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Generating Value from Investments in Business Analytics

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Foreword

So you've embraced the idea that data is an asset. You have invested in information technology platforms to collect and store a variety of data. You have recruited well and have in place skilled data analytic staff that can identify patterns in the data that reveal deeper customer insights, greater forecast accuracy and improved decision-making. The next question you need to ask is how do you ensure that these insights are being properly considered and acted upon in your business?

The motivation for this research report arose from anecdotal reports and our own interview work that indicated an increasing capacity within Australian organizations to generate data-driven analytical insights. However, those same organizations were experiencing bottlenecks converting insights into actionable decisions to exploit the newly acquired insight. The quote below expressed during our interview work illustrates the challenge:

"Analytics has gone from coding data to thinking and problem solving ... and the latter is where we add value. Even if you have perfect information, in the vast majority of cases that's no good unless you can execute the thing."

Australian Bank

By definition, business analytics demands that data-driven insights be used or executed in some way to create and capture value. This implies that organisational managers will apply data-analytic insights to their day-to-day decisions about resource allocation and their more strategic moves about how to best defend or enhance their current competitive position.

There are many levers that organisations can employ to motivate line managers to use business analytics-enabled insights and this report identifies many of the most effective interventions. Results shed new light on the levers that Australian organisations are using to acquire and exploit insights that, in turn, lead to performance gains.

We hope that you find the report to be a practical and useful guide.



Dr Rajeev Sharma, Professor

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Executive Summary

This document presents the key findings from a survey of business managers on the factors that influence the ability of organizations to capture value from their investments in business analytics. The key findings from this research are:

- Organizational capabilities in data management, systems integration and visualization are moderately well-developed, but less so in the area of predictive analytics.
- The top performing organizations on average are putting in approximately 95% more effort to acquire insights and approximately 99% more effort to exploit insights than the bottom performing organizations.
- The outcomes of this effort are visible in terms of innovation and performance. The top performing organizations achieve approximately 70% more innovation and report 95% higher performance than the low performing organizations.
- Organizational levers such as maturity of the business analytics platform, top management support, support from the business analytics team and the resource allocation process have substantial impacts on the outcomes measured such as organizational efforts to acquire and exploit business analytics-enabled insights, innovation, and organizational performance.
- However, those organizational levers are less valuable when they operate independently. Greatest gains in organizational performance are achieved only when they operate in conjunction with each other. In other words, increased investment in your business analytics platform (greater maturity) will confer performance gains only when the level of top management support is high, support from the business analytics team is high and the resource allocation process is made progressively more agile.

It can be tempting for busy managers to concentrate their efforts on ‘getting business analytics right’ one capability at a time and direct attention initially to technical platforms such as data management, systems integration and visualisation before tackling the need to align top management support and business analytics support. This approach, however, would seem to be flawed: well-developed technical systems, and aligned support or agile resource allocation processes in isolation are insufficient to generate superior performance. Rather, each capability needs to co-evolve with others for organizations to capture value from their investments in business analytics.

1: Introduction

1.1 Purpose and Scope

What do organizations need to do in order to capture greater value from their investments in business analytics?

Our starting point in addressing this question is that greater benefits from investments in analytics are likely to be realized when line managers become proactive consumers of analytics, i.e. they are actively involved in acquiring and exploiting analytics-based insights into their business. Particular attention is given to the organizational interventions that can lead to greater use of analytics by line managers and eventually to better performance. This research sheds new light on what is needed to realize value from business analytics.

The specific issues that this study focused on were the impacts of interventions that organizations can undertake in order to realize desired outcomes (Figure 1.1):



Figure 1.1: Purpose and Scope of this Study

The first set of four factors (maturity of the analytics platform, top management support, engagement of the analytics function with line managers, and organizational resource allocation processes) are ‘levers’ that organizations can pull in order to produce the desirable outcomes listed in the second box (acquisition of insights by line managers, exploitation of insights by managers, innovation, and organizational performance).

A key question that this study sought to address was to identify levers or combinations of levers that are most effective in generating the desired outcomes.

1.2 What did we do?

We started this study with a scoping exercise carried out jointly with SAS to identify specific questions to be investigated, a review of the literature to identify key factors and relationships to be investigated, and interviews with SAS clients to understand the context within which organizations use business analytics to capture performance gains.

Following the above activities, we developed a survey questionnaire to investigate the identified questions. The survey went through multiple rounds of revision in discussion with SAS personnel and a pilot test. The finalized survey was administered to a sample of line managers in the Australia/New Zealand region. The respondents were identified and contacted via email by SAS in December 2014 with a follow up email sent in January 2015. We hosted the questionnaire on a website which the respondents accessed through a link in their invitation emails. This study was conducted under approval from the University of Wollongong's Human Research Ethics Committee (HREC Approval No: HE13/262).

1.3 Who was studied?

The targets of this study were managers, senior managers and executives in various line management functions, such as general management, human resources, marketing and finance. The target respondents came from a wide range of industries and roles. Respondents were identified using a contact list of SAS and non-SAS clients maintained by SAS. Respondents were identified using their job titles to ensure that the responses came from line managers. In all 750 respondents were identified for inclusion in the survey. The survey was closed in March 2015, by which time 66 responses had been received.

What industries do the respondents come from?

Figure 1.2 gives a breakdown of survey respondents based on industry. The respondents came from Banking and Finance (23%), Government (15%), Information and Communications Technologies (14%), Utilities (8%), Hospitals and Medical (7%), Manufacturing and Retail (6%), Public Services (3%), Transportation (1%) and others (23%).

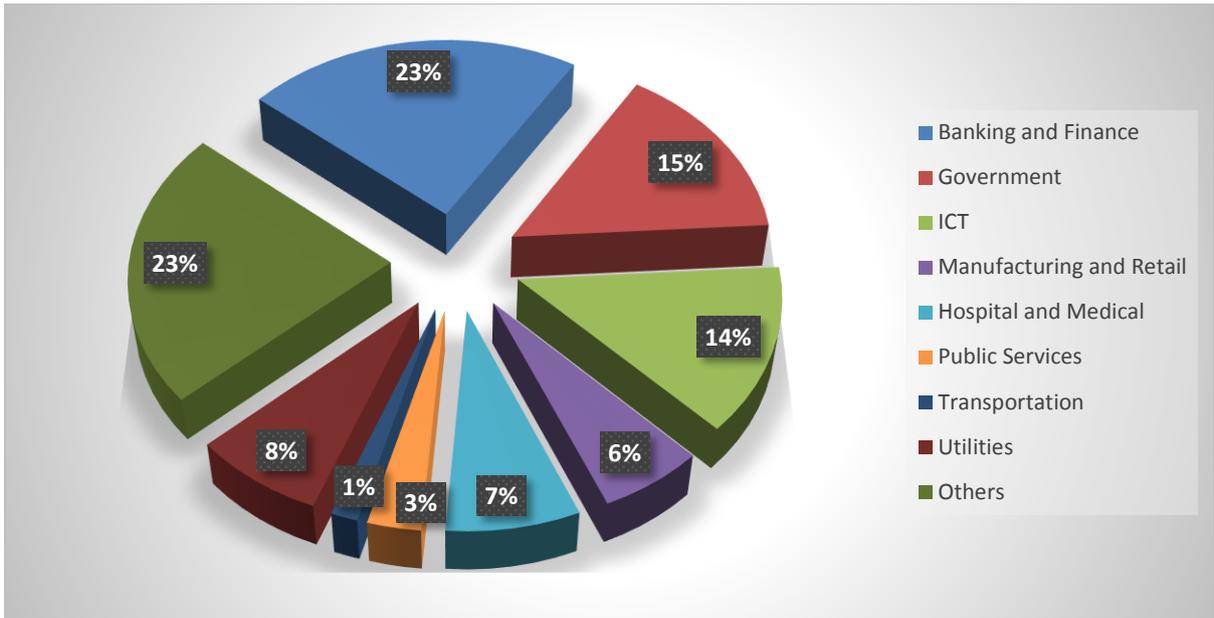


Figure 1.2: Breakdown of Survey Respondents by Type of Industry

What positions do the respondents occupy?

All respondents were senior managers as evident from the breakdown of job titles Figure 1.3. Respondents’ job titles included the following categories: Managers (45%), Directors (17%), Senior Managers (9%), Coordinators and Leads (6%), Consultant (2%), and Others (21%).

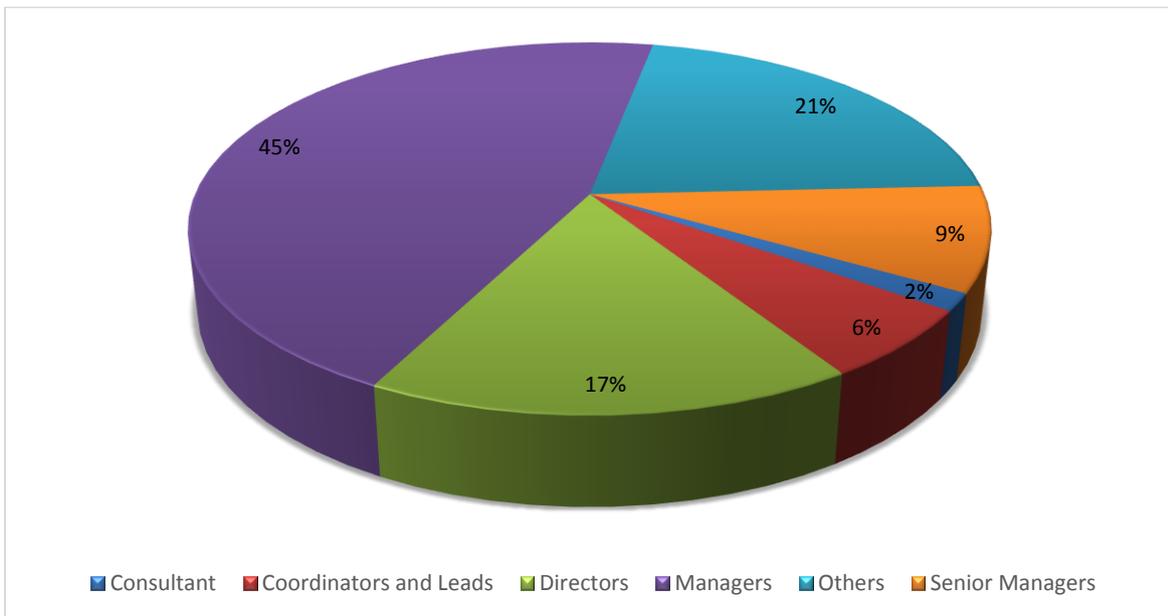


Figure 1.3: Breakdown of Survey Respondents by Job Titles

How experienced are the respondents?

Respondents had a mean experience of 7 years, with minimum being 0.5 year and maximum being 32 years. Approximately 25% of managers had less than 2.5 years of experience, 17% had managerial experience between 2.5-5 years, 26% of managers had managerial experience between 5-10 years, and 6%, 1.5% and 6% of managers had 10-15 years, 15-20 years and more than 20 years of managerial experience, respectively (Figure 1.4).

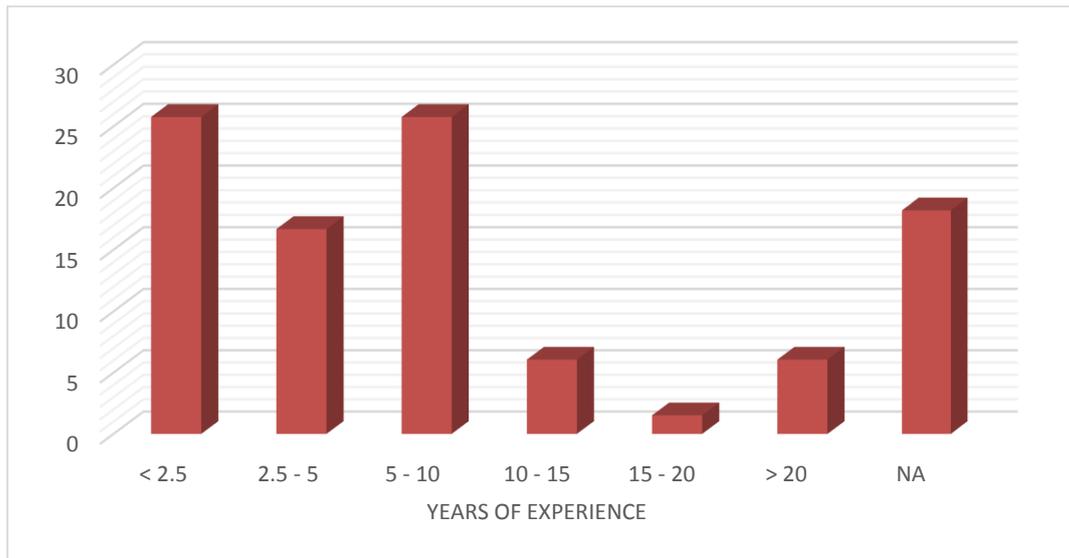


Figure 1.4: Job Experience of Respondents

1.4 Business Analytics: A Definition

For the purpose of this study, *Business Analytics* is defined as any technology that turns data into information, and provides value through creation of insights. This may include technologies and tools that support reporting, trending, segmentation, predictive modelling, performance management, and the discovery of actionable insights (Figure 1.5). This definition was provided to the respondents in the survey to orient their responses appropriately.



Figure1.5. Business Analytics Definition

2: Maturity of Business Analytics Capabilities

2.1 Why did we study this?

We decided to study the maturity of the business analytics capabilities in organizations for two reasons. One, it can have an impact on innovation and performance. There is an expectation that the more mature organizations are on their business analytics capabilities, the more likely they are to be innovative and high performing. Two, it is an important question in its own right as it paints a descriptive picture of the level and diversity of maturity within the respondent organizations.

2.2 How did we measure maturity of business analytics capabilities?

We employed Cosic et al.'s framework¹ to measure the level of maturity of business analytics capabilities. The framework identifies four key components that define the maturity of an organization's business analytics platform – data management capability, systems integration capability, reporting and visualization capability, and predictive discovery capability. Following Cosic et al., the questions that we asked respondents to evaluate the maturity of their business analytics platform are reported in Table 2.1.

Table 2.1: Business Analytics Maturity Dimensions

<i>Data Management Capability:</i> The extent to which your business analytics team extracts, integrates and converts data from multiple sources
<i>Systems Integration Capability:</i> The extent to which your organization has seamlessly integrates data from various operational systems into your business analytics systems
<i>Reporting and Visualization Capability:</i> The extent to which your business analytics team utilizes reporting and data visualization tools to present insights from business analytics in a readily understandable format for users and decision makers
<i>Predictive Discovery Capability:</i> The extent to which your business analytics team uses advanced analytics to proactively discover new insights and to predict future patterns and trends

¹ Cosic, R., Shanks, G., and Maynard, S. "Towards a business analytics capability maturity model," ACIS 2012: Location, location, location: Proceedings of the 23rd Australasian Conference on Information Systems 2012, ACIS, 2012, pp. 1-11.

The level of maturity on each dimension of maturity was measured on a five-level scale, reproduced in Table 2.2. Respondents were given the definitions of each dimension of maturity (Table 2.1) as well as the definition of each level of maturity (Table 2.2) and asked to rate the level of maturity of their organization on each dimension of maturity.

Table 2.2: Levels of Business Analytics Maturity

<i>Non-existent:</i> the organization does not have this capability
<i>Initial:</i> the capability exists but is poorly developed
<i>Intermediate:</i> the capability is well developed but there is much room for improvement
<i>Advanced:</i> the capability is very well developed but there is still a little room for improvement
<i>Optimized:</i> the capability is so highly developed that it is difficult to envision how it could be further enhanced

2.3 What did we find?

Figure 2.1 reports the distribution of responses on each dimension of maturity.

Data management capability:

A very small number of respondents (approx. 1.5%) reported that data management capability was at the optimized level and approx. 28% of respondents reported that data management capability was at the advanced level. A majority of the respondents (approx. 44%) reported that data management capability was at the intermediate level. A fairly large number of respondents a low level of data management capability; approx. 20% reported that they were at the initial level and approx. 6% of the respondents reported that they were at the non-existent level.

Systems integration capability:

A very small number of respondents (approx. 1.5%) reported that systems integration capability was at the optimized level and approx. 20% of respondents reported that systems integration capability was at the advanced level. A majority of the respondents (approx. 41%) reported that systems integration capability was at the intermediate level. A fairly large number of respondents a low level of systems integration capability; approx. 20% reported that they were at the initial level and approx. 18% of the respondents reported that they were at the non-existent level.

Reporting and visualization capability:

A very small number of respondents (approx. 3%) reported that reporting and visualization capability was at the optimized level and approx. 15% of respondents reported that reporting and visualization capability was at an advanced level. A majority of the respondents (approx. 42%) reported that reporting and visualization capability was at the intermediate level. A fairly large number of respondents reported a low level of visualization capability; approx. 27% reported that they were at the initial level and approx. 12% of the respondents reported that they were at the non-existent level.

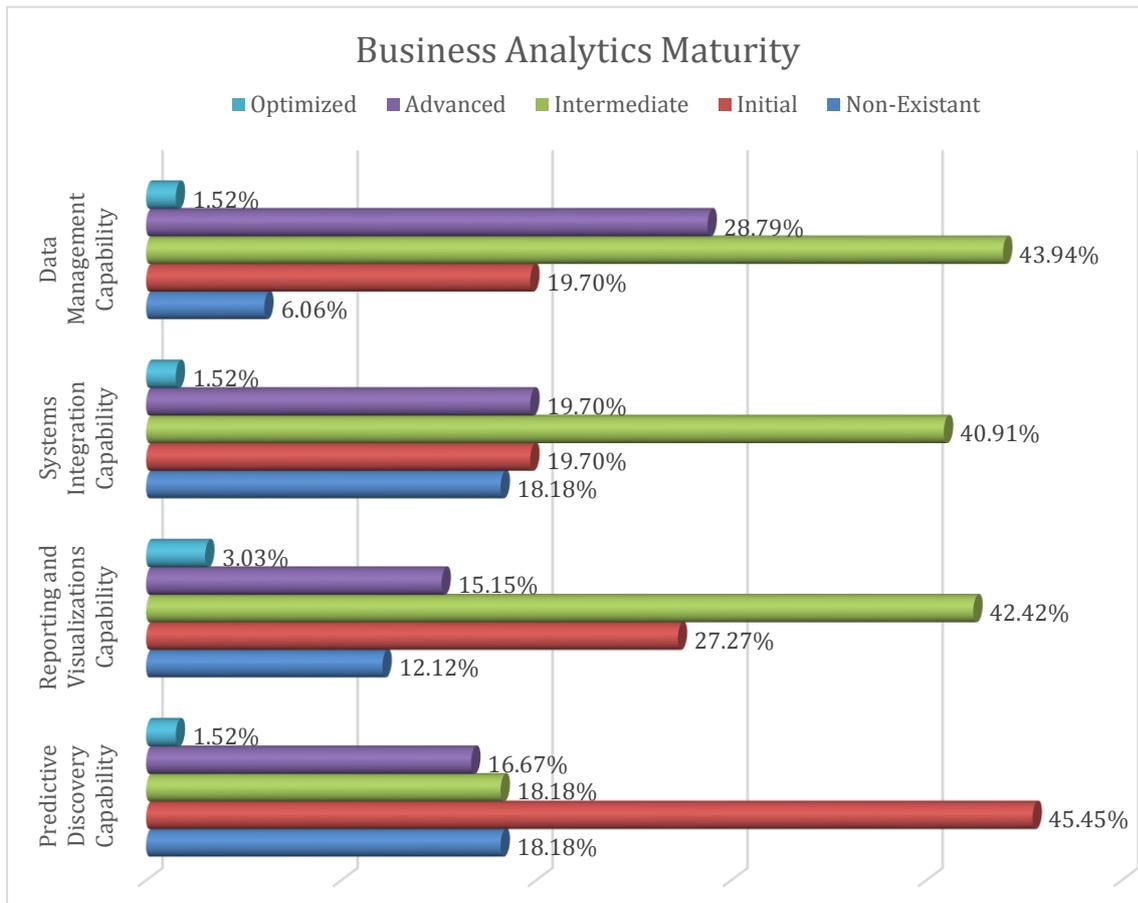


Figure 2.1: Level of Business Analytics Maturity

Predictive discovery capability:

A very small number of respondents (approx. 1.5%) reported that predictive discovery capability was at the optimized level and approx. 17% of respondents reported that predictive discovery capability was at the advanced level, with approx. 18% reporting that predictive discovery capability was at an intermediate level. A majority of respondents reported a low level of predictive discovery capability; approx. 45% reported that they were at the initial level and approx. 18% of the respondents reported that they were at the non-existent level.

2.4 What do we conclude?

Key conclusions that we draw from the above analysis are:

- (a) Very few organizations (approx. < 2%) feel that the maturity of their Business Analytics platform is at the 'Optimized' level.
- (b) A fairly large number of organizations (approx. between 25% and 63%) feel that the maturity of their Business Analytics platform is at the 'Non-existent' or 'Initial' level.
- (c) As we move from the more basic Business Analytics capability (i.e. Data Management) through towards more sophisticated capabilities (i.e. Systems Integration, Reporting & Visualization, and Predictive Discovery, in that order), we find that the number of organizations reporting a 'Non-existent' or 'Initial' level increases (25% for Data Management to 63% for Predictive Discovery; both Systems Integration and Reporting & Visualization are at approx. 38%).

We conclude that while a large number of organizations have invested in the more basic elements of Business Analytics (i.e., developing a Business Analytics capability up to an 'Intermediate' level), there is still significant scope for organizations to develop more advanced Business Analytics platforms.

3: Acquiring Insights Using Business Analytics

3.1 Why did we study this?

Developing business analytics capabilities is just a start in the journey towards improving organizational performance. Once organizations have invested in a business analytics platform and developed the associated capabilities, they need to invest significant resources in acquiring and exploiting insights. Figure 3.1 describes the sequence of activities involved in improving organizational performance.

In this study, we focused on the resource investment behavior of line managers. This decision was predicated on the assumption that line managers' demand for analytics-based insights is an important driver of business analytics-enabled improvement in organizational performance. Accordingly, we asked line managers to provide data on three key resources under their control that they spent on acquiring analytics-based insights, their own time, the time of their direct reports, and their budget.



Figure 3.1: Business Analytics Value Chain

3.2 How did we measure resources spent by line managers on acquiring insights?

We asked line managers to answer questions on the amount of time they spent acquiring insights, the time spent by their direct reports spent on acquiring insights, and the budget that was spent on acquiring insights.

To improve the validity of the conclusions drawn from this study, where possible, we asked the respondents to provide quantitative data on how they deployed their resources. Specifically, to capture the time spent on acquiring insights, we asked respondents to answer questions on the number of hours they spent, the proportion of time that they spent, and the number of meetings they had. To capture data on the budget that they spent on acquiring insights, we asked them to answer questions on the number of projects that they initiated and

the dollar value of their budget that they spent on acquiring insights. We supplemented the above quantitative data with responses to questions on the more conventional Agree-Disagree type scales.

3.3 What did we find?

Resources spent on acquiring insights

Figure 3.2 reports the distribution of Strongly Agree-Strongly Disagree responses of line managers on key resources spent on acquiring insights.

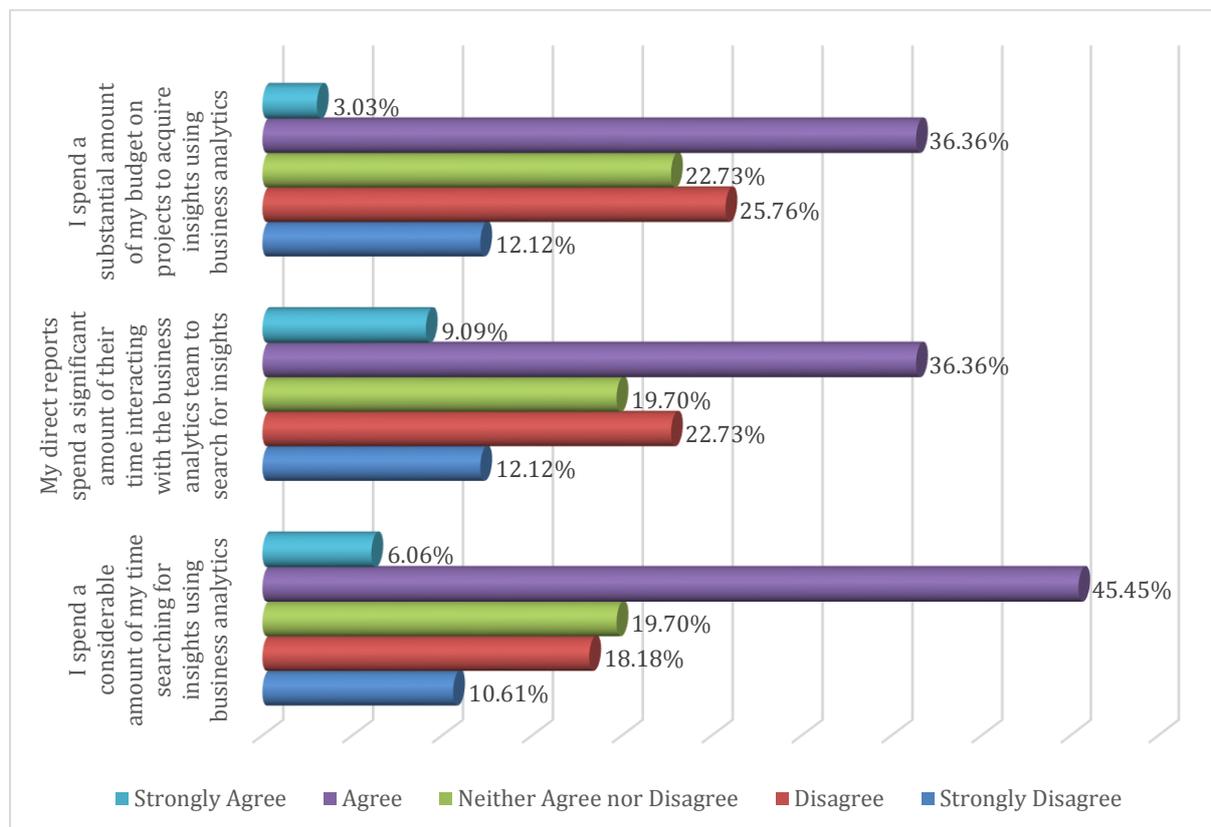


Figure 3.2: Manager's Involvement in Acquiring Business Analytics Insights

On the item, ‘I spend a substantial amount of my budget on projects to acquire insights using business analytics’, approx. 39% of respondents Agree or Strongly Agree with the statement while approx. 38% of respondents Disagree or Strongly Disagree.

On the item, ‘My direct reports spend a significant amount of their time interacting with the business analytics team to search for insights’, approx. 45% of respondents Agree or Strongly Agree with the statement while approx. 35% of respondents Disagree or Strongly Disagree.

On the item ‘I spend a considerable amount of my time searching for insights using business analytics’, approx. 51% of respondents Agree or Strongly Agree with the statement while approx. 29% of respondents Disagree or Strongly Disagree.

Overall, on average, across the three resources (managers’ time, direct reports’ time and budget), slightly more (45%) respondents agree with the statements than disagree with the statements (34%). The data suggest that there is room for line managers to spend more resources on acquiring analytics-based insights.

Time spent with direct reports

Figure 3.3 reports the distribution of responses on the question ‘How many hours (approximately) have you spent with your direct reports searching for insights using business analytics in the last one month?’

Slightly more than a third (approx. 36%) of respondents spent between 0-5 hours per month while another 22.7% spent between 6-10 hours per month; the rest (approx. 41%) spent more than 10 hours per month.

On average, respondents spent approx. 14 hours per month with their direct reports searching for analytics-based insights.

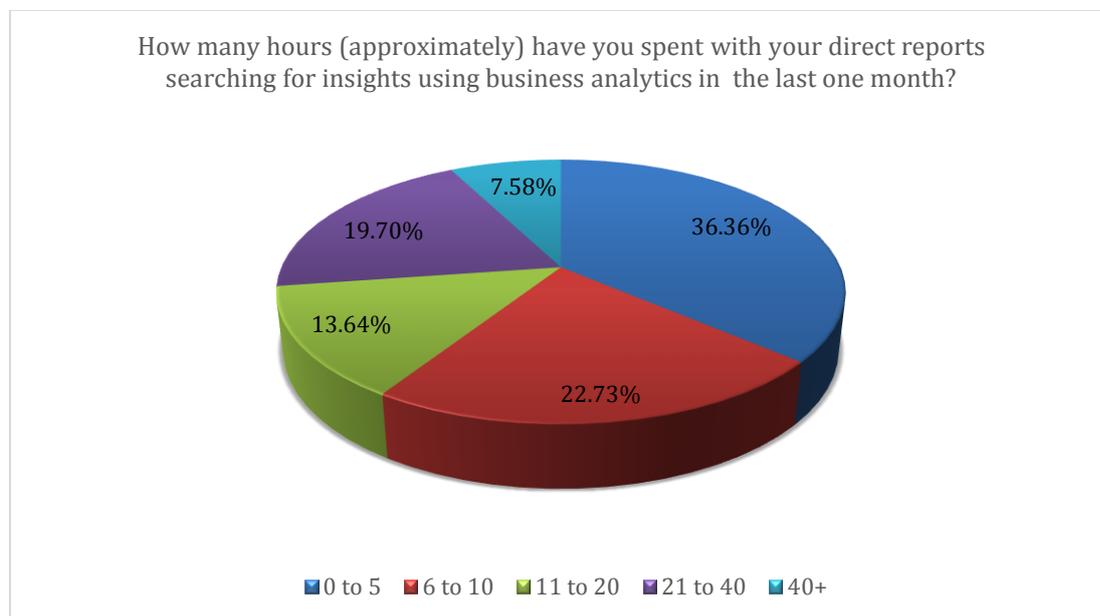


Figure 3.3: Hours Spent by Managers with their Direct Reports

Time spent searching for insights

Figure 3.4 reports the distribution of responses on the question ‘In the last six months, on average, what percentage of your time (approximately) have you spent searching for insights using business analytics?’

Slightly less than a third (approx. 30%) of respondents spent between 0-5% of their time searching for analytics-based insights while another 13% spent between 6-10 % of their time; the rest (approx. 56%) spent more than 10% of their time. On average, respondents spent approx. 16% of their time searching for analytics-based insights.

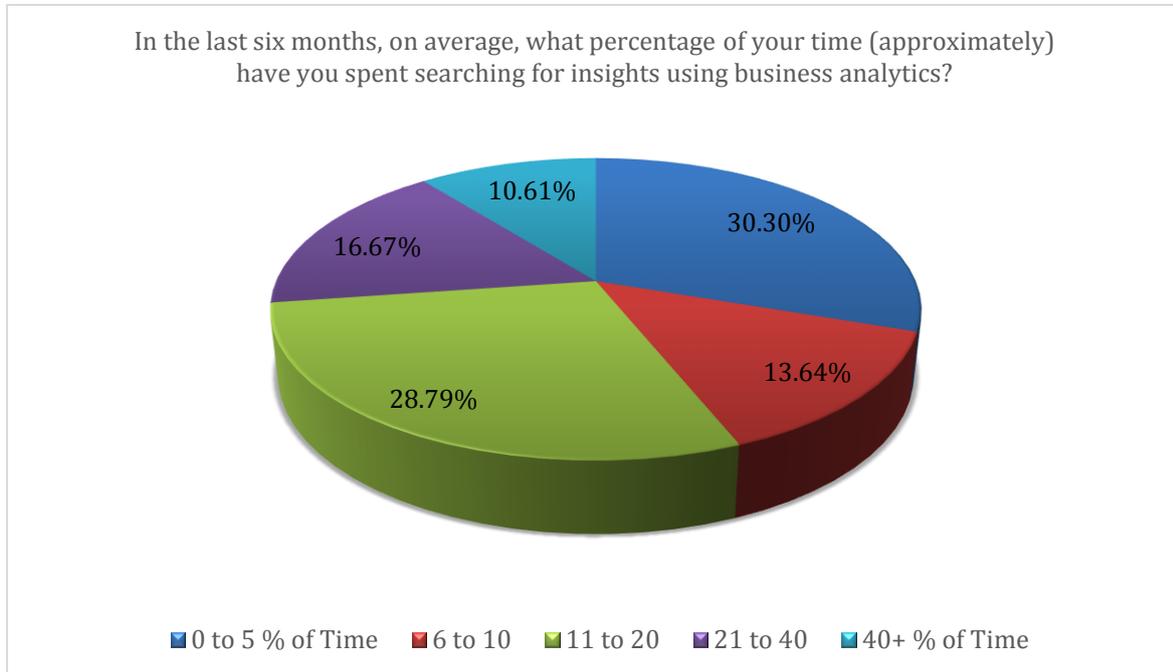


Figure 3.4: Percentage of Managerial Time Invested to Search for Insights

Time spent in interaction with business analytics team

Figure 3.5 reports the distribution of responses on the question ‘How many meetings (approximately) have you had in the last one month with your business analytics colleagues to acquire insights using business analytics?’

Slightly less than half (approx. 48.5%) of the respondents had 2 or fewer meetings per month with their colleagues from business analytics while the other half had 3 or more meetings per month. On average, respondents had approx. 5 meetings per month with their business analytics colleagues to acquire insights using business analytics.

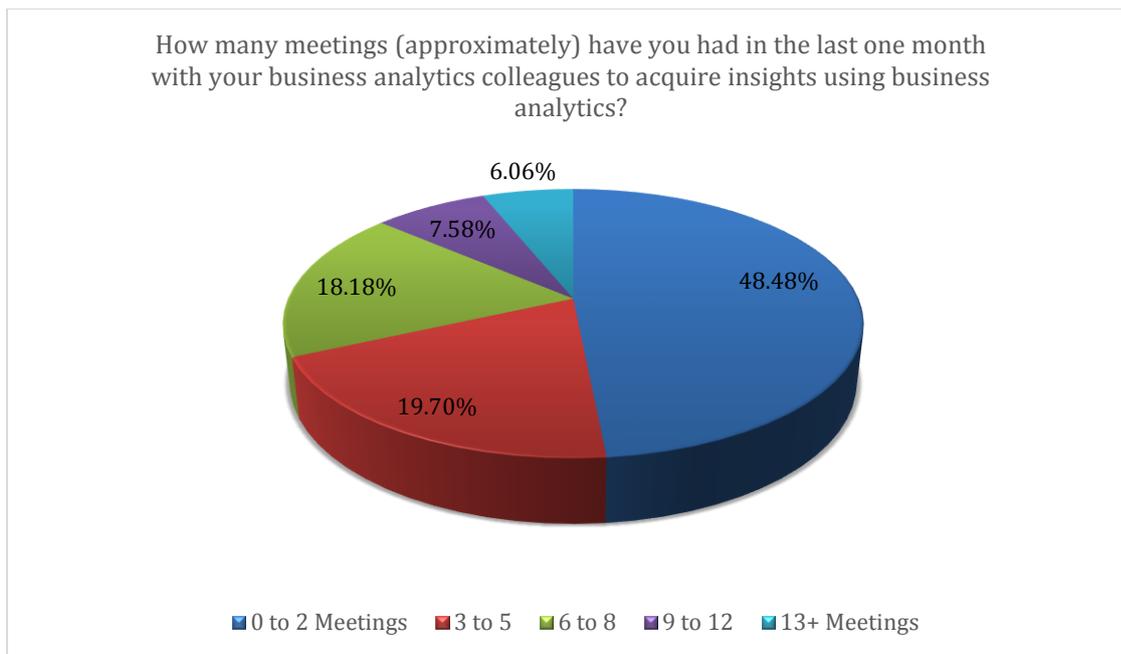


Figure 3.5: Number of Meetings between Managers and Business Analytics Team

Projects initiated to acquire BA-generated insights

On the question ‘In the last six months how many projects have you initiated to obtain insights from business analytics?’, the responses ranged between 0 and 15 projects, though one respondent reported initiating 200 projects. Approx. one-sixth (16%) of the respondents reported initiating zero projects, and another approx. one-sixth (17%) of the respondents reported initiating 1 project. A little less than half the respondents (44%) reported initiating 3 projects, while the rest approx. 23% reported initiating 4 or more projects. On average, respondents reported initiating 3 projects in the previous six months.

Money spent on projects to acquire BA-generated insights

On the question ‘How much money (approximately) have you spent from your budget on business analytics projects in the last six months?’ the median value is approx. \$7,000. The responses ranged between \$0 and \$1,000,000. Approx. 38% of the respondents reported spending \$0, another approx. 33% reported spending \$60,000 or less, while the rest approx. 30% reported spending over \$60,000. Five exceptional cases reported spending \$1,000,000 while another 3 cases reported spending \$5,000,000.

3.4 What do we conclude?

- (a) Line managers report spending considerable resources under their control on searching for insights. Typically, this involves spending an average of 14 hours per month with their direct reports, 16% of their own time (approx. 31 hours per month, assuming a 196 hour month), and hold an average of 5 meetings per month with their business analytics colleagues (approx. 5 hours per month, assuming an average of 1 hour per meeting).
- (b) On average, line managers initiated 3 projects in the last six months to acquire insights and half the respondents spent \$7,000 or less on those projects.
- (c) A comparison of the findings reported in Figures 3.3. and 3.4 against those in Figure 3.5 suggests that while line managers and their direct reports spend considerable time searching for analytics-based insights, the levels of interaction with their colleagues from business analytics are much lower.
- (d) The average level of interaction between line managers and their colleagues in the business analytics function is suboptimal and likely to impede the extent of acquired insight.

4: Exploiting Insights Acquired Using Business Analytics

4.1 Why did we study this?

As shown in Figure 3.1, acquiring and exploiting insights using the business analytics platform are key activities in creating value from investments in business analytics. Both activities require the expenditure of resources over and above those spent on developing and running the business analytics platform.

Exploiting insights could involve employing analytics-based insights in strategizing and decision-making processes and could involve investing resources (time, financial and personnel) on projects (e.g., segmentation and mailing campaigns) to capture value. Accordingly, the resources that line managers spend on exploiting analytics-based insights are an important predictor of value creation.

4.2 How did we measure resources spent by line managers on exploiting insights?

We measured this in a similar manner to resources spent on acquiring insights, i.e. by capturing the amount of time spent by line managers, the use of insights by their direct reports and the resources spent by line managers from their budgets.

4.3 What did we find?

Resources spent on exploiting insights

Figure 4.1 reports the distribution of Strongly Agree-Strongly Disagree responses of line managers on key resources spent on exploiting insights.

On the item ‘Over the last one year, I have invested a significant amount of resources (time/financial/personnel) on performance improvement projects influenced by insights generated from the use of business analytics’, approx. 53% of respondents Agree or Strongly Agree with the statement while approx. 35% of respondents Disagree or Strongly Disagree.

On the item ‘Business analytics-enabled insights play a key role in decisions my direct reports make’, approx. 57% of respondents Agree or Strongly Agree with the statement while approx. 29% of respondents Disagree or Strongly Disagree.

On the item ‘I spend a considerable amount of my time analyzing reports generated by my business analytics group when making important decisions’, approx. 42% of respondents Agree or Strongly Agree with the statement while approx. 38% of respondents Disagree or Strongly Disagree.

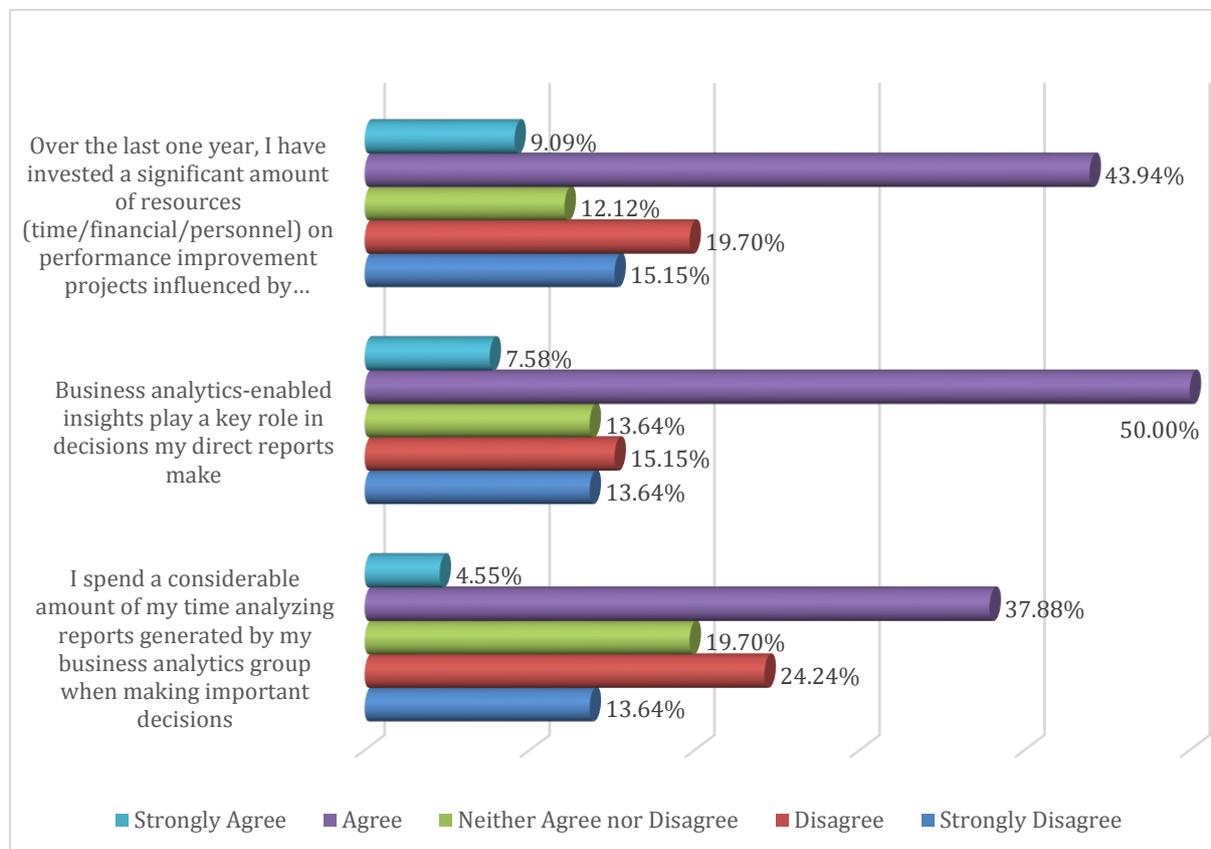


Figure 4.1: Managers Involvement in Exploiting Insights

Overall, on average, across the three resources (managers’ time, direct reports’ time and budget), slightly more than half (51%) of respondents agree with the statements than disagree with the statements (34%).

Time spent analyzing reports

Figure 4.2 reports the distribution of responses on the question ‘How many hours have you spent analyzing reports with your business analytics colleagues in the last one month?’

Approx. 60% of respondents spent less than 10 hours per month with their business analytics colleagues analyzing reports. The rest 40% spent more than 10 hours per month.

On average, respondents spent approx. 12 hours per month with their business analytics colleagues analyzing reports.

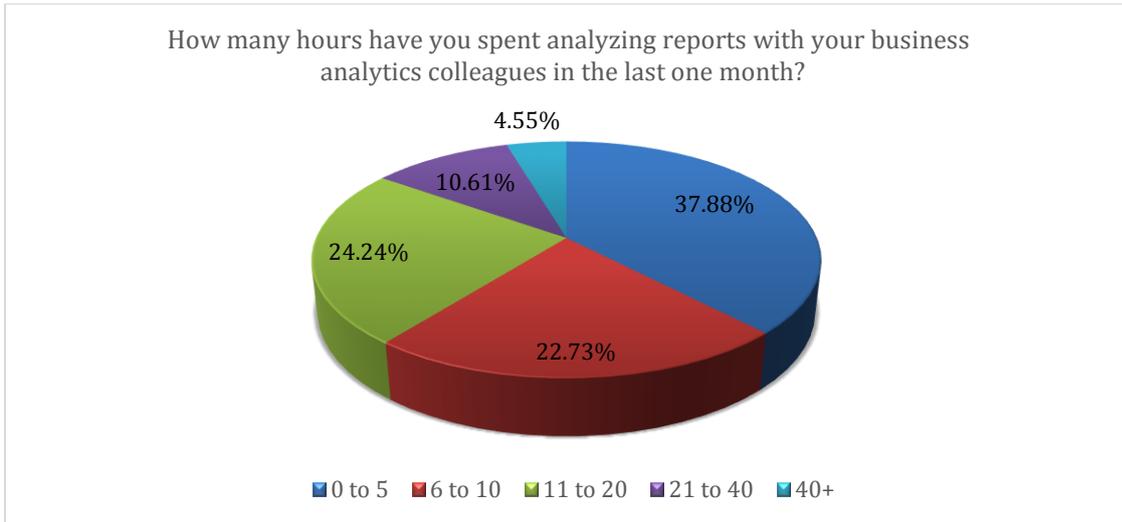


Figure 4.2: Hours Spent on Analyzing Business Analytics Reports

Time spent on projects to exploit insights

Figure 4.3 reports the distribution of responses on the question ‘In the last six months, on average, what percentage of your time (approximately) have you spent on projects to exploit business analytics-enabled insights?’

Slightly more than half (approx. 52%) of respondents spent less than 10% of their time on projects to exploit insights acquired using business analytics; approx. 21% spent between 11 and 20% of their time; while a fairly large proportion (approx. 27%) spent more than 21% of their time on those projects.

On average, respondents spent approx. 16% of their time on projects to exploit business analytics-enabled insights.

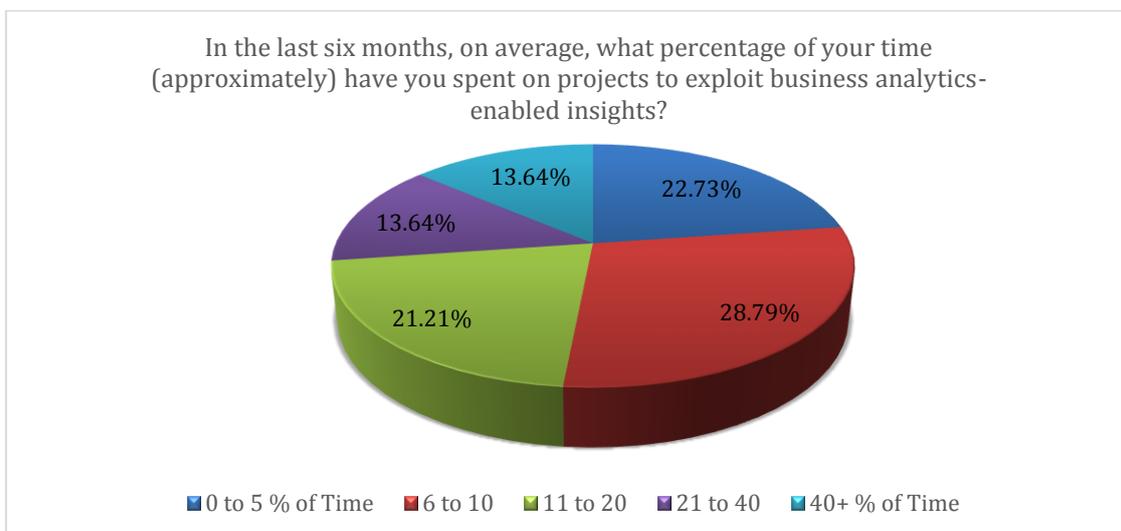


Figure 4.3: Percentage of Time Spent on Exploiting Insights

Time spent with direct reports

Figure 4.4 reports the distribution of responses on the question ‘In the last one month, how many meetings have you held with your direct reports to discuss insights generated through the use of business analytics?’

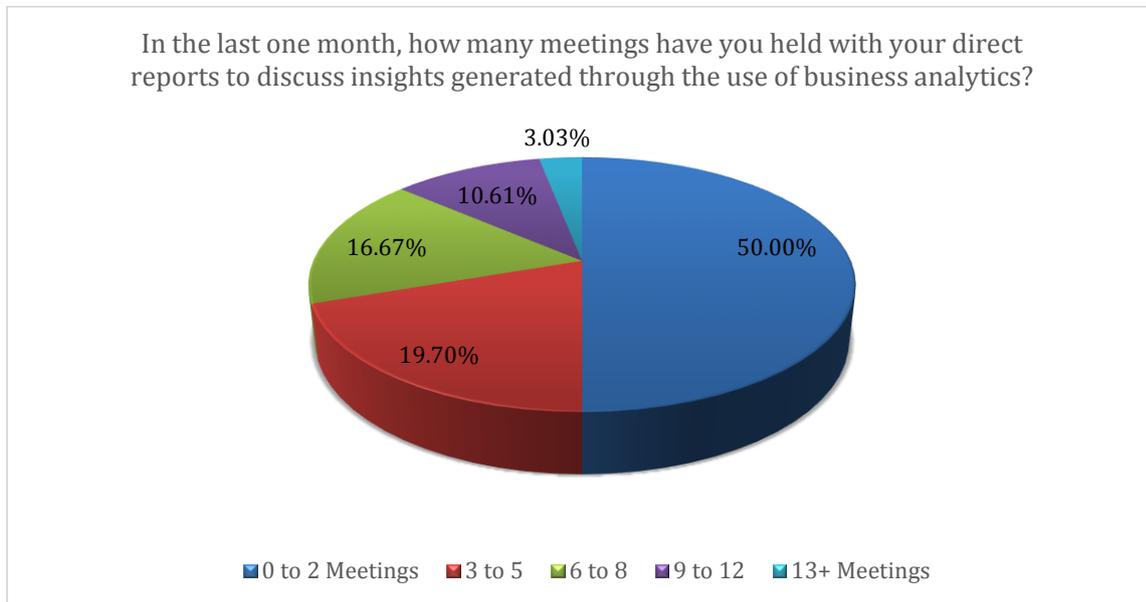


Figure 4.4: Number of Meetings between Managers and Direct Reports

Half the respondents (50%) had 2 or fewer meetings per month with their direct reports, while the other half held 3 or more meetings per month.

On average, respondents held approx. 4 meetings per month with their direct reports to discuss insights generated through the use of business analytics.

Projects initiated to exploit BA-generated insights

On the question ‘In the last six months how many projects have you initiated that exploit insights that have been generated through the use of business analytics?’, the responses ranged between 0 and 10 projects, though one respondent reported initiating 250 projects. Approx. one-third of the respondents reported initiating zero projects, another approx. one-third of the respondents reported initiating between 1 and 2 projects, while the rest reported initiating 3 or more projects. On average, respondents reported initiating 2 projects in the previous six months.

Money spent on projects to exploit BA-generated insights

On the question ‘How much money (approximately) have you spent on projects that exploit insights obtained from the use of business analytics, in the last six months?’ the majority of the responses ranged between \$0 and \$500,000. Approx. 60% of the respondents reported spending \$0, approx. 20% reported spending \$50,000 or less, while the rest approx. 20% reported spending over \$50,000. Two exceptional cases reported spending \$1,000,000 while another 2 cases reported spending \$5,000,000. Excluding those four outliers, the respondents reported spending an average of \$51,000 in the previous six months.

4.4 What do we conclude?

- (a) Line managers report spending considerable resources under their control on projects to exploit BA-generated insights. Typically, they report holding an average of 4 meetings per month (approx. 4 hours per month, assuming an average of 1 hour per meeting) with their direct reports, spending 16% of their own time (approx. 31 hours per month, assuming a 196 hour month), and spending an average of 10 hours per month with their business analytics colleagues on activities associated with exploiting BA-generated insights.
- (b) Line managers appear to be spending more time with their business analytics colleagues on exploiting insights than on acquiring insights. Conversely, they appear to be spending more time with their direct reports on acquiring insights than on exploiting insights. They appear to be spending the same amount of their own time on acquiring and exploiting insights.
- (c) On average, individual line managers initiated 2 projects and spent approx. \$51,000 over a six-month period on projects to exploit BA-generated insights.
- (d) More than half the line managers are investing resources into performance improvement programs on the basis of BA. With the exception of a few extreme cases the average level of investment is still relatively low.

5: Top Management Support for Business Analytics Projects

5.1 Why did we study this?

Prior literature, including our own work suggests that the support provided by the top management team has an important bearing on the success and use of innovative technologies in organizations. Since analytics-based decision making is a fairly radical innovation, we decided to measure the extent to which top managements are supporting business analytics.

5.2 How did we measure the extent of support provided by top management?

Following prior literature and our own work in this area, we measured the extent of support provided by top management on four key aspects of support shown in Table 5.1:

Table 5.1: Top Management Support for Business Analytics

<i>Resources:</i> The extent to which top managers committed resources (time/personnel/financial) to support business analytics projects.
<i>Vision:</i> The extent to which top managers communicated the importance of business analytics for creating value.
<i>Change:</i> The extent to which top managers changed existing norms to support adoption of business analytics.
<i>Monitoring:</i> The extent to which top managers got involved with direct reports on business analytics projects.

We asked the respondents to provide data on the extent their top managers provided support for business analytics projects, i.e. time spent by their top managers with them, human and financial resources that their top management spent on supporting business analytics projects, and changes made by their top manager for supporting business analytics projects. We captured the extent of top management support on Agree-Disagree type scales, as well as on open-ended numerical scales.

5.3 What did we find?

Top Management Resource Support

Figure 5.1 reports the distribution of Strongly Agree-Strongly Disagree responses of line managers on their top management's commitment of key resources for business analytics projects.

On the item 'Committing resources for the success of business analytics projects has been a priority for my manager in the last one year', approx. 50% of respondents Agree or Strongly Agree with the statement while approx. 27% of respondents Disagree or Strongly Disagree.

On the item 'In the last one year, my manager has committed substantial resources (time/personnel/financial) to business analytics projects', approx. 53% of respondents Agree or Strongly Agree with the statement while approx. 28% of respondents Disagree or Strongly Disagree.

Overall, on average, across questions on committing key resources towards business analytics projects, more respondents (approx. 52%) agree with the statements than disagree with the statements (approx. 27%).

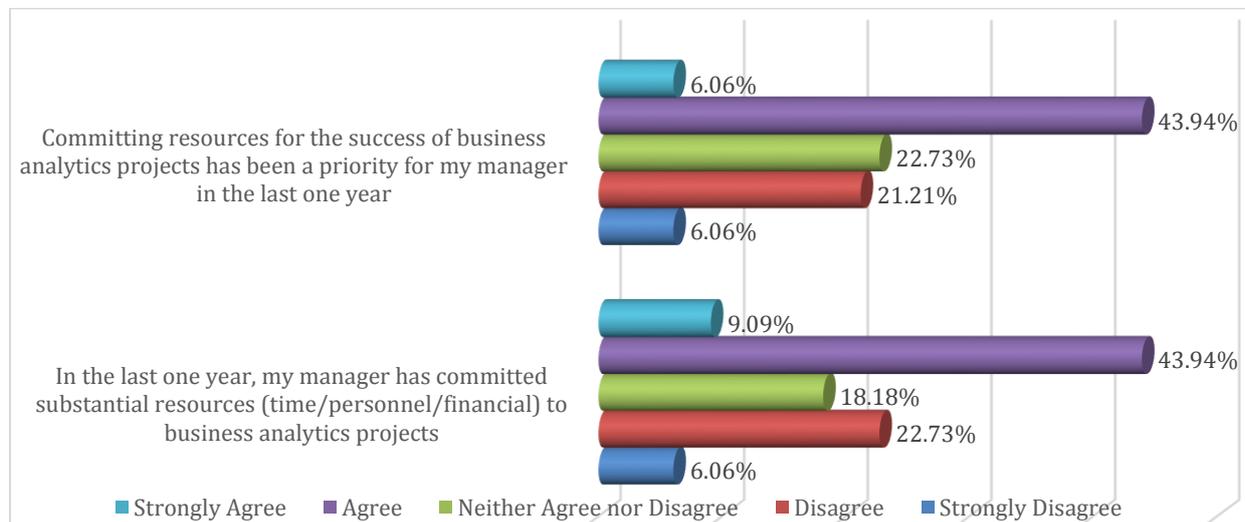


Figure 5.1: Top Management Actions to Support Business Analytics Project

Figure 5.2 reports the distribution of responses on the question 'In the last six months, how many meetings did you have with your manager to discuss resourcing (time/financial/personnel) of business analytics projects?'

Half of the respondents reported that they had between 0-3 meetings, while approx. 20% of respondents had between 4-6 meetings to discuss resourcing for the business analytics projects. The rest (approx. 30%) had more than 6 meetings.

On average, respondents held between 4 and 6 meetings in the last six months with their managers to discuss resourcing for business analytics projects.

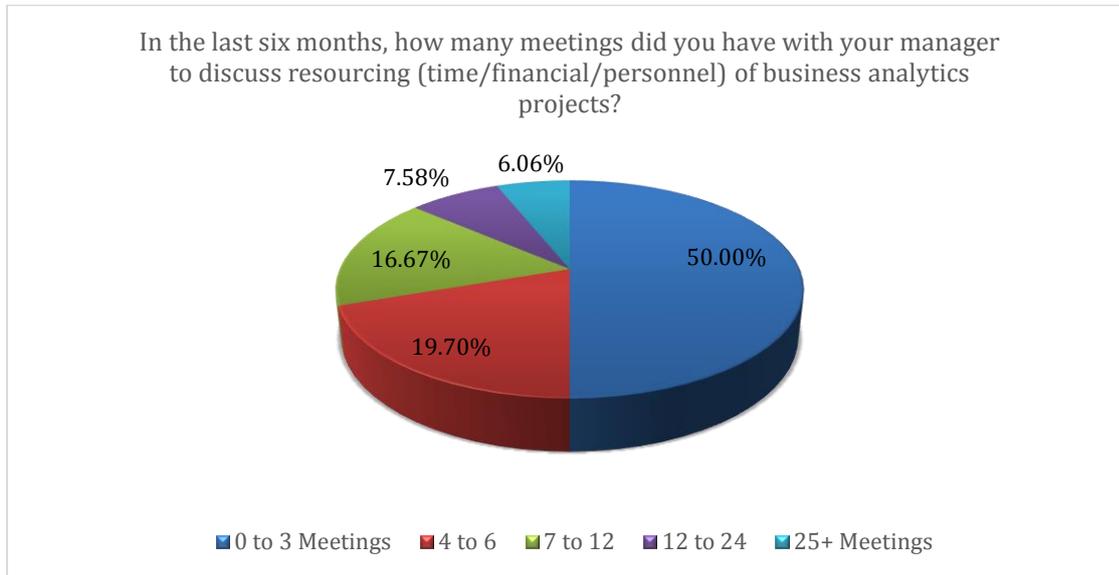


Figure 5.2: Number of Meetings with Top Management

On the question, ‘How many business analytics projects has your manager approved in the last one year?’, the majority of the responses ranged between 0 and 25 projects, though one respondent reported 100 projects while another reported 500 projects. Approx. a quarter of the respondents reported zero projects, another approx. 50% reported between 1 and 3 projects, while the rest reported more than 3 projects. On average, respondents reported that their top managements had approved 3.4 projects in the previous year.

Top Management Vision Support

Figure 5.3 reports the distribution of Strongly Agree-Strongly Disagree responses of line managers on their top managers communicating the importance of business analytics projects.

On the item ‘My manager has frequently articulated the importance of business analytics for improving performance’, approx. 57% of respondents Agree or Strongly Agree with the statement while approx. 26% of respondents Disagree or Strongly Disagree.

On the item ‘My manager has clearly explained to my unit the strategic value of investing in business analytics’, approx. 48% of respondents Agree or Strongly Agree with the statement while approx. 35% of respondents Disagree or Strongly Disagree.

On the item ‘In the last one year, my manager has regularly communicated (emails, meetings, newsletters, announcements etc.) to my unit about the importance of business analytics’, more than half (approx. 51%) of respondents Agree or Strongly Agree with the statement while approx. 32% of respondents Disagree or Strongly Disagree.

Overall, on average, across questions on communicating the importance strategic value of business analytics for performance improvements, more respondents (approx. 52%) agree with the statements than disagree with the statements (approx. 30%).

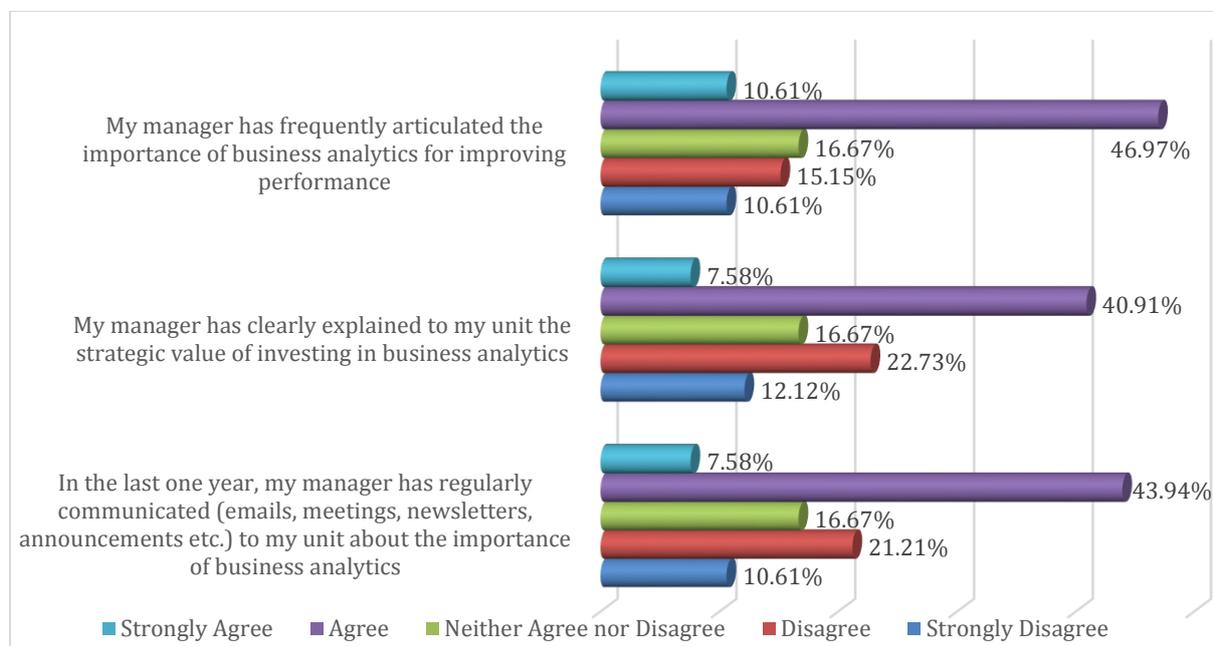


Figure 5.3: Articulation of Strategic Vision and Goals by Top Management

Top Management Support for Change

Figure 5.4 reports the distribution of Strongly Agree-Strongly Disagree responses of line managers on their top managements’ efforts to change existing organizational practices and policies to encourage the adoption and use of business analytics.

On the item ‘My manager has encouraged me to employ the use of business analytics as a Key Performance Indicator for evaluating the performance of my direct reports’, approx. 31% of respondents Agree or Strongly Agree with the statement while approx. 41% of respondents Disagree or Strongly Disagree.

On the item ‘My manager employs my use of business analytics as a Key Performance Indicator for evaluating my performance’, approx. 35% of respondents Agree or Strongly Agree with the statement while approx. 41% of respondents Disagree or Strongly Disagree.

On the item ‘In the last one year, my organization has introduced a number of new policies to encourage the use of business analytics’, approx. 42% of respondents Agree or Strongly Agree with the statement while approx. 30% of respondents Disagree or Strongly Disagree.

Overall, on average, for questions on the top management’s support for change, approx. 36% respondents agree with the statements, while an almost equal number (approx. 37%) respondents disagree with the statements.

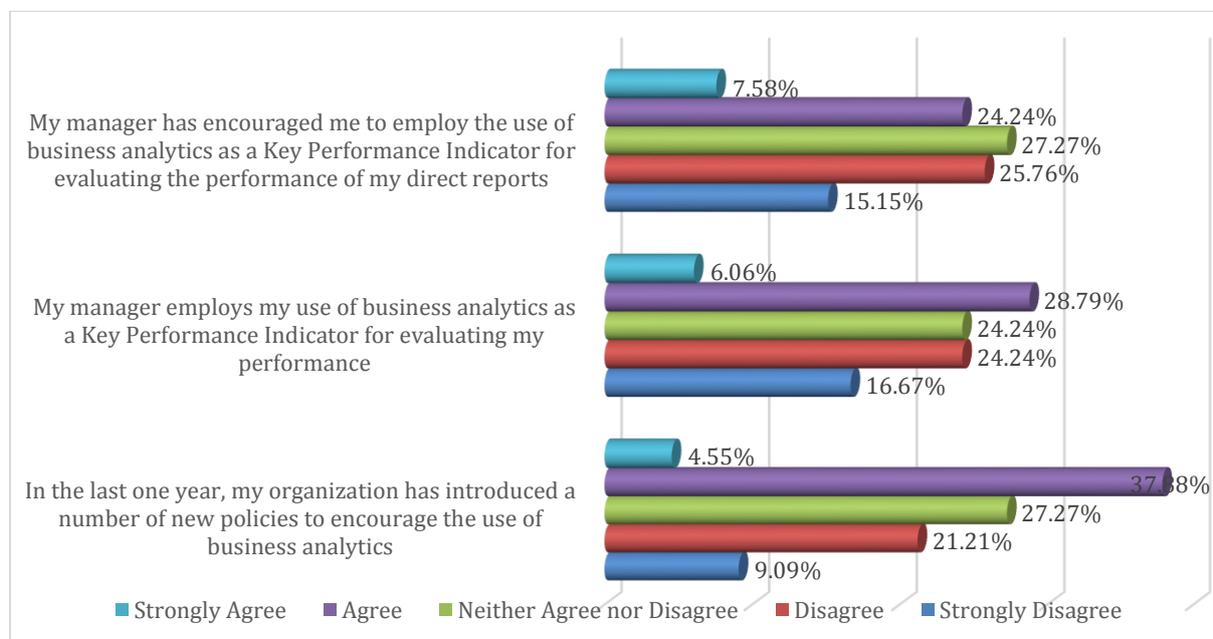


Figure 5.4: Support for Change from Top Management

Top Management Monitoring Support

Figure 5.5 reports the distribution of Strongly Agree-Strongly Disagree responses of line managers on the involvement of their top management with business analytics projects.

On the item ‘My manager personally monitors the progress of business analytics projects’, approx. 41% of respondents Agree or Strongly Agree with the statement while other approx. 41% of respondents Disagree or Strongly Disagree.

On the item ‘My manager has regularly provided constructive feedback on the progress of business analytics projects’, approx. 44% of respondents Agree or Strongly Agree with the statement while approx. 35% of respondents Disagree or Strongly Disagree.

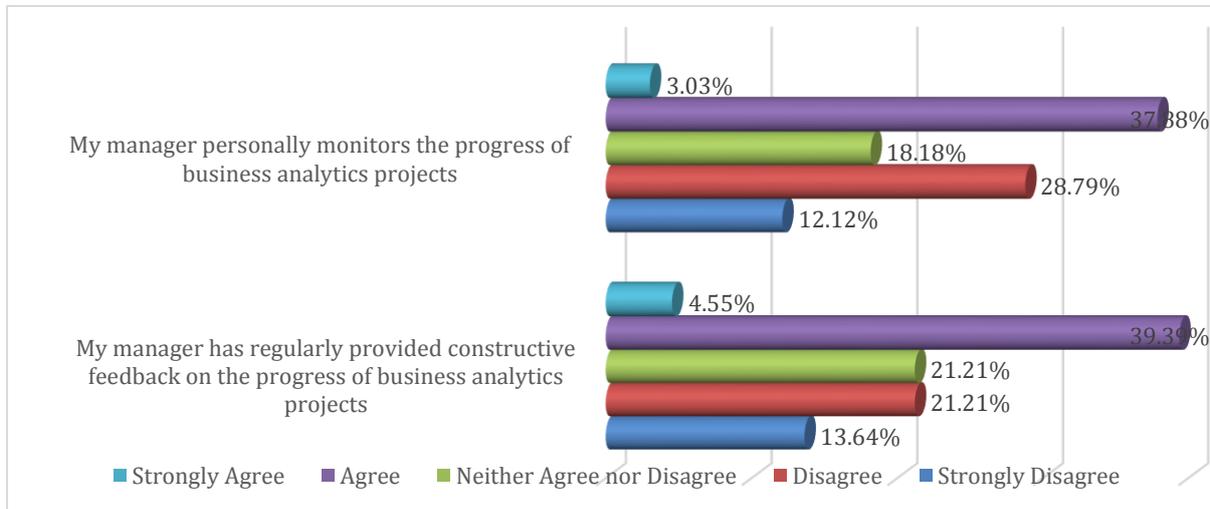


Figure 5.5: Top Management's Level of Monitoring Support

Figure 5.6 reports the distribution of responses on the question ‘In the last one month, (on average) how frequently has your manager asked you about the progress of business analytics projects?’

Slightly less than half (approx. 48%) of the top managers asked their direct reports on the progress of business analytics projects once a month or less, while another approx. 13% were monitoring the progress once in two weeks. The rest (approx. 38%) of top managers kept tabs with their direct reports at least once a week. On average, respondents were asked about the progress of business analytics projects once in two weeks.

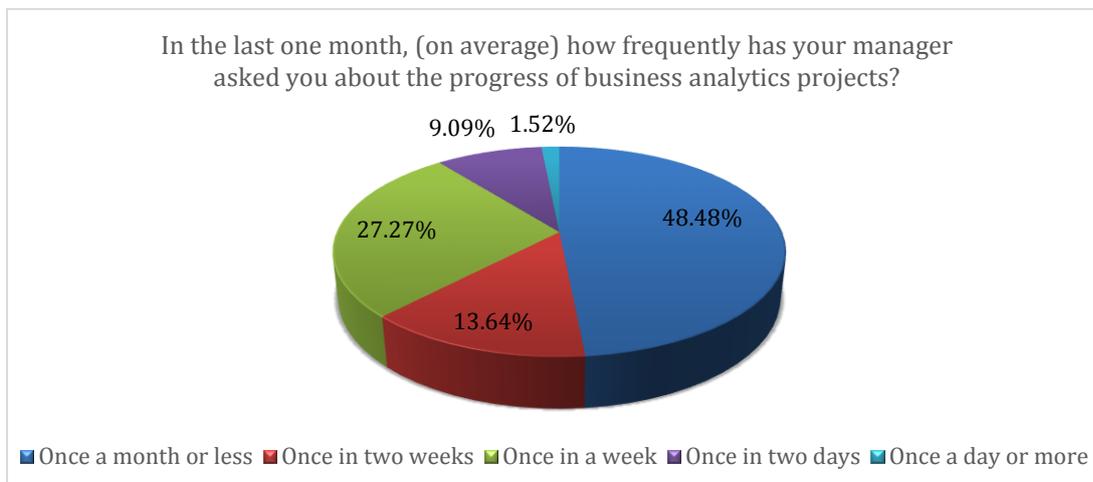


Figure 5.6: Top Management's Involvement with Line Managers

Figure 5.7 reports the distribution of responses on the question ‘How many meetings has your manager had with you to discuss the progress of business analytics projects in the last one month?’

More than half (approx. 63%) of top managers had 2 or fewer meetings with their direct reports to monitor the progress of business analytics projects, while the rest (approx. 36%) of top managers kept tabs with their direct reports at least once a week on the same.

On average, respondents had between 2 and 3 meetings per month with their managers to discuss the progress of business analytics projects.

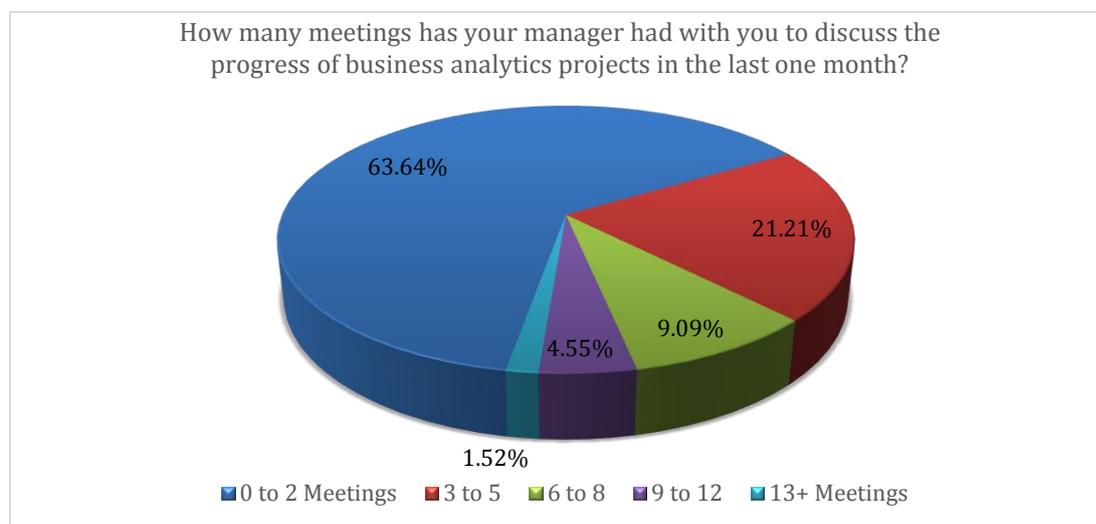


Figure 5.7: Number on Meetings to Monitor Business Analytics Projects

5.4 What do we conclude?

- (a) Across three of the four forms of top management support, resource commitment, articulating vision, and monitoring support, respondents are positively inclined towards the level of support provided by their top managements.
- (b) Respondents are ambivalent towards the level of support provided by top managements to create the changes in policies and practices that would encourage the use of business analytics. This appears to be a lever that is not sufficiently exploited by top managements to promote the use of business analytics.

- (c) Top managements are providing a reasonable level of resourcing for business analytics, including their own time and personal involvement. There seem to be a reasonable number of business analytics projects approved by top management.
- (d) However, there is a lot of variability across respondents on the level of resources committed by top managements. This appears to be primarily due to a low level of commitment of resources for business analytics from top managements in a large number of organizations. This may not be surprising due to the fact that business analytics is a fairly new innovation and it will take time for more organizations to get actively involved with these technologies.

6: Support from Business Analytics Team

6.1 Why did we study this?

Business analytics teams in organizations are an important resource that line managers call upon in acquiring and exploiting BA-generated insights. Line managers and business users rely on their colleagues in the business analytics function for their expertise in data integration, in querying and analyzing data, and in creating proof-of-concept models to evaluate their business value. Due to the specialized nature of those skills, organizations often create a centralized business analytics unit that is available to all business units.

For this study, we decided to focus on two key indicators that reflect the relationship between business units and the business analytics team. One indicator that we examined is the level of training provided by the business analytics team to business units. The other is the extent to which the business analytics team engages with the business units to understand their working and needs and to demonstrate to them the value that can be created by business analytics. The decision to focus on these two indicators was predicated on the assumption that the relationship between business units and the business analytics team is an important predictor of the success of business analytics in organizations.

6.2 How did we measure support provided by the business analytics team?

Training refers to the extent to which business analytics teams provided training to line managers and their direct reports on business analytics functionalities. We measured various aspects of training on Strongly Agree-Strongly Disagree type scales. We complemented this by capturing on numerical open-ended scales responses to questions on the number of hours the respondents and their direct report spent on training programs.

Engagement refers to the extent to which business analytics teams engaged with business units to demonstrate and communicate the value of business analytics to managers. We measured various aspects of engagement on Strongly Agree-Strongly Disagree type scales.

6.3 What did we find?

Figure 6.1 reports the distribution of Strongly Agree-Strongly Disagree responses for training provided by the business analytics team to business users.

On the item ‘The business analytics team in my organization encourages business users to undertake advanced training programs in business analytics’, approx. 30% of respondents Agree or Strongly Agree with the statement while approx. 39% of respondents Disagree or Strongly Disagree.

On the item ‘The business analytics team in my organization provides the necessary training for business users’, approx. 28% of respondents Agree or Strongly Agree with the statement while approx. 36% of respondents Disagree or Strongly Disagree.

Overall, on average, across the two items, more (37.5%) respondents disagree with the statements than agree with the statements (29%).

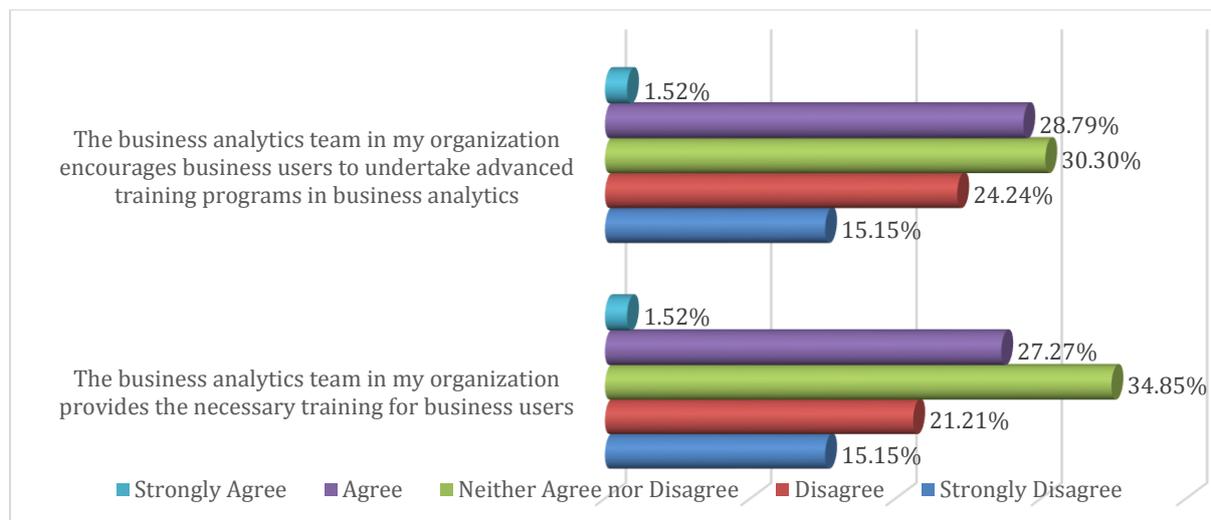


Figure 6.1: Training provided by Business Analytics Team to Business Users

On the question, ‘How many hours did you spend in training sessions to learn about business analytics in the last one year?’ the majority of the responses ranged between 0 and 50 hours. Approx. 42% of the respondents reported spending zero hours on training, another approx. 40% reported spending between 1 and 16 hours on training, while the rest approx. 20% reported spending more than 16 hours. On average, respondents reported spending approx. 8 hours per year on training in business analytics (one respondent reporting 160 hours of training is excluded in the calculation of this average).

On the question, ‘In the last one year, on average, how many hours has each of your direct reports spent being trained on business analytics?’, the majority of the responses ranged between 0 and 48 hours. Approx. 42% of the respondents reported that their direct reports spent zero hours on training, another approx. 40% reported spending between 1 and 16 hours on training, while the rest approx. 20% reported spending more than 16 hours. On average, respondents reported that their direct reports spent approx. 8 hours per year on training in business analytics (5 respondent reporting 100 hours or more spent by their direct reports on training; those five respondents are excluded in the calculation of this average).

Figure 6.2 reports the distribution of Strongly Agree-Strongly Disagree responses for engagement between business analytics team and line managers.

On the item ‘My business analytics group has run several pilot projects for my unit’, approx. 28% of respondents Agree or Strongly Agree with the statement while slightly more (approx. 35%) respondents Disagree or Strongly Disagree.

On the item ‘My business analytics group has made substantial efforts to understand the workings of my unit’, approx. one third of respondents Agree or Strongly Agree with the statement while another approx. one third of respondents Disagree or Strongly Disagree.

On the item ‘My business analytics team has clearly communicated to my unit the success it has delivered in other parts of the organization’, approx. 35% of respondents Agree or Strongly Agree with the statement while approx. 32% of respondents Disagree or Strongly Disagree.

On the item ‘My business analytics team has clearly communicated to my unit the types of insights that they could generate using business analytics’, approx. 35% of respondents Agree or Strongly Agree with the statement while approx. 32% of respondents Disagree or Strongly Disagree.

On the item ‘My business analytics team has adequately demonstrated to my unit the value that business analytics can deliver for my unit’, approx. 39% of respondents Agree or Strongly Agree with the statement while approx. 28% of respondents Disagree or Strongly Disagree.

Overall, on average, across the five items capturing the engagement between business analytics team and line managers, slightly more (34%) respondents agree with the statements than disagree with the statements (32%).

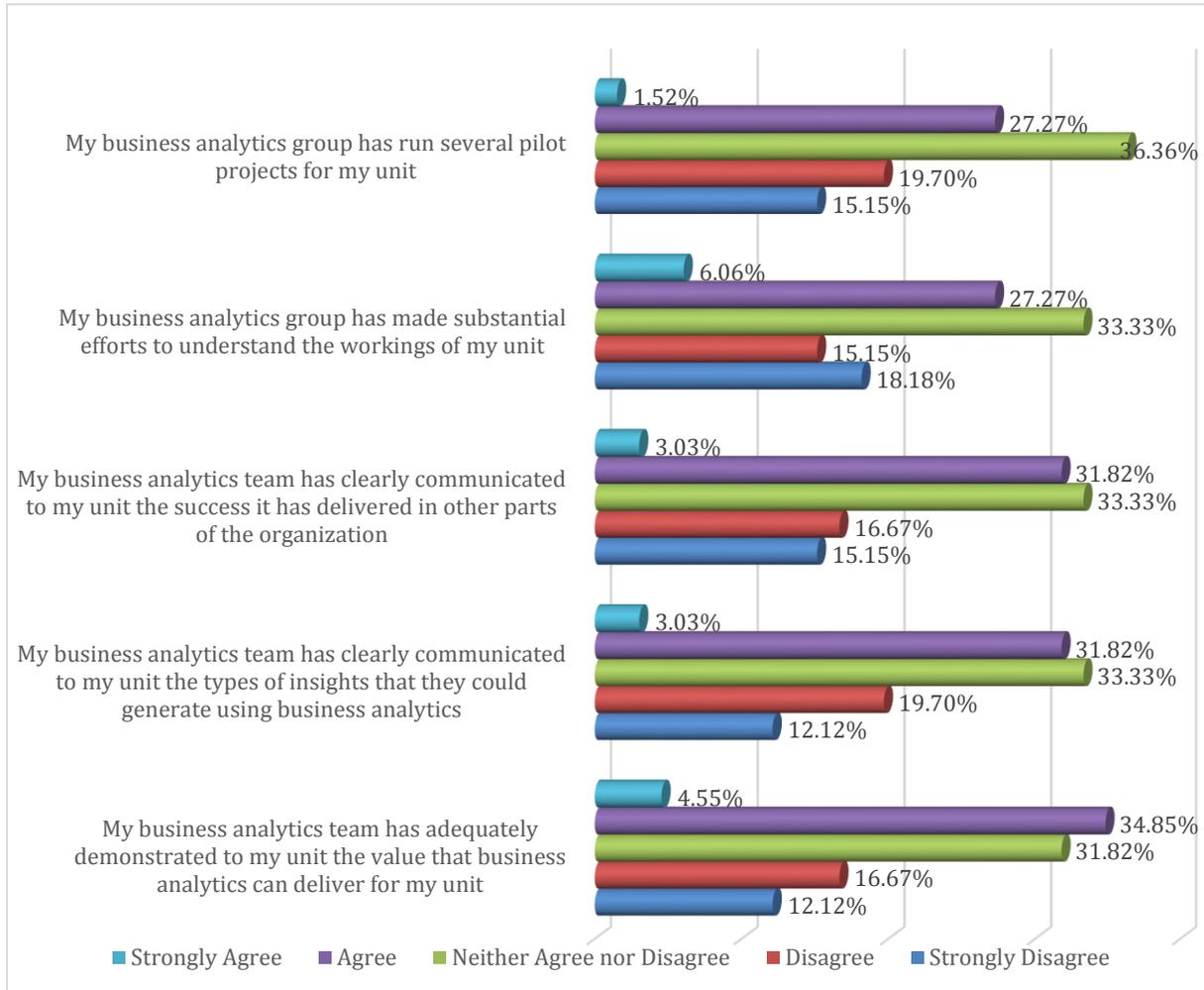


Figure 6.2: Engagement between Business Analytics Team and Line Managers

6.4 What do we conclude?

- (a) In over 40% of the organizations the business analytics team provided no training to line managers or their direct reports.
- (b) On average, line managers and their direct reports spend approx. one day a year on training in business analytics.
- (c) Only one-third of the respondents are positively inclined towards the level of training provided by the business analytics team, while another one-third are negatively inclined.
- (d) There is much room for business analytics teams in organizations to support business units. They can do this by providing greater level of training to business users and to engage more proactively with them to understand their working and

needs and to demonstrate to them the business value that can be created by business analytics.

7: Resource Allocation Process

7.1 Why did we study this?

As shown in Figure 3.1, organizations create value from business analytics when they invest resources to exploit BA-generated insights. Line managers usually have to engage with the organization's capital budgeting process to request resources to exploit insights.

We decided to focus on two key aspects of the organizations' resource allocation process, the centralization and formalization of the process. This was predicated on the assumption that the more formalized and centralized the process of resource allocation, the more difficult it will be for line managers to obtain resources to exploit insights.

7.2 How did we measure the key dimensions of the resource allocation process?

Centralization reflects the degree to which the allocation of discretionary resources for performance improvement projects is centralized at the top of the organization's hierarchy. The more centralized an organization's resource allocation process, the fewer the discretionary resources available to line managers to invest in exploiting BA-generated insights.

Similarly, formalization reflects the degree to which line managers need to follow formal rules and procedures to request discretionary resources for performance improvement projects. The more formalized an organization's resource allocation process, the more will be the effort required of line managers to obtain discretionary resources to invest in exploiting BA-generated insights.

We measured the centralization and formalization of the resource allocation process on Strongly Agree-Strongly Disagree type scales by asking managers to respond to questions capturing the extent to which they were allowed to commit resources themselves and the extent to which they needed to follow formal rules and procedures to obtain resources for exploiting BA-generated insights².

² Subsequently in this Report we refer to the more centralized and formalized resource allocation processes as less agile while the less centralized and formalized resource allocation processes are referred to as more agile. The less agile processes can also be considered as more conservative and exerting a higher degree of control, while the more agile processes can be considered more aggressive and exerting less control.

7.3 What did we find?

Figure 7.1 reports the distribution of Strongly Agree-Strongly Disagree responses from line managers on the extent of centralization of the resource allocation process.

On the item ‘My manager has to consult his/her superiors before committing any resources to business analytics projects’, approx. 38% of respondents Agree or Strongly Agree with the statement while approx. 36% of respondents Disagree or Strongly Disagree.

On the item ‘If I need resources to exploit business analytics-enabled insights, I need to get an approval from my managers’, approx. 59% of respondents Agree or Strongly Agree with the statement while approx. 15% of respondents Disagree or Strongly Disagree.

On the item ‘I need to consult my managers before I allocate resources to business analytics projects’, approx. 56% of respondents Agree or Strongly Agree with the statement while approx. 22% of respondents Disagree or Strongly Disagree.

On the item ‘I can make my own decisions to allocate resources on business analytics projects’, approx. 51% of respondents Agree or Strongly Agree with the statement while approx. 29% of respondents Disagree or Strongly Disagree.

Overall, on average, across the four items, slightly more than half (approx. 51%) the respondents report a high degree of centralization of the resource allocation process (i.e. Agree or Strongly Agree) while approx. 25% report a low degree of centralization (Disagree or Strongly Disagree).

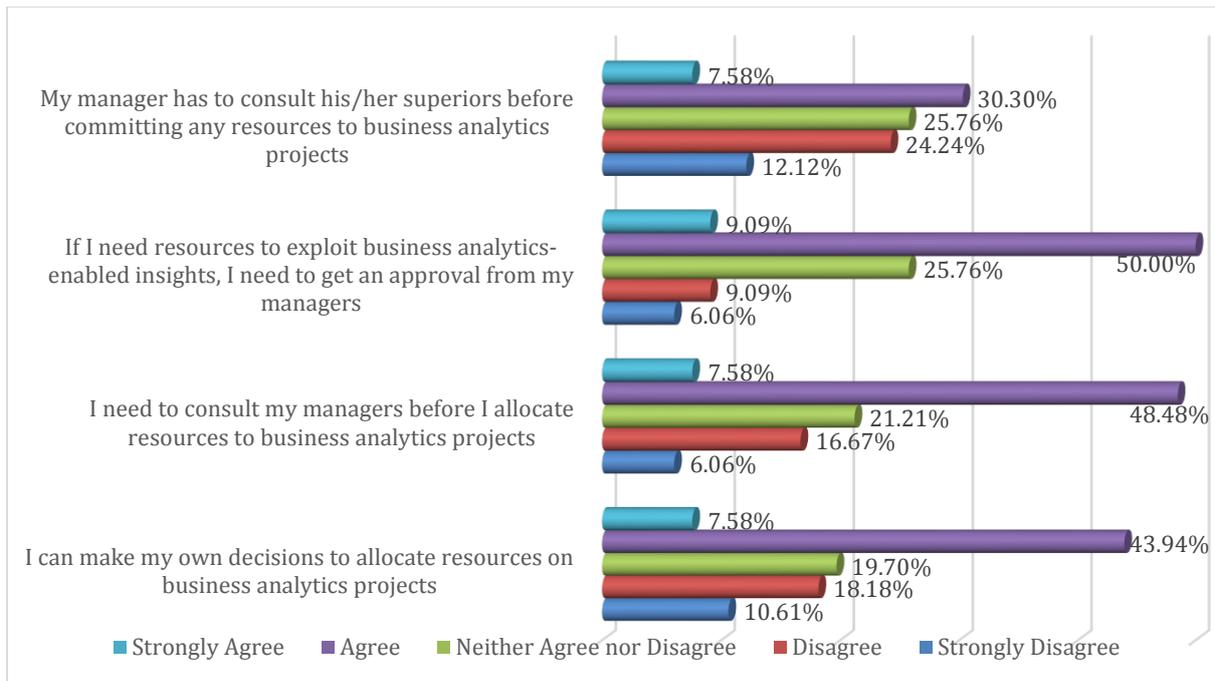


Figure 7.1: Centralization of the Resource Allocation Process

Figure 7.2 reports the distribution of Strongly Agree-Strongly Disagree responses from line managers on the formalization of the resource allocation process.

On the item ‘I need to write a formal proposal to request any resources for business analytics projects’, approx. 45% of respondents Agree or Strongly Agree with the statement while approx. 30% of respondents Disagree or Strongly Disagree.

On the item ‘My organization strictly follows rules and procedures for allocating resources’, approx. 39% of respondents Agree or Strongly Agree with the statement while approx. 29% of respondents Disagree or Strongly Disagree.

On the item ‘In my organization, there are established rules and procedures for allocating resources for business analytics projects’, approx. 49% of respondents Agree or Strongly Agree with the statement while approx. 26% of respondents Disagree or Strongly Disagree.

Overall, on average, across the three items, more (44%) respondents agree with the statements than disagree with the statements (28%).

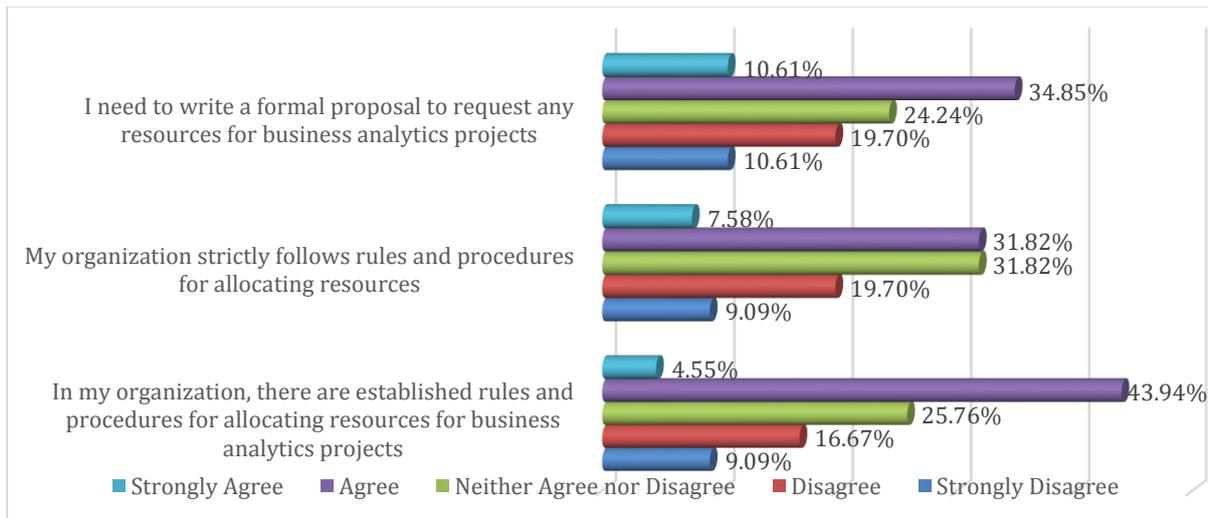


Figure 7.2: Formal Rules and Procedures for Committing Resources

7.4 What do we conclude?

- (a) Line managers report a high degree of centralization and formalization of the resource allocation process.
- (b) Few line managers have discretionary resources to spend on projects to acquire or exploit BA-enabled insights. Line managers, in general, need to apply formally through their managers to centralized resource allocation committees to obtain resources for business analytics projects.

8: Outcomes: Innovation and Performance

8.1 Why did we study this?

We decided to study the relationship between business analytics capabilities and innovation and performance for two reasons: (1) innovation and performance are key outcomes that influence competitive advantage, and (2) by studying outcomes we can identify organizational practices and interventions that can contribute to generating better returns from investments in business analytics.

8.2 How did we measure the outcomes?

We measured the impact of business analytics on innovation using self-assessed measures based on Strongly Agree-Strongly Disagree type scales. We asked questions on improvements to features and quality of existing products and services, to operational efficiencies and distribution channels, as well as on new products/services and new customer segments.

We measured the performance impacts of business analytics on Strongly Agree-Strongly Disagree type scales by asking respondents to answer questions on the contributions of business analytics to performance and business value.

8.3 What did we find?

Figure 8.1 reports the distribution of Strongly Agree-Strongly Disagree responses from line managers on the extent of business analytics-enabled innovation with existing products/services/operations. Figure 8.2 reports the responses on innovation with new products/services/operations.

On the item ‘My unit was able to improve the performance of its distribution channels as a result of insights generated from the use of business analytics’, approx. 38% of respondents Agree or Strongly Agree with the statement while approx. 27% of respondents Disagree or Strongly Disagree.

On the item ‘My unit was able to capture operational efficiencies based on the insights generated from the use of business analytics’, approx. 57% of respondents Agree or Strongly Agree with the statement while approx. 18% of respondents Disagree or Strongly Disagree.

On the item ‘My unit has improved the quality of our existing products/services based on insights generated using business analytics’, approx. 56% of respondents Agree or Strongly Agree with the statement while approx. 27% of respondents Disagree or Strongly Disagree.

On the item ‘My unit has introduced a number of new features in the existing products/services based on insights generated using business analytics’, approx. 48% of respondents Agree or Strongly Agree with the statement while approx. 29% of respondents Disagree or Strongly Disagree.

Overall, on average, on the extent to which business analytics enabled organizations to innovate with existing products/services/operations, roughly half (approx. 50%) the responses are positively inclined while roughly a quarter (approx. 25%) are negatively inclined.

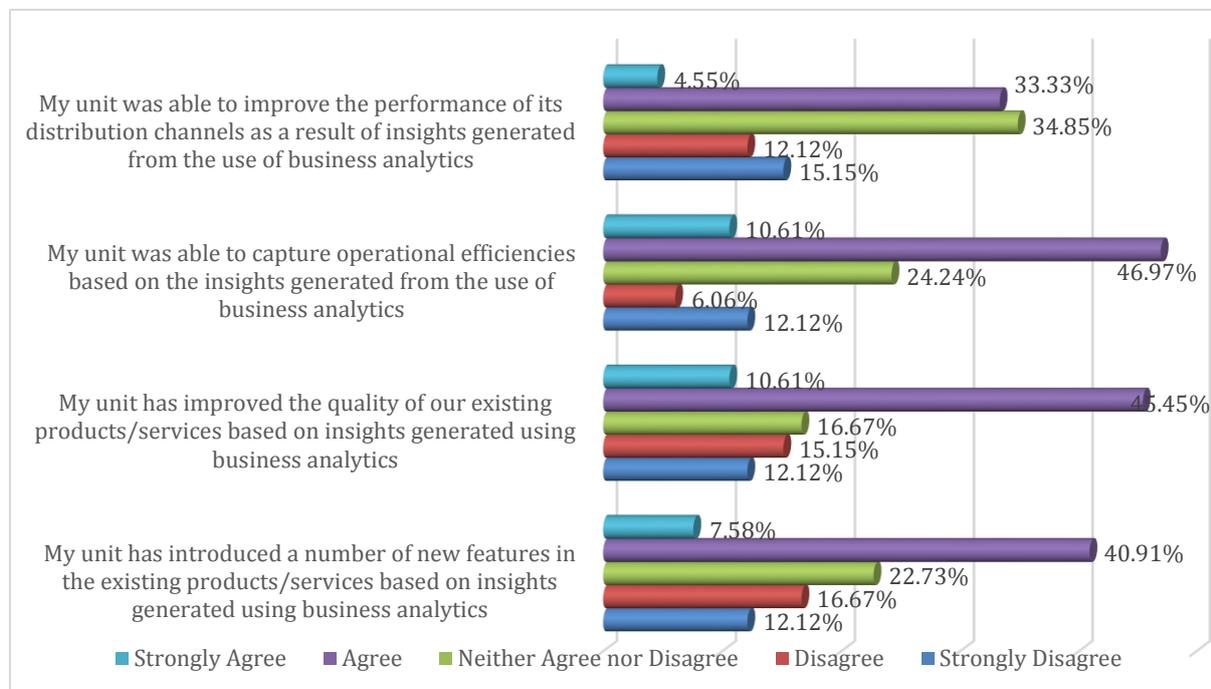


Figure 8.1: Business Analytics enabled Innovation – Existing Products/Services/Operations

Figure 8.2 reports the distribution of Strongly Agree-Strongly Disagree responses from line managers on business analytics-enabled innovation with new products/services/operations.

On the item ‘My unit was able to experiment with new products/services as a result of insights generated from the use of business analytics’, approx. 39% of respondents Agree or Strongly Agree with the statement while approx. 27% of respondents Disagree or Strongly Disagree.

On the item ‘My unit has been able to promote our products/services to new customer segments identified by the use of business analytics’, approx. 28% of respondents Agree or Strongly Agree with the statement while approx. 32% of respondents Disagree or Strongly Disagree.

On the item ‘My unit has introduced a number of new services based on insights generated using business analytics’, approx. 42% of respondents Agree or Strongly Agree with the statement while approx. 35% of respondents Disagree or Strongly Disagree.

On the item ‘My unit has introduced a number of new products based on insights generated using business analytics’, approx. 35% of respondents Agree or Strongly Agree with the statement while approx. 36% of respondents Disagree or Strongly Disagree.

Overall, on average, on the extent to which business analytics enabled organizations to introduce innovations related to new products/services/operations, slightly more than one-third (approx. 36%) of responses are positively inclined while a similar number (approx. 33%) are negatively inclined.

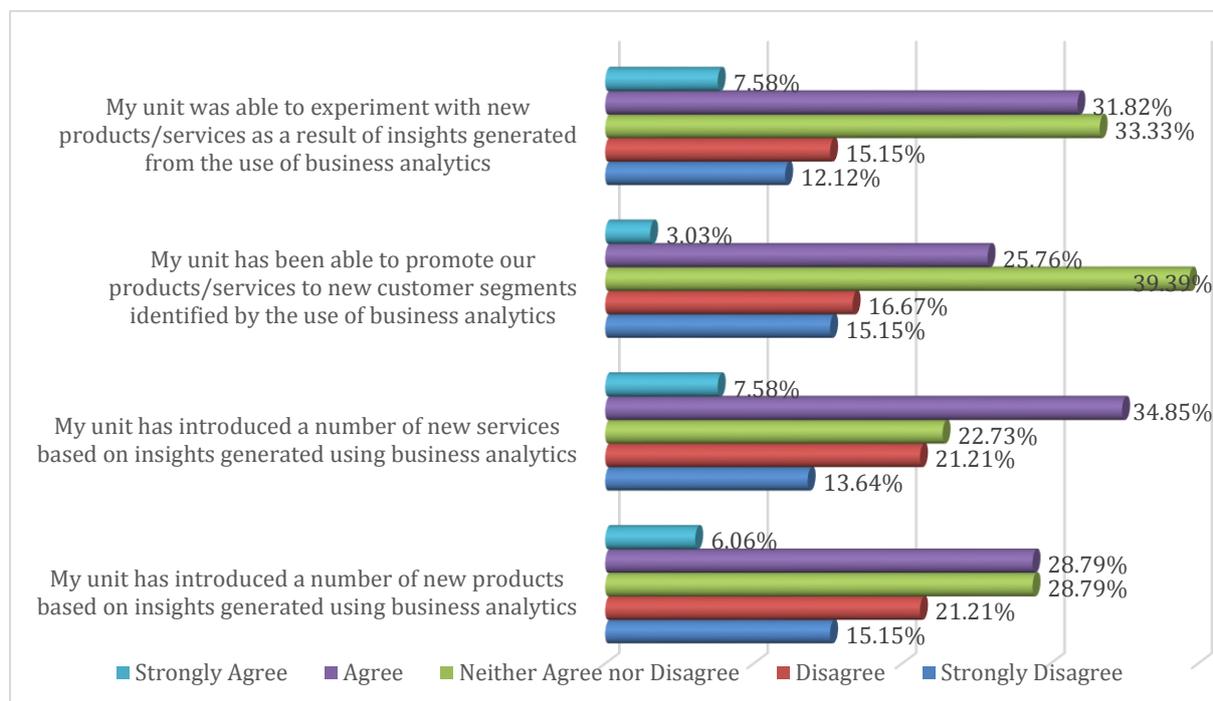


Figure 8.2: Business Analytics enabled Innovation – New Products/Services/Operations

Figure 8.3 reports the distribution of Strongly Agree-Strongly Disagree responses from line managers on business analytics enabled organizational performance.

On the item ‘The use of business analytics has generated significant business value for my unit’, approx. 50% of respondents Agree or Strongly Agree with the statement while approx. 22% of respondents Disagree or Strongly Disagree.

On the item ‘The use of business analytics has contributed significantly to improving the performance of my unit’, approx. 51% of respondents Agree or Strongly Agree with the statement while approx. 24% of respondents Disagree or Strongly Disagree.

Overall, on average, across the two items measuring business analytics enabled organizational performance gains, slightly more than half (approx. 50%) the responses agree with the statements while less than a quarter (approx. 23%) disagree with the statements.

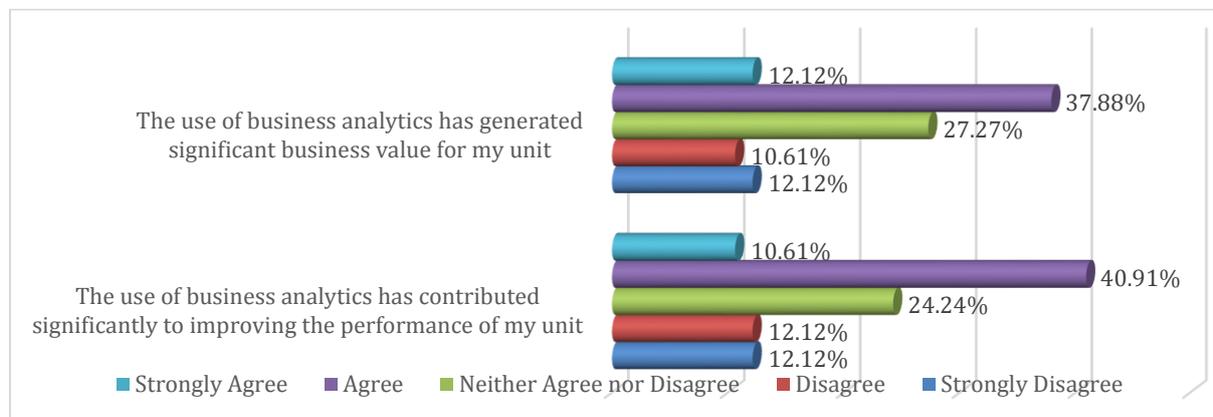


Figure 8.3: Business Analytics enabled Organizational Performance

8.4 What do we conclude?

- (a) Line managers report a high level of business analytics-enabled innovation. They report incremental (i.e. based on existing products/services/operations) innovations as well as more breakthrough innovations (i.e. based on new products/services/operations).
- (b) Line managers report a higher degree of business analytics-enabled innovation with existing products/services/operations than with new products/services/operations.
- (c) In more than 50% of the cases, line managers agree or strongly agree that business analytics has enabled improvement in organizational performance.

(d) Business analytics is no panacea however, as there remains substantial variability in the extent to which organizations are able to capture gains in innovation and performance from the use of business analytics.

9: What Contributes to Generating Value?

9.1 Why did we study this?

In this section we analyze the data to identify the organizational interventions that contribute to desired outcomes (see Figure 1.1). Specifically, we seek to identify organizational interventions that contribute to efforts by line managers to acquire insights, to exploit insights, to improve innovation and to improve business performance.

A second objective of our analysis is to identify the interventions (or combinations of interventions) that separate the high performing organizations from those not performing so well in creating value from business analytics.

9.2 What did we do?

First, we conducted a sub-group analysis to identify how the scores on the desired outcomes (i.e. acquire insights, exploit insights, innovation and performance) vary between organizations that are Low or High on the organizational interventions³ (i.e. maturity of the business analytics platform, top management support, and support from the business analytics team). In this analysis, we used a median split on organizational interventions to separate the Low and High groups.

Second, we extended the sub-group analysis to estimate the magnitude of differences on outcomes between organizations that were in the Low-Low quadrant on interventions and outcomes versus those that were in the High-High quadrant.

Next, we conducted a regression analysis to identify the effect of combinations of interventions on outcomes, e.g. how do top management support and business analytics maturity jointly affect innovation and performance?

In conducting this analysis, we combined the individual item measures to create higher-level factors to present an overview of the findings. Specifically, we combined all the items relating to the maturity of the business analytics platform into one factor (called Business Analytics Maturity); all the items relating to top management support into one factor (called

³ Resource allocation process was found to have an enabling effect on other intervention only and its influence is examined in conjunction with other interventions in the sections on *Innovation* and *Organizational Performance* later in this Chapter.

Top Management Support); all the items of support from business analytics team into one factor (called Business Analytics Team Support); all the items of resource allocation process into one factor (called Agility of the Resource Allocation Process⁴); all items of innovation into one factor (called Innovation); and all items of performance into one factor (called Organizational Performance). In total, we investigate six factors.

9.3 What did we find?

The following sections present the effects of intervention factors (Business Analytics Maturity, Top Management Support, and Business Analytics Team Support) on each of the outcome factors of interest (Acquire Insights, Exploit Insights, Innovation and Performance).

Efforts to Acquire Insights

Table 9.1 presents the effects of the interventions on Efforts to Acquire Insights. The data in Table 9.1 reveals that Efforts to Acquire Insights increase with increasing Business Analytics Maturity (approx. 20% increase), Top Management Support (approx. 33% increase) and Business Analytics Team Support (approx. 16% increase). The data also reveal that there is a large gap between the top performing organizations and the bottom performing organizations: the top performers are, on average, putting in approx. at least *90% more effort to acquire insights* than the bottom performing organizations.

⁴ We label the resource allocation processes that are more formalized and centralized as less agile while those that are less formalized and centralized as more agile.

Table 9.1: Effects of Interventions on Efforts to Acquire Insights

Outcome ➔	<i>Efforts to Acquire Insights</i> (Mean score = 16.2; Range = 6 to 30)			% Change in Efforts to Acquire Insights when Intervention goes from Low to High ^{1, 2}	Difference in Efforts to Acquire Insights between Top Performers and Bottom Performers ³
	Low	High			
Business Analytics Maturity	12.1	21.4	High	+20.1%	+94.5%
	11.0	20.5	Low		
Top Management Support	12.7	21.1	High	+33.0%	+94.0%
	10.9	21	Low		
Business Analytics Team Support	12.4	21.2	High	+16.1%	+98.1%
	10.7	20.9	Low		

¹: The Low group is composed of 50% of the organizations below the median value (n = 33) while the High group is composed of 50% of the organizations above the median value (n = 33).

²: The number of organizations in each cell is not the same, hence this value differ from that computed by the simple means of the values in the cells.

³: Computed as the % difference in Efforts to Acquire Insights between organizations in the Low-Low quadrant and those in the High-High quadrant.

A deeper analysis based on regression of the data to investigate the joint effects of all interventions on organizational 'Efforts to Acquire Insights' reveals that:

- (a) Increasing the level of Top Management Support significantly increases Efforts to Acquire Insights.
- (b) Business Analytics Team Support and Top Management Support are complementary and operate in conjunction to influence Efforts to Acquire Insights (see Figure 9.1).

Interpretation of Figure 9.1 reveals that even when Top Management Support is Low, it is still possible to increase Efforts to Acquire Insights by increasing the level of Business Analytics Team Support. In other words, the mean score for Efforts to Acquire Insights increases from 12.7 under Low Business Analytics

Team Support to 14.0 (an increase of 10.2%) under High Business Analytics Team Support.

Under High levels of Top Management Support, the mean scores for Efforts to Acquire Insights do not change substantially. When both Business Analytics Team Support and Top Management Support are Low, the mean score is 12.7. However, when both are High, the mean score increases to 18.9 (an increase of approx. 49%).

Top Management Support	H	19.6	18.9
	L	12.7	14.0
Mean Efforts to Acquire Insights ¹		L	H
		BA Team Support	

Figure 9.1: Joint effects of Top Management Support and Business Analytics Team Support on Efforts to Acquire Insights

(¹ Mean score on Efforts to Acquire Insights for full sample = 16.2; Range = 6 to 30)

Efforts to Exploit Insights

Table 9.2 presents the effects of the interventions on Efforts to Exploit Insights. The data in Table 9.2 reveals that Efforts to Exploit Insights increase with increasing Business Analytics Maturity (20.7% increase), Top Management Support (35.0% increase) and Business Analytics Team Support (23.4% increase). The data reveal that there is a large gap between the top performing organizations and the bottom performing organizations, i.e. the top performers are putting in, on average, at least 90% more effort into exploiting insights than the bottom performing organizations.

Table 9.2: Effects of Interventions on Efforts to Exploit Insights

Outcome →	<i>Efforts to Exploit Insights</i> (Mean score = 16.1; Range = 6 to 30)			% Change in Efforts to Exploit Insights when Intervention goes from Low to High ^{1, 2}	Difference in Efforts to Exploit Insights between Top Performers and Bottom Performers ³	
	Intervention ↓	Low				High
<i>Business Analytics Maturity</i>	Low	12.0	21.8	High	+20.7%	+98.5%
	High	11.0	19.6	Low		
<i>Top Management Support</i>	Low	13.6	21.8	High	+35.0%	+113.5%
	High	10.2	19.3	Low		
<i>Business Analytics Team Support</i>	Low	12.1	21.1	High	+23.4%	+91.3%
	High	11.1	20.4	Low		

¹: The Low group is composed of 50% of the organizations below the median value (n = 33) while the High group is composed of 50% of the organizations above the median value (n = 33).

²: The number of organizations in each cell is not the same, hence this value differ from that computed by the simple means of the values in the cells.

³: Computed as the % difference in Efforts to Exploit Insights scores between organizations in the Low-Low quadrant and those in the High-High quadrant.

Deeper analysis based on regression of the data to investigate the joint effects of all interventions on organizational 'Efforts to Exploit Insights' reveals that efforts to Exploit Insights increase significantly with increasing levels of all three interventions, Top Management Support, Business Analytics Maturity and BA Team Support.

Innovation

Table 9.3 presents the effects of the interventions on Innovation. The data in Table 9.3 reveals that Innovation increases with Business Analytics Maturity (27.7% increase), Top Management Support (32.8% increase) and Business Analytics Team Support (38.4% increase). The data reveals that there is a large gap between the top performing organizations and the bottom performing organizations, i.e. the top performers are capturing, on average, approx. at least 70% more Innovation than the bottom performing organizations.

Table 9.3: Effects of Interventions on Innovation

Outcome →	Innovation (Mean score = 24.6; Range = 8 to 40)			% Change in Innovation when Intervention goes from Low to High ^{1, 2}	Difference in Innovation between Top Performers and Bottom Performers ³
	Intervention ↓	Low	High		
<i>Business Analytics Maturity</i>		21.9	30.5	+27.7%	+75.8%
		17.4	30		
<i>Top Management Support</i>		20.5	30.9	+32.8%	+69%
		18.3	28.8		
<i>Business Analytics Team Support</i>		22.8	30.8	+38.4%	+76%
		17.5	29.1		

¹: The Low group is composed of 50% of the organizations below the median value (n = 33) while the High group is composed of 50% of the organizations above the median value (n = 33).

²: The number of organizations in each cell is not the same, hence this value differ from that computed by the simple means of the values in the cells.

³: Computed as the % difference in Innovation scores between organizations in the Low-Low quadrant and those in the High-High quadrant.

Deeper analysis based on regression of the data to investigate the joint effects of all interventions on organizational 'Innovation' reveals that:

- (a) The level of Innovation increase significantly with increasing levels of Top Management Support and BA Team Support.
- (b) The Resource Allocation Process and Business Analytics Maturity have a joint enabling effect on Innovation (Figure 9.2).

In other words, when Business Analytics Maturity is Low, a *less agile* Resource Allocation Process serves to *increase* the level of Innovation: the mean value of Innovation goes up of 21.3 to 25.5, an increase of approx. 20%. Increasing the agility of the Resource Allocation Process when the level of Business Analytics Maturity is Low can have a negative impact on the level of Innovation.

When Business Analytics Maturity is High, the mean value of Innovation does not differ substantially between High and Low levels of Agility of the Resource Allocation Process.

Business Analytics Maturity	H	28.3	27.6
	L	25.5	21.3
Mean Innovation ¹		L	H
		Agility of Resource Allocation Process	

Figure 9.2: Joint effects of Resource Allocation Process and Business Analytics Maturity on Innovation

(¹ Mean Innovation score for full sample = 24.6; Range = 8 to 40)

Organizational Performance

Table 9.4 presents the effects of the interventions on Organizational Performance. The data in Table 9.4 reveals that Organizational Performance increases with Business Analytics Maturity (19.9% increase), Top Management Support (17.7% increase) and Business Analytics Team Support (39.4% increase). The data reveals that there is a large gap between the top performing organizations and the bottom performing organizations, i.e. the top performers are achieving, on average, approx. at least 95% better Organizational Performance than the bottom performing organizations.

Table 9.4: Effects of Interventions on Organizational Performance

Outcome →	<i>Organizational Performance</i> (Mean score = 6.5; Range = 2 to 10)			% Change in Organizational Performance when Intervention goes from Low to High ^{1, 2}	Difference in Organizational Performance between Top Performers and Bottom Performers ³
	Low	High			
Intervention ↓					
<i>Business Analytics Maturity</i>	5.73	8.28	High	+19.9%	+116.2%
	3.83	8.47	Low		
<i>Top Management Support</i>	5.29	8.37	High	+17.7%	+96.5%
	4.26	8.36	Low		
<i>Business Analytics Team Support</i>	6.00	8.30	High	+39.4%	+101%
	4.13	8.50	Low		

¹: The Low group is composed of 50% of the organizations below the median value (n = 33) while the High group is composed of 50% of the organizations above the median value (n = 33).

²: The number of organizations in each cell is not the same, hence this value differ from that computed by the simple means of the values in the cells.

³: Computed as the % difference in Organizational Performance scores between organizations in the Low-Low quadrant and those in the High-High quadrant.

A deeper analysis of the data to investigate the joint effects of all interventions on organizational 'performance' reveals that:

- (a) All four interventions have significant joint (interaction/enabling) effects on Organizational Performance. The implications of this for managers are that high levels of performance are only possible when the 'levers' operate in conjunction.
- (b) Organizational Performance increases significantly when Business Analytics Team Support increases.
- (c) Top Management Support has an important enabling effect on the impact of Business Analytics Maturity, i.e. for organizations to realize the potential performance gains available from their investments in their business analytics platform, a high level of support from top management is required (Figure 9.3).

Business Analytics Maturity	H	6.9	7.5
	L	5.1	7.2
Mean Organizational Performance ¹		L	H
		Top Management Support	

Figure 9.3: Joint effects of Business Analytics Maturity and Top Management Support on Organizational Performance

(¹ Mean Organizational Performance score for full sample = 6.5; Range = 2 to 10)

When Business Analytics Maturity and Top Management Support are both Low, the mean performance score is 5.1; when both are High, the mean performance score increases to 7.5, an increase of approx. 47%.

However, that full potential for an increase in organizational performance is not realized when only one of the two ‘levers’ is High while the other is Low.

- (d) BA Team Support has an important enabling effect on the impact of Top Management Support, i.e. for organizations to realize the potential performance gains available from increasing levels of Top Management Support, a high level of support from the BA team is also required (Figure 9.4).

BA Team Support	H	7.3	7.8
	L	4.9	6.4
Mean Organizational Performance ¹		L	H
		Top Management Support	

Figure 9.4: Joint effects of Top Management Support and Business Analytics Team Support on Organizational Performance

(¹ Mean Organizational Performance score for full sample = 6.5; Range = 2 to 10)

When Business Analytics Team Support and Top Management Support are both Low, the mean performance score is 4.9; when both are High, the mean performance score increases to 7.8, an increase of approx. 59%.

However, that full potential for increase in organizational performance is not realized when only when one of the two ‘levers’ is High while the other is Low.

- (e) The Agility of the Resource Allocation Process has an important enabling effect on the impact of Business Analytics Maturity, i.e. for organizations to realize the potential performance gains available from their investments in their business analytics platform, a high level of agility in the resource allocation process is required (Figure 9.5).

Business Analytics Maturity	H	7.2	7.7
	L	7.3	5.7
Mean Organizational Performance ¹		L	H
		Agility of Resource Allocation Process	

Figure 9.5: Joint effects of Business Analytics Maturity and Agility of Resource Allocation Process on Organizational Performance

(¹ Mean Organizational Performance score for full sample = 6.5; Range = 2 to 10)

When Agility of Resource Allocation Process is Low, increasing levels of Business Analytics Maturity do not have an impact on performance.

Further, when Business Analytics Maturity is Low, increasing the Agility of Resource Allocation Process has a negative impact on performance. This condition has the lowest mean performance, 5.7.

The best outcome is achieved when both Business Analytics Maturity and Agility of Resource Allocation Process are High. Under this condition the mean performance score is 7.7, which is an approx. 35% increase over the worst performing cell.

As organizations ramp up their investment in the business analytics platform, performance gains will be realized only when they also make commensurate changes to their resource allocation processes, i.e. make them more agile and make resources more easily available to line managers to invest in business

analytics projects and projects to exploit BA-generated insights and convert them into innovations.

- (f) The Agility of the Resource Allocation Process has an important enabling effect on the impact of Top Management Support, i.e. for organizations to realize the potential performance gains available from increasing levels of Top Management Support, a high level of agility in the resource allocation process is required (Figure 9.6).

Top Management Support	H	7.5	7.2
	L	6.6	5.5
Mean Organizational Performance ¹		L	H
		Agility of Resource Allocation Process	

Figure 9.6: Joint effects of Top Management Support and Agility of Resource Allocation Process on Organizational Performance

(¹ Mean Organizational Performance score for full sample = 6.5; Range = 2 to 10)

When Top Management Support is Low, *increasing* the Agility of Resource Allocation Process has a *negative* impact on performance, i.e. performance declines from a mean score of 6.6 to a mean score of 5.5 (a decrease of approx. 17%) when the resource allocation process is made more agile.

Increasing the level of Top Management Support increases organizational performance both under High and Low Agility of the Resource Allocation Process, by approx. 31% and 14%, respectively.

However, when Top Management Support is very High, *increasing* the Agility of Resource Allocation Process has a *marginal positive* impact on performance, an increase from a mean score of 7.2 to 7.5 (an increase of approx. 4%).

The best mean performance is obtained under High Top Management Support and Low Agility of the Resource Allocation Process, an increase of approx. 36% over the worst mean performance score (an increase from a mean score of 5.5 to a mean score of 7.5)

As organizations ramp up the level of support provided by top management, performance gains will be higher when they also make commensurate changes to their resource allocation processes, i.e. make them more agile and make resources more easily available to line managers to invest in business analytics projects and projects to exploit BA-generated insights and convert them into innovations.

9.4 What do we conclude and recommend?

Organizations can capture substantial gains in innovation and organizational performance from their investments in business analytics. However, there are substantial differences across organizations in their ability to capture those gains.

A key conclusion that we draw from the analysis is that all four levers examined, Business Analytics Maturity, Top Management Support, Resource Allocation Process and BA Team Support have an important influence on innovation and organizational performance.

However, innovation and performance gains are achieved only when the levers are working in conjunction. In particular, for organizations investing in increasing the maturity of their business analytics platform, performance gains will be realized when they pay concurrent attention to the following:

- (a) Make sure that top management is providing a high level of support to line managers.
- (b) The business analytics team engages with and provides a high level of support to line managers.
- (c) The resource allocation process should become progressively more agile as the level of Top Management Support and Business Analytics Maturity increase. In particular, the resource allocation process should make it easier for line managers to invest in BA projects and in projects to exploit BA-enabled insights.
- (d) A highly agile resource allocation process should be put in place only when the level of top management support and the maturity of the business analytics platform are high. Else, there is a high likelihood of low performance when an agile resource allocation process operates under Low Top Management Support and Low Business Analytics Maturity. A conservative resource allocation performance serves to protect against severe performance decline under conditions of low top management support and low maturity of the business analytics platform.