TDWI CHECKLIST REPORT
Fundamentals of Business Intelligence for the Small and Midsize Enterprise

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FOREWORD
Business intelligence spurs opportunity, growth, and scalability.

NUMBER ONE
Identify business processes to be improved.

NUMBER TWO
Provide a data system designed to support reporting and analysis.

NUMBER THREE
Standardize methods for data representation and data integration.

NUMBER FOUR
Establish a plan for ensuring high-quality data.

NUMBER FIVE
Provide methods for the delivery and presentation of actionable knowledge.

NUMBER SIX
Incorporate the right kinds of analytics to address increased appetite for BI.

NUMBER SEVEN
Continuously monitor key performance measures.

NUMBER EIGHT
Consider vendors who provide a complete suite of capabilities.

SUMMARY AND CONCLUSIONS

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The significant issues faced by leaders of small and midsize enterprises (SMEs) reflect the growth of their businesses—both past and future. To nurture a successful business from the ground up, the owner of a small or midsize enterprise must be aware of what is going on in the organization. As the business expands, its functions must scale (in marketing, sales, operations, and manufacturing), staff skills must improve, and effectiveness must increase. Maintaining a constant awareness of all the moving parts becomes more difficult as the business organizes around functional or departmental needs.

In fact, as the business grows, so do different types of challenges and opportunities. Effective sales tracking, finding opportunities for revenue generation, and accurate forecasting become more difficult for sales departments with larger, hierarchical, and more geographically distributed teams. Marketing teams need a comprehensive understanding of customer profiles, behaviors, and segmentation to optimally allocate marketing spend across channels and geographies to achieve better targeting and increased campaign effectiveness. Getting this information becomes more difficult, and manual processes do not scale.

Maintaining high levels of efficiency at the call center contrasts with reducing customer churn and increasing customer satisfaction. Improving product/service delivery means optimizing the supply chain by overseeing inventory, managing suppliers, and meeting customer needs—all while maintaining profitability. Finance must be able to access the right information to prevent closing delays, while the legal and compliance teams must oversee increased corporate governance and regulatory reporting and compliance.

Continued growth depends on understanding how the business runs, recognizing opportunities, taking action, and realizing measurable benefits in a repeatable manner. By delivering actionable knowledge to the right individual within the appropriate window of opportunity, business intelligence (BI) techniques and tools help the user visualize the way the business is run, envision the right changes for organizational advantage, and provide continuous insight into how the company and its stakeholders meet defined corporate goals.

This TDWI Checklist Report describes the fundamental aspects of BI that are necessary to help small and midsize enterprises achieve scalability by revealing new business opportunities, enabling rapid response to emerging issues, and continuously monitoring business success.

**NUMBER ONE**
IDENTIFY BUSINESS PROCESSES TO BE IMPROVED.

TDWI has defined business intelligence as “the processes, technologies, and tools needed to turn data into information, information into knowledge, and knowledge into plans that drive profitable business action.” The key is driving profitable actions, and the first step is recognizing and targeting specific business or operational processes for improvement.

The challenge for growing enterprises is transitioning from a reactive environment into a proactive one whose tactical actions also contribute to achieving strategic goals. This requires corporate introspection—reviewing the organization’s key performance objectives, how these objectives are achieved, and identifying the business or operational processes in greatest need of improvement.

You must also define “success.” Improvements are demonstrated through measures and metrics, and therefore it is necessary to define performance measures, success objectives, and information requirements for each identified business process. Put a framework in place to conduct a baseline measurement and continuous monitoring of these key performance indicators (KPIs). For example, if customer satisfaction is a key measure of value, seek out processes that lead to providing better products and services. When operational efficiency is critical, look for productivity gaps. If preventing fraud and abuse is important, look for processes that are affected by revenue leakage.

Once business processes are identified, you need to know the key players, the roles they play, and how additional knowledge provided through a BI framework can benefit the organization. These stakeholders, business users, and customers become the primary consumers of BI, and their needs must be solicited to create your initial set of functional and information requirements for reporting, analysis, delivery, and presentation.

Ask your users what they do, how they do it, and what prevents them from getting their jobs done. Identify their success criteria and filter out their information needs for reporting, analysis, delivery, and presentation. These tasks will help set achievable goals for improvement and corresponding performance measures that can be continually monitored to ensure that the actionable knowledge leads to increased value.
It is possible to provide limited reporting and analyses by querying data in the database. However, there are a number of reasons for employing a separate system to feed business intelligence applications:

**System performance.** An organization’s existing transaction environment may be able to tolerate a few ad hoc report requests, but as the appetite for actionable knowledge increases, there is a risk that more ad hoc queries will slow down or interfere with existing production systems.

**Data accessibility.** Many reports and analyses will use data created or updated by more than one business application. This means that the data needed to create a report might not be immediately available or accessible.

**Data usability.** Many operational systems are designed to support rapid execution of transactions, but are not well organized for reporting and analysis. To make the data suited for reporting and analysis, it often needs to be reorganized into a database configuration that can respond more rapidly to requests for information.

**Data quality.** Data errors that may be ignored within the transactional application might lead to inaccurate or inconsistent sums and averages in downstream reports. Since many reports and analyses are created using a number of different sources, there may be inconsistencies among those data sets as well.

Fortunately, there is a good approach to addressing these issues: provide a separate data and processing environment. Data used for business intelligence purposes is extracted from the source systems and collected in a separate system, often referred to as an operational data store, a data warehouse, or a data mart. Unlike transactional or operational systems, data warehouses are engineered to support data cleansing, consolidation, various data architectures for aggregating and summarizing results, and BI applications for reporting and analysis.

Applications supporting various business functions were originally designed and developed to meet each function’s immediate operational needs. Correspondingly, there will be differences in the ways developers envisioned the technical aspects of the system, especially the data. For example, the definitions and representations of a customer or a product in one application may be inconsistent with the definitions and representations in other applications. In addition, the era in which the application was developed often dictates differences in the way data sets are stored, from lists of records in file-based data sets, to more complex indexed systems, to more modern relational database management systems.

However, when presenting business intelligence results for review, any perceived inconsistencies between generated reports or between generated reports and what is seen in the source systems will cast doubt on the entire BI system. Differences in data element names, definitions, data types, field sizes, and corresponding business rules are magnified when data sets are brought together for analytical purposes. When two reports present different customer counts or monthly sales, it raises users’ suspicions about all the reports.

Standardizing the definitions, data element representations, table structures, and overall data model used for the core business information concepts (such as customer or product) captured within the data warehouse will reduce the negative impacts of variation and inspire increased trust in the resulting reports and analyses.

In addition, establish consistency in the techniques and tools used for moving data from the source systems to the data warehouse. Consider using a single suite of data integration tools for extracting data from the source systems, making decisions about mapping source data to a common data warehouse model, and applying data corrections and enhancements in the same way. Manage these techniques and tools using a common interface that simplifies (and might even allow for explanations of) the transformations and presents them in a way that is easily understood by all invested stakeholders.
Poor data quality is one of the most critical problems organizations face in deploying a business intelligence program. Data quality is rarely perfect—even if it is satisfactory for its immediate purposes in a business application. When the data is repurposed for reporting and analysis, the impacts of previously ignored errors can be greatly magnified. To maintain trust in the results, establish a plan for ensuring measurably high-quality data.

Data quality is often defined in terms of “fitness for use,” and as data sets are used for additional analytical applications, you must expand the list of expectations and criteria for quality. Some examples include completeness of the data, accuracy/correctness of data values, timeliness in providing access to the data, consistency of values within and across data sets, and uniqueness.

Data cleansing is just one aspect of a data quality program. In the best scenario, there are processes for determining where errors are introduced and policies for fixing the flawed processes to prevent bad data from being created. Any data corrections should be done as early as possible in the data lifecycle, but where corrections must be made later in the information flow, it is desirable to make sure corrections can be made consistent with the source data.

A data quality plan encompasses:

- The collection of requirements for quality
- The definition of data quality rules
- Inspection, monitoring, and notification of data quality rule violations
- Tools and techniques for assessing data quality, eliminating the root causes of data failures, and cleansing errors

Use data profiling tools for assessment, inspection, monitoring, and notification. Data cleansing and enhancement rely on tools and techniques for parsing, standardization, enrichment, and identity resolution and correction to ensure that data quality is sufficient for downstream business analysts.

Business intelligence environments provide visibility into historical operations, report on current tasks and trends, and help develop predictive models to guide future activities. But different people in the business will look to business intelligence for different uses.

Senior managers need high-level performance measures related to how each area of the business is meeting the strategic vision. Business analysts will “slice and dice” data along different dimensions and hierarchies (e.g., geographic regions, population profiles, product categories) to reveal opportunities for business process adjustments. Line managers review summaries and trends of their areas of the business to look for “burning platform” issues that can be addressed in the short- or medium-term. Operational team members such as call center representatives, front-line sales people, or logistics and supply-chain staff require alerts about emerging issues in the field. What’s more, their immediate decisions can be improved and their decision time frames accelerated with informed recommendations provided via business intelligence.

To help these different users make the best use of the actionable knowledge that a BI system provides, you must package, deliver, and present reports, analyses, and alerts in ways best suited to the business processes and the individuals’ roles. A senior manager will peruse a high-level dashboard reflecting key performance indicators, but a business analyst requires more hands-on access to the data, organized along a variety of dimensions. Weekly, daily, or even hourly reports configured using a standard spreadsheet style can be delivered via e-mail or Web posting to line managers.

You can even stream analytical results directly into operational applications. For example, integrated customer profiles and predictive analytics can adjust customer support representative scripts in real time; delivery routes can be adjusted based on existing traffic patterns and sent directly to truck drivers; and produce suppliers can be notified of changes in deliveries to prevent spoilage.

Ensure that your business intelligence platform provides different interfaces, including reports, dashboards and scorecards, dimensional analysis, ad hoc queries, and a variety of visualization techniques. Enable both “pulling” via direct requests and “pushing” critical information delivered directly via the Web to desktop systems as well as mobile devices.
For many users, canned reports may be sufficient for an iterative review of historical operations that might suggest improvements. Business analysts may initially depend on online analytical processing (OLAP), which allows for “slicing and dicing” the data to answer different types of questions or to review what-if scenarios. But as more users become accustomed to using business intelligence applications, their appetite for actionable intelligence capability will grow—so make sure to introduce new analytic capabilities to meet the increasing demand.

Historical reporting and ad hoc queries shed light on what has happened in the past. Dashboards and scorecards provide insight into what is happening now. More advanced techniques involving dimensional analysis, data mining, text analytics, statistical analysis, forecasting models, and predictive analytics not only allow for scenario analysis and answering what-if questions, but they also help users rapidly exploit emerging opportunities, identify and address emerging issues as they evolve, guide strategic decision making about the future, and anticipate new ways to help the business.

Consider these examples:

- Web analytics, market basket analysis, and abandoned cart analysis can be used to optimize offer placement on Web sites to improve customer retention and increase sales.

- Classification and segmentation techniques can be applied to customer purchasing transaction data and geo-demographic data to analyze customer behavior and create characteristic customer profiles. Predictive methods use these profiles to enhance the marketing and sales processes to create opportunities for increased revenue through cross- and up-selling.

- Sentiment analysis combines text analytics, event analysis, and social network analysis to continuously monitor customer feedback from customer service notes, online postings, and social media channels, and to be proactive in addressing negative perceptions quickly.

One caveat, though: it is challenging to deliver these more complex capabilities unless there is a solid foundation in place. Plan the growth of your program to mature in lockstep with your users’ expanding demand by selectively integrating advanced techniques on top of a robust business intelligence framework.
Small and midsize enterprises may not have the luxury of extra staff or the resources to invest in building a business intelligence program from scratch. SME leaders look for rapid time to value when implementing technologies to spur corporate growth, and seek to avoid deployments that are riddled with barriers. Seek out vendors with a broad range of industry experience, a comprehensive end-to-end suite of tools, and a maturity path for a BI deployment.

BI vendors often go beyond selling tools by providing vertical solutions targeted at specific industries (e.g., financial services, healthcare, consumer packaged goods, manufacturing, retail) and individual business functions (e.g., marketing, sales, supply chain management, compliance, finance). These solution providers can jump-start the small and midsize enterprise using industry-specific data warehouse models, a multitude of source-system connectors to facilitate data integration, and templates customized to specific business functions. Vendors with a high number of field deployments are also likely to have a larger community of expert users, making it easier to find qualified personnel to speed deployment.

Many of the Checklist items recommend different aspects of BI technology: data warehousing, data integration, data modeling, data quality, presentation, delivery, visualization of analytical results, and advanced analytics tools. Using a single vendor providing all of these capabilities simplifies the procurement effort, reduces complexity associated with system interoperability, and reduces acquisition and ongoing maintenance costs.

Partner with a vendor who can guide your business as your BI needs mature. Consider vendors whose offerings go beyond traditional reporting and OLAP tools to provide advanced analytics (e.g., sentiment analysis, text analytics, search and exploration), a variety of delivery models and mobility solutions, and expert consulting to help your company scale and grow. Narrowing the field to these types of BI providers will speed time to value by helping your team recognize opportunities and understand how the business runs. This will lead to the delivery of actionable knowledge, which will drive profitable actions that lead to measurable benefits.

Apply corporate wisdom to find the right areas for improvement. Combine knowledge of business strategy and mission with experiences and pains solicited from stakeholders to find the best opportunities for reaching your goals.

Enable a platform for analysis that does not conflict with production systems. Allow analysts to collect and pore over the right sets of data without artificial constraints.

Standards promote consistency in reporting while reducing the data consolidation effort. Agreeing to standard data models, access, and integration eliminates replicated functionality and promotes trust in the end-to-end processes.

Quality data going in means quality results coming out. Establishing continuous oversight of compliance with data quality expectations assures users that they can trust the analytic results.

Match the delivery and presentation of business intelligence to the needs of different user communities. Different end users consume different types of information products in different ways. The presentation of key findings or summaries should encourage profitable actions.

Grow your analytics repertoire to meet user enthusiasm. More mature users will benefit from more sophisticated knowledge discovery and investigation techniques.

Maintain the virtuous cycle by taking action. The value of business intelligence comes from exploiting actionable knowledge. Review performance measures, synthesize BI results, and make the right decisions to take advantage of new opportunities.

Look for vendors with best-of-breed, end-to-end functionality. Enlightened vendors consider the entire information production flow and engineer their tools for optimal interoperability. Attempting to jury-rig different tools increases the effort as well as the time to value. Engage vendors who offer methodologies and guidance to supplement their products.
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