination of tools or frameworks in order to achieve business/IT alignment success [18]. A complex cascade of key performance indicators (KPIs), key goal indicators (KGIs) and other metrics are used in order to ensure traceability of strategic alignment throughout the organization [17][18][19].

These metrics may not necessarily represent the set of metrics proposed by SAMM. Studies have shown that in order to use SAMM effectively, native metrics and tools must be tweaked in order to fit criteria established by SAMM [4]. This paper aims to highlight this issue with respect to usability of SAMM. While SAMM can be used to measure business/IT alignment maturity for an organization, it is a highly subjective tool and most studies show the use of a survey instrument to derive overall maturity. Interestingly, if the organization uses different levels of cascades in strategic, tactical and operational alignment, at the micro level, the reported results of the surveys may vary with the specific tier at which the data is collected. Furthermore, if different tiers of an organization report different data with regards to business/IT alignment maturity, it would be difficult to derive an overall organizational business/IT maturity level. A very similar problem has been highlighted by a previous study in the context of aggregation of organizational metrics while using a cascading BSC [8]. The study also points to the fact that measuring maturity may involve distinct frameworks with each prescribing its own maturity model. Thus, it is important to create mappings between maturity models being used for different frameworks in order to derive an overall organizational maturity model with respect to business/IT alignment [9].

The following sections will elaborate on how SAMM provides a unified and aggregate maturity model to measure business/IT alignment success and maturity, but inherently lacks in prescribing steps for simplifying the measurement process and guidelines for implementation in varied environments. It is important to note that this study is an attempt at understanding the complexities of measuring business/IT

alignment in a varied environment. The long term goal is to find an objective and comprehensive solution to the problem of measuring business/IT alignment maturity at the micro level and such a scenario is subject to various constraints including the environment in which alignment is being measured. For this paper, a previously published sample cascading BSC environment is used.

## 2 Analysis Approach

This paper provides an analysis of SAMM at micro levels in a cascading BSC environment. Individual components (SAMM and cascading BSC) will be analyzed with a focus on two aspects: 1) Alignment measurement parameters native to BSC and 2) Maturity model used in a cascading environment and its relevance to SAMM. The goal is to investigate if the cascading BSC inherently provides information that can be used in conjunction with SAMM to derive a maturity level of business/IT alignment (with respect to criteria prescribed by SAMM). It is noteworthy that the goal is not to provide a working model of a combination of both the BSC and SAMM, but to provide insights into the problems involved in this process and the required steps in order to mitigate these problems.

### 2.1 Relevance to Previous Research

The author has published an example of a cascading BSC previously [9]. This framework is an integrated strategic framework for Information Security Management and uses COBIT for governance and Security Engineering Capability Maturity Model (SSE-CMM) for maturity measurement. The cascading BSC used for strategic alignment is displayed in Figure 1 and the maturity model used is shown in Figure 2. These two components are used as major building blocks for analysis where cascading BSC forms the micro-level environment where alignment maturity needs to be measured and the SSE-CMM maturity model shows how strategic alignment is measured using mappings between existing models due to lack of a comprehensive mechanism.

## 3 Components

In this section, the two major components that form the basis of investigation for this paper – Strategic Alignment Maturity Model (SAMM) and the cascading Balanced Scorecard (BSC) – are outlined and their functions are explained from the perspective of micro-level strategic alignment.

### 3.1 Strategic Alignment Maturity Model (SAMM)

SAMM is a tool that can be used to measure alignment maturity [3]. SAMM proposes that IT-Business alignment can be captured according to six areas of maturity. Table 1 shows the areas and levels of maturity. It also shows some sample attributes of each area that are relevant to the measurement.

SAMM prescribes the following areas in order to measure organizational maturity: A) Communication; B) Competency / Value measurement; C) Governance; D) Partnership; E) Scope and architecture; and F) Skills.

For each of these areas, this maturity model classifies the alignment between business and IT into five levels: 1) Initial / Ad hoc process; 2) Committed process; 3) Established / Focused process; 4) Improved / Managed process; 5) Optimized process.

**Table 1.** SAMM and its areas, maturity levels and attributes [3].

<b>Area</b>	<b>Level</b>	<b>Attribute</b>
<b><u>Communication</u></b> Liaison Effectiveness, Understanding of Business by IT, Understanding of IT Inter/Intra-organizational Learning/Education, Protocol Rigidity, Knowledge Sharing	1	Business/IT lack understanding
	2	limited business/IT understanding
	3	good understanding; relaxed communications emerging
	4	Bonding, unified
	5	informal, pervasive
<b><u>IT Value</u></b> IT Metrics, Business Metrics, Balanced Metrics, Service Level Agreements, Benchmarking, Formal Assessments/Reviews, Continuous Improvement	1	some technical measurements
	2	measures functional cost efficiency
	3	measures some cost effectiveness; dashboard established
	4	measures cost effectiveness; some partner value; dashboard managed
	5	measures extended to external partners
<b><u>IT Governance</u></b> Business Strategic Planning, IT Strategic Planning, Budgetary Control, Steering Committee(s), Prioritization Process	1	no formal process, cost center, reactive priorities
	2	Tactical at functional level, occasionally responsive
	3	relevant process across the organization
	4	managed across the organization
	5	integrated across the firm and partners
<b><u>Partnership</u></b> Business Perception of IT Value, Role of IT in Strategic Business Planning, Shared Goals, Risk, Rewards/Penalties, IT Program Management, Relationship/Trust Style, Business Sponsor/Champion	1	conflict; IT is a cost of doing business
	2	IT emerging as an asset; process enabler
	3	IT is as an asset; process driver; conflict seen as creative
	4	IT enables/drives business strategy
	5	IT-business adaptive and improvise together
<b><u>Scope &amp; Architecture</u></b> Traditional, Enabler/Driver, External, Standards Articulation, Architectural Integration, Architectural Transparency, Agility, Flexibility, Manage Emerging Technology	1	Traditional (e.g., accounting, email)
	2	Transactional (e.g., ess, dss)
	3	integrated across the organization
	4	integrated with partners
	5	evolve with partners
<b><u>Skills</u></b> Cultural Locus of Power, Change Readiness, Innovation, Entrepreneurship, Management Style, Career Crossover, Training/Education, Hiring and Retaining	1	IT takes risk, little reward; technical training only
	2	differs across functional organizations
	3	emerging value service provider; balanced technical and business hiring
	4	shared risks and rewards
	5	education/careers/rewards across the organization

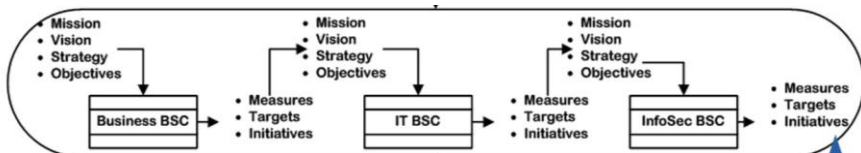
The above is a general maturity and attribute list prescribed by SAMM and can be tweaked to fit the organizational needs. Several past studies have tried to adapt this maturity model based on survey questionnaires, qualitative responses and quantitative analysis to fit the results within the parameters of SAMM. It was difficult to find studies that highlight difficulties in the micro-level applicability of SAMM with respect to the strategic, tactical and operational levels of the organization. Further discussion about the differences between such past studies and the approach of this paper is presented in the analysis section.

### 3.2 Cascading BSC Approach and Alignment Maturity Model

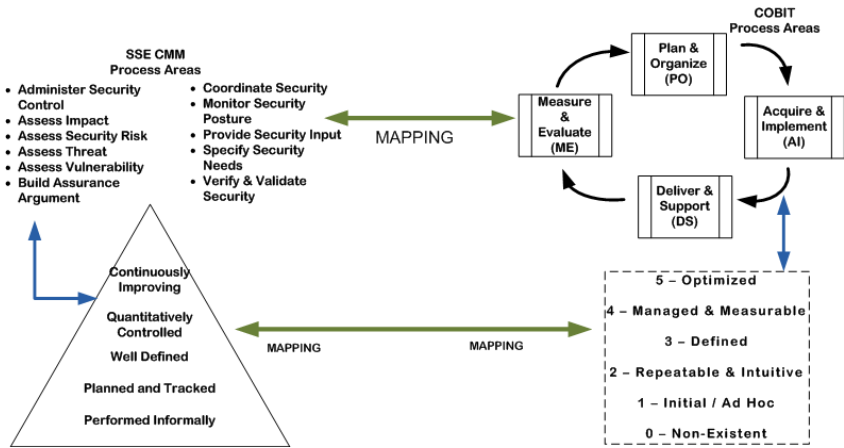
Balanced Scorecard [10] by definition is a performance management system that enables businesses, business units and functional business areas to drive strategies based on goal definitions, measurement and follow-up [11]. According to the Balanced Scorecard Institute [12], “cascading a balanced scorecard means to translate the corporate-wide scorecard (referred to as Tier 1) down to first business units, support units or departments (Tier 2) and then teams or individuals (Tier 3). The result should be to focus across all levels of the organization. The organizational alignment should be clearly visible through strategy, using strategy maps, performance measures and targets, and initiatives. Scorecards are used to improve accountability through objective and performance measure ownership, and desired employee behaviors are incentivized with recognition and rewards.” This cascading process can help achieve a better fit for the organization and provide a customized scorecard that can produce improved results. The cascading balanced scorecard approach (between business and IT) can be successfully used as a strategic management tool [13], [14], [15], and [16].

There are two aspects that need to be considered within the BSC context:

- 1) *The cascading BSC model and metrics related to it:* In Fig. 1, a cascading BSC is displayed for strategic alignment of business, IT and information security functions within an organization [9]. Output objectives and their respective metrics from the first tier serve as input to the next tier and an overall organizational set of metrics is derived in order to measure success of the initiatives at each tier. It must be noted that there is no comprehensive set of metrics to track the success of alignment. This is a fundamental problem that needs to be addressed.



**Fig. 1.** An integrated framework for Business-IT-Information Security Alignment using cascading BSC approach [9]



**Fig. 2.** A maturity model used for measuring alignment maturity using process mapping between COBIT process areas and SSE-CMM [9]

2) *The maturity model used to measure overall maturity of the organization:* Fig. 2 provides an example of measuring alignment maturity in a cascading BSC environment with use of different maturity models by creating a process mapping between them and was published in [9]. Since the context of research in [9] was strategic information security management, the maturity model prescribed by COBIT is used by creating process mappings with Systems Security Engineering Capability Maturity Model (SSE-CMM). It shows how SSE-CMM process areas can be mapped with COBIT domains and the corresponding maturity models can be aligned, in order to effectively measure strategic alignment of information security processes.

This is done primarily due to lack of a tool that can provide a comprehensive maturity model and metrics. Although SAMM can be used to mitigate this gap, it may not provide a solution that takes into account factors such as variation in the definition of quantitative metrics when varied frameworks are used for alignment. For example, if the previous study was about alignment of IT service strategy and the ITIL framework was used instead of COBIT, then Capability Maturity Model Integration (CMMI) would logically provide a better fit in terms of maturity model than SSE-CMM. Thus, depending on organizational requirements the maturity model used may vary and it is difficult to measure alignment using a standard set of criteria in such diverse and varied environments. In order to ease the process of measurement, some fundamental metrics may have to be introduced at every tier within the cascading BSC, such that deriving a clear maturity level is indeed possible.

## 4 Analysis

This section provides an analysis of problems related to alignment measurement and alignment maturity measurement within a cascading BSC context. The goal is to highlight issues in terms of maturity measurements that currently exist and present some solutions that can be applied.

#### 4.1 Alignment Measurement Problems in a Cascading BSC Approach

Using a cascading BSC approach, several studies [9], [19], [20] have focused on deriving organization-wide Key Performance Indicators (KPIs) and metrics from different tiers within the BSC cascade. These studies highlighted the problem of existence of numerous metrics at different tiers without guidance about how to integrate or aggregate such metrics. In [20] a cascade of KPIs and Key Goal Indicators (KGIs) was used in order to mitigate the problem of integration and aggregation of metrics and [9] showed how this approach can be used to establish traceability with KPIs and KGIs within the organization.

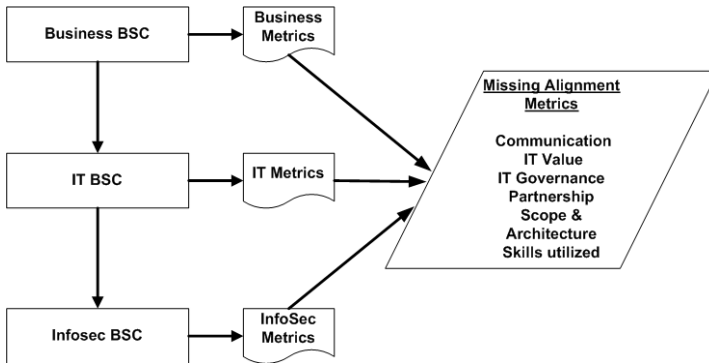
Firstly, such KPIs and KGIs (along with other metrics) are relevant to strategic alignment and are excellent in terms of aligning strategy and tracing process performance within the organization. These metrics may not be suitable to measure alignment success or alignment maturity. When organizations design BSCs, measurement of alignment success is not taken into consideration, as the primary focus is only on strategic alignment via use of objectives and indicators. Secondly, at each tier different metrics are used and therefore result in different alignment measurement criteria for each tier. Without guidance about measuring comprehensive strategic alignment maturity, it is difficult to achieve quantifiable results.

In order to highlight some of the difficulties involved with respect to use of SAMM at the micro-level, Table 2 shows the InfoSec BSC from [9]. This is the final tier of the cascading BSC approach in an information security strategy alignment project and mitigates the gap between business objectives and IT objectives via use of a specific BSC for information security strategy. The goal of using a specific InfoSec BSC is to provide clear top-down and bottom-up traceability in terms of objectives, metrics, targets and initiatives. Thus in Table 2, “S1-O1-M1-T1” represents the corresponding strategic initiative, objective, metric and target established at the business and IT levels. The lower part of the table represents initiatives, metrics and targets specific to the information security business unit. Importantly, the objectives and metrics of the InfoSec BSC are specific to information security strategy alignment, without necessarily providing any metrics to measure maturity of alignment. Such alignment metrics are also missing from the Business BSC and IT BSC used in [9]. Thus, using an InfoSec BSC would ease the process of strategic alignment based on metrics and/or KPIs and KGIs, but measuring maturity of overall alignment within the business unit or the organization as a whole would prove to be difficult.

To further highlight the problem discussed above, Fig. 3 displays the missing “alignment metrics” that can be used as guidance for tracking business/IT/infosec alignment maturity in a cascading environment. In the absence of such alignment maturity metrics, which in this example have been derived from [3], the output from each tier of the cascading BSC would only be useful as a strategic metric and not as an alignment maturity metric.

**Table 2.** InfoSec BSC showing traceable metrics for strategic alignment to Business & IT [9]

Objective	Objective Detail	Target ID	Measurement Details	Target
Strategy: S1	Monitor & Report	S1-O1-M1-T1	% of security CPOE events generated per day vs. total CPOE events	< 10%
Objective: O1 <i>Secure CPOE Integration</i>	Problem Tracking	S1-O2-M1-T1	% of reported security issues traced vs. unresolved	90%
	Violations	S1-O3-M1-T1	% of security violations detected per day	100%
Initiative	Measurement Details	Target	Initiatives	
S1-O1-M1-T1-II <i>Objective: Secure CPOE Integration</i>	% of security CPOE events generated per day vs. total CPOE events	< 10%	+ Enhance CPOE security evaluation process + Increasing physician awareness by providing additional training + Increasing application awareness by providing additional training to configuration mgmt. teams	
S1-O2-M1-T1-II	% of reported security issues traced vs. unresolved	90%	Historical tracking tools, training for current staff, ticketing and reporting system	
S1-O3-M1-T1-II	% security violations detected per day	100%	Installation of IDS / IPS	



**Fig. 3.** Missing alignment metrics in a cascading BSC environment

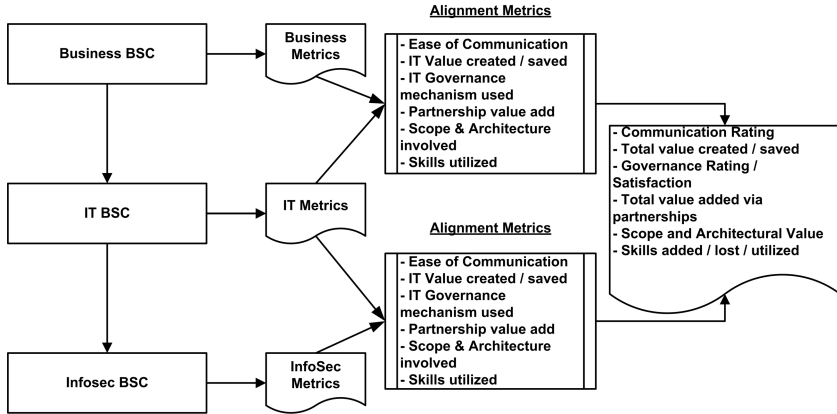
Hence, it is important to distinguish between metrics that are used for strategic alignment and metrics that are used to measure maturity of strategic alignment.

**4.1.1 Mitigation of Alignment Measurement Problems in a Cascading BSC Approach**

As discussed above, a mechanism must be devised to mitigate the lack of “alignment measurement” and “alignment maturity measurement” metrics at each tier in a cascading BSC. As a first step, it is important to recognize that alignment must not be measured at each individual tier in the cascade, but at the intersection of two tiers, thus staying true to the very definition of alignment. Fig. 4 shows how alignment metrics based on SAMM can be used between two tiers of a cascading BSC in order



to derive a common “alignment metric document” that can serve as a baseline for deriving strategic alignment maturity. To that end, the organization must devise alignment metrics based on its own requirements and taking into account its current metric collection mechanisms, complexity of enterprise architecture, domain of business, governance model, etc. Furthermore, it is important to note that this is not a comprehensive solution to measuring strategic alignment maturity. This is a conceptual step that shows how organizations can move towards adoption of SAMM and other strategic alignment maturity models, even while functioning in a complex alignment environment that is not natively designed to support initiatives like SAMM.



**Fig. 4.** Use of “alignment metrics” between each cascade/tier in BSC, in addition to using traditional metrics

**4.2 Maturity Measurement Problems in a Cascading BSC Approach**

Problems that exist in using a maturity model to assess strategic alignment maturity are well documented [3], [4], [5], and [6]. Several studies have attempted to solve this problem by using well-established industry maturity models like CMMI, SSE-CMM, COBIT Maturity Model, etc. [8], [9], [17]. These studies have mostly used a process mapping approach to create process maps [21] between the maturity model and other components within their respective frameworks. Problems related to measurement of maturity in such frameworks are also well documented. These problems include:

1. Lack of a comprehensive maturity model to measure overall maturity of the alignment process [8], [9].
2. A mismatch between maturity models proposed by different elements of the tools/frameworks used in the alignment process [8], [9]

Some recent studies have cited SAMM as a solution. Most of these studies are qualitative and based on surveys, thus covering only macro-level aspects of measuring alignment maturity [3], [4], [22], [23], [24]. The survey and questionnaire tools are excellent in terms of providing a perception of strategic alignment of the organization via the person responding to the survey. It would be interesting to

investigate if these responses remain the same or vary with respondents from the same organization but different business units. Furthermore, there is no evidence about the tools or frameworks used by the surveyed organizations to measure strategic alignment maturity.

Consequently, it is very important to try to apply the principles of SAMM at the micro level, in order to provide uniformity in alignment maturity at all levels of the organization – strategic, tactical and operational. Organizations that have different business units reporting different levels of maturity in terms of strategic alignment, often pose a problem of measuring overall organizational strategic maturity. Fig. 5 displays a scenario where different business units may report varying maturity levels with respect to SAMM criteria, thereby making it difficult to calculate overall strategic alignment maturity of the organization.

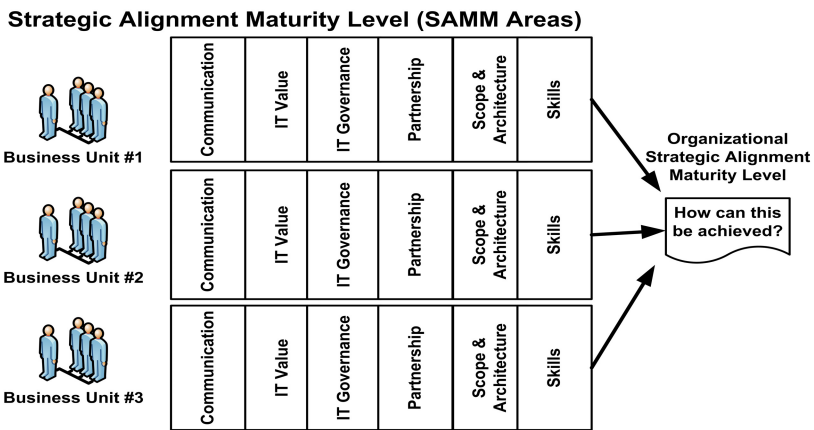


Fig. 5. SAMM areas being reported at different maturity levels by different business units

Therefore, it is important to establish and introduce metrics related to SAMM areas into alignment mechanisms already in use. Further investigation into how this can be achieved is necessary and forms the basis of the future work of this study.

## 5 Conclusion and Future Work

SAMM is an excellent model to measure maturity of strategic alignment of an organization at the macro level. However, at the micro level, challenges exist in terms of using metrics derived from traditional alignment frameworks such as cascading BSC. The metrics from cascading BSC framework can be easily used to align business and IT strategies, but these metrics are not inherently designed to track strategic alignment maturity.

This paper has highlighted the following aspects with respect to alignment metrics:

1. The need to establish valid metrics, based on attributes and areas prescribed by SAMM, in order to ensure that strategic alignment maturity can be objectively measured and tracked.
2. An analysis of problems underlying application of SAMM at the micro level.

It provides a conceptual solution with respect to establishing “strategic alignment maturity” metrics. Nevertheless, there is still a problem in connecting specific aspects of existing and widely-used maturity models with those prescribed by SAMM which needs to be addressed in detail.

This paper is not a comprehensive solution to the problems mentioned above. It provides guidance to ease the application of SAMM in complex environments such as those with cascading BSCs. Thus, future work involves:

1. A step-by-step application of metrics that can help track and measure strategic alignment maturity in a cascading BSC environment.
2. Pre-define domain-specific metrics with respect to SAMM attributes in addition to the six areas already covered.
3. Attempt to provide objective metrics, such that an auditable and traceable maturity model can be established, while applying underlying principles of continuous improvement that can help sustain the established processes.

The above points provide a basis for future studies with goals that would help achieve seamless integration of SAMM with micro-level alignment frameworks.

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