# The Use of Visualization in the Communication of Business Strategies: An Experimental Evaluation

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**Abstract**

An experiment was conducted to gather empirical evidence regarding whether the use of visualization is better than text in the communication of a business strategy. A total of 76 managers saw a presentation of the strategy of the financial services branch of an international car manufacturer. The visual representation of the strategy was chosen as the independent variable, and the effects on the audience were measured. Three types of visual support were chosen as conditions: bulleted list, visual metaphor, and temporal diagram. Each subject saw one representation format only. Subjects who were exposed to a graphic representation of the strategy paid significantly more attention to, agreed more with, and better recalled the strategy than did subjects who saw a (textually identical) bulleted list version. However, no significant difference was found regarding the understanding of the strategy. Subjects who were exposed to a graphic representation of the strategy perceived the presentation and the presenter significantly more positively than did those who received the presentation through a bulleted list.

**Keywords**

strategy visualization, strategy communication, visual metaphor, temporal diagram, bulleted list

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The Achilles' heel of any business strategy is usually its implementation. And the most delicate part of the implementation process is often the communication of a new strategy. It is thus not surprising that many studies have mentioned the importance and problems of strategy implementation. Strategy concerns the current situation of an organization, its goals, and especially how it is going to achieve these goals. The essence of a strategy consists of achieving a competitive advantage (Collis & Rukstad, 2008), and—according to Mintzberg (2005, p. 139)—it is through strategy that "you can shape the future" of an organization. Strategy implementation is important because it is essential for the performance of an organization (Nobel, 1999a, in Van Riel, 2008). However, even a well-formulated strategy will not produce superior performance if it is not successfully implemented (Nobel, 1999b, in Yang, Guohui, & Eppler, 2011). The importance of strategy implementation is further illustrated by the results of various surveys conducted with senior executives. In 2004, according to an Economist survey of 276 senior operating executives, 57% of firms were *not* successful in executing strategic initiatives over the past 3 years (Allio, 2005, cited in Yang et al., 2011). In 2006, a global survey by the Monitor Group asked senior executives about their priorities and found that the number one result, by a clear margin, was *strategy execution* (Kaplan & Norton, 2008). In 2007, Tony Hayward, then the new CEO of BP, stated, "Our problem is not about the strategy itself, but about our execution of it" (Kaplan & Norton, 2008, p. 3). Chief executive officers would rather have a good strategy that their organization can execute than a brilliant one that their people do not understand and cannot deliver (Kaplan & Norton, 2008). In other words, strategy implementation is the most difficult and most important step in the strategy process. The best test of managerial excellence is an excellent implementation of a strategy that is the most reliable formula for turning companies into outstanding performers (Thompson, Strickland, & Gamble, 2005, cited in Schaap, 2006). But why is this still a problem?

A major problem in strategy implementation seems to be that companies underestimate or ignore the importance of the role of lower-level management and employees for the successful execution of a strategy. A successful strategy implementation is determined not just by those people who have defined the strategy, but also by the decisions and actions of all employees at all levels of an organization (Schaap, 2006). Organizations depend on all of their employees to accomplish strategic initiatives, not on top management alone (Van Riel, 2008). Research has revealed that, on average, *95% of a company's employees are not aware of, or do not understand, its strategy* (Kaplan & Norton, 2005). Given this suboptimal situation, our study sheds light on more effective ways to communicate business strategies to employees. To do so, we first review four key challenges in strategy communication below, as they are the dependent variables of our experimental study. We then discuss the independent variables of our study—that is, the rationale for the chosen strategy communication modalities that affect these challenges. This is followed by the method that we have employed to assess strategy communication and by the main results and their implications.

## Challenges and Approaches of Strategy Communication

A review of literature about the problems of strategy implementation (Yang et al., 2011) shows four dominant problems areas: (a) awareness of and attention to strategy information, (b) understanding of the strategy, (c) agreement and support of the strategy, and (d) retention or recall of the strategic content. Below we discuss these four issues in more detail.

### *Attention*

Among employees, the first problematic area to communicate a strategy is inadequate attention, awareness, and interest for the strategy. Consensus cannot be achieved if lower-level management and nonmanagement are not aware of the same information concerning a strategy (Nobel, 1999b, in Yang et al., 2011). Another study found that "employees cannot help implement a strategy that they are not aware of" (Kaplan & Norton, 2008, p. 12).

### *Comprehension*

A shared understanding of middle management and those at the operational level with the top management team's strategic goals is of critical importance for effective implementation (Rapert, Veliquette, & Garretson, 2002, cited in Yang et al., 2011). Employees who do not understand the strategy cannot link their daily actions to its successful execution (Kaplan & Norton, 2008). In a survey, more than 40% of senior managers and more than 90% of all employees stated that they did not believe that they had a clear understanding of their company's strategy. Yet it is important that employees really understand the strategy and not simply see it or hear about it (Kaplan & Norton, 2008).

### *Agreement*

Strategy implementation efforts may fail if the strategy does not receive support and commitment from the majority of employees and middle management (Rapert et al., 2002, cited in Yang et al., 2011). Management must thus align employees with the strategy. Unless all employees understand the strategy and are motivated to achieve it, successful execution of the strategy is unlikely (Kaplan & Norton, 2008). When employees do not understand and agree with a company's strategic plan, there will be a much higher likelihood that the implementation process of that plan will fail (Schaap, 2006).

### *Retention*

If employees cannot remember the key elements of the strategy, they are unlikely to consider it in their daily actions. Retention is thus another key aspect in strategy

communication. The key elements of a strategy are often hidden away on a static piece of paper in a strategic plan (Van Riel, 2008). Hence, managers cannot remember and summarize their company's strategy in their own words, and even if they could, it is not clear if their colleagues would put it the same way (Collis & Rukstad, 2008). Communicating the strategy in a memorable way is thus a key requirement for strategy implementation.

One key for the better execution of strategies is thus to engage employees through a better way of communicating the strategy. Many researchers have mentioned the importance of communication for the strategy implementation process (Mazzola & Kellermanns, 2010) and "communication is mentioned more frequently than any other single item promoting successful strategy implementation" (Yang et al., 2011, p. 18). Yet little empirical research has so far looked at what really constitutes *effective managerial communication of business strategies*. Again, Kaplan and Norton's seminal 2008 study provides an exception: When comparing companies achieving an outstanding performance with underperformers, their research showed that 73% of companies achieving outstanding performance clearly communicated their strategy, whereas only 28% of the underperformers took such an action. In other words, clear and compelling communication of a strategy enables better strategy implementation (Kaplan & Norton, 2008). It is therefore surprising that researchers in strategic management put a lot of effort into the analysis and definition of strategies, but neglect the process of *communicating* the strategy. While the focus of a number of studies was explicitly on the role of information and communication in strategic business alignment, no one, to the best of our knowledge, has ever looked into *how* the information about a business strategy that is communicated is represented (Frank & Brownell, 1989, cited in Van Riel, Berens, & Dijkstra, 2006). This is echoed in the results of a literature review on the factors influencing strategy implementation, which states that "several researchers just point out that communication is important, but there is no in-depth analysis on exactly *how* communication influences strategy implementation" (Yang et al., 2011, p. 32). When we juxtapose this apparent gap in the literature with the extensively documented benefits of graphic representations for complex communication, an important research opportunity opens up, namely, studying the impact of visualization on the communication of business strategies. We define visualization in this context as the graphic representation or mapping of information in a spatial schema (such as a diagram, map, metaphor, or sketch; see Tversky, 2004). The spatial placement of information on a visual structure or background image structures information meaningfully and provides an overall logic to the represented information (Huff, 1990). This overall, highly visible logic or graphic organization of information is missing in a simple bullet point list or text.

Visualization is frequently mentioned by visual communication scholars to be important in business communication (Horn, 1998; Huff, 1990; Kosslyn, 2007; Lehtonen, 2011; Striker, 2005; Tversky, 2004), yet bulleted lists are still dominating and ubiquitous in corporate, governmental, and pedagogical settings. They have replaced the traditional blackboard and are presented as the main visual aid on slides (Lanir & Booth, 2007). They are most often chosen as the means of display either

because of habits and preferences of a particular individual, professional community, or organization, or because their use is driven by the capabilities of the tools at hand. The normal, direct channel of business communication has become the projected slide, and presentation software enables the creation of millions of presentation slides each year (Tufte, 2003).

Even though the use of bulleted lists is ubiquitous in organizations today, we have only a limited understanding of their effects. In a comprehensive review of the extant literature on the use of slide presentations in the classroom, the authors reach an ambiguous conclusion. "Put simply," they write, "the majority of studies comparing computer-generated slide-based instructions against other instructional methods have failed to find significant differences in learning outcomes" (Levasseur & Sawyer, 2006, p. 111). Furthermore, even though the projected slide being read by the audience as a group while listening to a speech is the normal way of communicating in business, the effect of such communication is unclear (Gold, 2002, cited in Stoner, 2007). Hierarchical bullet points and low spatial resolution result in the inability to establish a logical connection of the content within and in between slides (Tufte, 2003). However, Edward Tufte (as the most prominent attacker of slide shows) has received a lot of criticism himself regarding his article on the cognitive style of PowerPoint, primarily for blaming PowerPoint as a dysfunctional communication tool. Kosslyn (2007, p. 3), a cognitive psychology professor at Stanford, mentions that the critique should not be so much about the tool, but more about how the tools influences the way people present content. Based on seminal research regarding cognitive load, bulleted lists should be avoided, given their disadvantages for effective learning (Clark, Nguyen, & Sweller, 2005). The use of bullet points in presentation software uniformly divides all slides into superior and subordinate parts. The hierarchical single-path structure is used to organize all types of contents, regardless of their inherent structure. Even though bullet lists may lead to superficial and simplistic thinking, they are widely used in corporate strategizing (Gold, 2002, cited in Stoner, 2007). Indeed, another study found that bullet points are very frequently employed in corporate strategy presentations (Shaw, Brown, & Bromiley, 1998, cited in Tufte, 2003). But presentation slides that contain only bullet points cannot show even simple, one-way causal models. In addition, bullet point lists and written statements are not the best way to communicate complex strategic ideas. The authors thus suggest using diagrams or images instead of bullet lists.

Closely related to the use of diagrams is the depiction of business strategies as visual metaphors. A metaphor provides the path from the understanding of something familiar to something new. In this way it improves understanding; this is why Aristotle called the metaphor a tool of cognition. According to Aristotle, a metaphor provides rapid information and is instructive to the highest degree as it facilitates the process of learning. Communicating with or through a visual metaphor is an indirect and stimulating way of communication, as the viewer must mentally reconstruct the displayed picture correctly and therefore complete the idea behind the shown content or image in his or her mind (Haynes, 1975; Ortony, 1975). A visual metaphor enables the reader to transfer existing knowledge to new areas and allows for a better understanding of


**Figure 1.** Example of a simple visual metaphor: Strategy as a stream of actions.
*Source*. Eppler and Mengis (2012).

complex thoughts, which is the main element of successful communication (Eppler & Mengis, 2012). In terms of functions, visual metaphors fulfill a dual purpose: First, they position information graphically to organize and structure it, and, second, they convey insights about the represented information through the key characteristics of the metaphor that is employed (Lengler & Eppler, 2007). The main aim behind the use of visual metaphors is to reduce complexity by carrying elements from an already mastered subject to a new domain. In addition, one should not neglect the mnemonic (i.e., facilitating remembering) and coordination function (i.e., providing an area of mutual and explicit focus) of visual metaphors. Visual metaphors can thus help to focus, accelerate, and improve recall (Worren, Moore, & Elliott, 2002). Figure 1 is a simple visual metaphor example from the realm of management (based on an idea by Henry Mintzberg and taken from the management textbook by Eppler & Mengis, 2012).

The visual metaphor of a boat on a river explains strategy as a stream of actions geared toward a destination (with intermediate goals) and restricted by several legal and historic factors. The visual metaphor also highlights the fact that some elements of the strategy are emergent (i.e., the small river flowing into the main river), while others remain unrealized (the river flowing out of the main one). In this way the metaphor makes something abstract concrete, memorable, and accessible.

A temporal diagram, the second visual condition in our experiment, is a visualization that is defined as a visual language sign having the primary purpose of denoting function and/or relationship (Garland, 1979). As in any other diagram, a temporal diagram contains information that is organized by location, so that the information can be accessed and processed simultaneously. It uses standardized shapes to convey

mostly analytical knowledge in a highly structured and systematic format (Eppler & Burkhard, 2006). The temporal diagram approach is very generic, simple, and flexible. The generic approach has great potential to support business strategy (Phaal, Farruk, & Probert, 2001). A temporal diagram has an adaptable structure with layers and sublayers, and delivers information in a chronological format that allows for the presentation of the information and for the use of the temporal diagram as a powerful communication tool (Phaal & Muller, 2007). A temporal diagram (also called strategy roadmap) has two major advantages: First, it makes abstract concepts accessible by reducing complexity through structuring information sequentially. Specifically, the temporal diagram aligns planned actions in their ideal sequence. Like a regular road map it provides cues as to where the company currently is and where it can move to, as well as through which intermediate milestones or medium term objectives. As a second advantage, it illustrates and explains causal or temporal relationships, which in turn helps to discover and communicate relationships among parts on different levels (Yates, 1985). A good temporal diagram can "convey instantly and memorably a relationship that would otherwise require a laborious and easily forgotten explanation" (Platts & Hua Tan, 2004, p. 667).

Due to its flexibility in terms of format and structure, the temporal diagram approach can be customized to many different contexts. Virtually all requirements engineering notations use temporal diagrams as the primary basis for communicating requirements (Moody, Heymans, & Matulevicius, 2010). Today, it is one of the most widely used management techniques, and it is increasingly applied for the development, communication, and implementation of business strategies. By using the temporal diagram approach repeatedly, the activity becomes more visible to senior managers since a key output from any temporal diagram activity is strategic communication (Phaal & Muller, 2007). The temporal diagram approach has gained acceptance and is considered a key supporting technique that uses simple visual frameworks to support dialogue and communication necessary to develop, deploy, and implement the desired strategy (Phaal & Muller, 2007). Figure 2 is a simple temporal diagram template taken from the realm of (technology) strategizing. Typical alternative forms (as reviewed in Phaal, Farruk, & Probert, 2003) of real-life temporal diagrams or roadmaps use the following dimensions or streams for their sequential and parallel mapping of goals or activities (Phaal et al., 2003, pp. 12-13): business objectives/projects/knowledge management enablers/processes/assets or product characteristics/components/manufacturing processes or commercial perspective/business process/technical perspective.

Of course, neither temporal diagrams nor visual metaphors are without disadvantages or risks, hence the need for a systematic evaluation. One potential disadvantage to note in this context is any visual metaphor's interpretational openness or vagueness, which can lead to misinterpretations. Likewise, in the article on the use of temporal diagrams for the visualization of strategy, the conclusion is that even though the visual aspect of a temporal diagram is the main reason why it is so attractive, guidance and evaluation are needed to support the development of temporal diagrams as effective aids for communication (as they can also be misunderstood by the viewers). It is proposed to conduct experiments to assess how to best use temporal diagrams and to

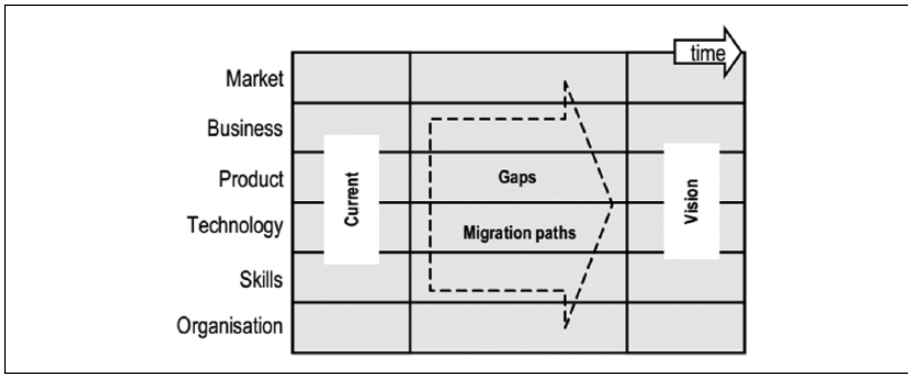


**Figure 2.** Example of a simple temporal diagram structure.
*Source.* Adopted from Phaal, Farruk, and Probert (2001).

identify requirements for its enhancement (Phaal & Muller, 2007). These findings are echoed by a study where experiments about techniques taught in business report writing were conducted and the author suggests conducting more experiments to determine the effects of other communication techniques (Gros, 1974). Furthermore, in an experiment on the use of graphics in teleconferences, it was found that the effectiveness of (even) poorly designed graphs was higher than no graphs and it was concluded that the mere use of visuals assists the communication process (Smeltzer & Vance, 1989). The effectiveness of a visualization depends on its perception and cognition by the viewer (Tory & Möller, 2004). Finally, according to another study, bullet point lists and written statements are not the best way to communicate often complex strategies and suggest using diagrams or images instead (Shaw et al., 1998, cited in Tufte, 2003). These studies provide arguments why diagrams and images should be used in the communication of business strategies, but also why it is important to empirically evaluate the effects of these communication approaches. How we have done this for the current study is described in the next section.

## Method

### *Participants*

Subjects for our experimental study were 76 experienced middle or upper managers, of whom 58 were male and 18 were female, from various industries (including manufacturing, services, and nonprofits) and organizational types (local small and medium enterprises as well as multinationals) with an average age of 35 years and an average work experience of 11 years. The average experience with strategic management issues was 3 years. All subjects took part in a (all-English) business strategy class at a Swiss university within an executive MBA program with students from around the world; the majority of the students were European since the hosting university was in Europe.

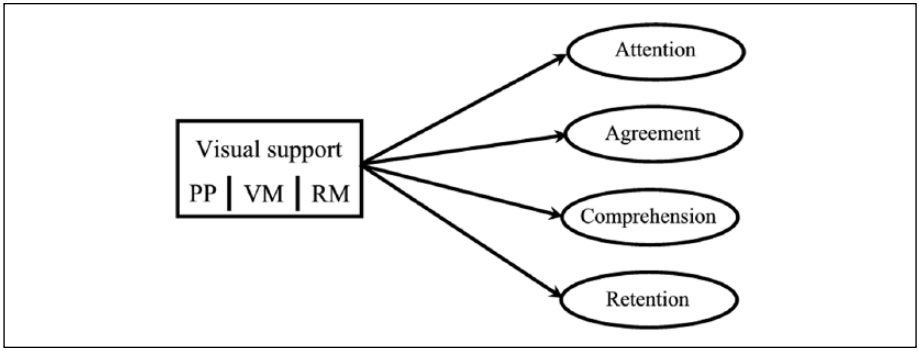


**Figure 3.** Independent (presentation conditions: PP = bulleted list; RM = temporal diagram; VM = visual metaphor) and dependent variables (attention, agreement, comprehension, retention) of the study.

## *Material*

The participating managers were witnessing a strategy presentation about the (authentic, but somewhat simplified) strategy of the financial services branch of an international car manufacturer. The managers were aware that the strategy presentation was part of a research project and that an evaluation would be conducted. Each subjects saw only one of the following (projected) presentation versions: (a) bulleted lists on two presentation software slides, (b) a visualization in the form of a visual metaphor (with identical text to condition 1), or (c) a temporal diagram (again with the same items as the bulleted lists slides). All three conditions were in color and had similar font sizes, while the font size of the visual metaphor was slightly smaller than the font size of the bulleted list and the temporal diagram. After the strategy presentation, the effects on each respective audience were measured in terms of attention, comprehension, agreement, and retention through a survey. The perception of the visual and the perception of the presenter were also measured through survey questions. The response rate to the survey was 100%.

The visual presentation support is the independent variable in our study, which the researcher manipulated to measure the differences in the effects on the dependent variables, which are attention, agreement, comprehension, and retention, as shown in Figure 3.

## *Procedure*

As a preparatory step for the experiment, we have simplified the business strategy of a financial services business branch of an international car manufacturer to 17 information units, namely a major overall strategic goal, three subgoals with three elements each, three success factors for the strategy, and one barrier. As a second preparation step, we have created three types of visual support based on these identical 17 information items defining the strategy: text in the form of *hierarchical bullet points* and

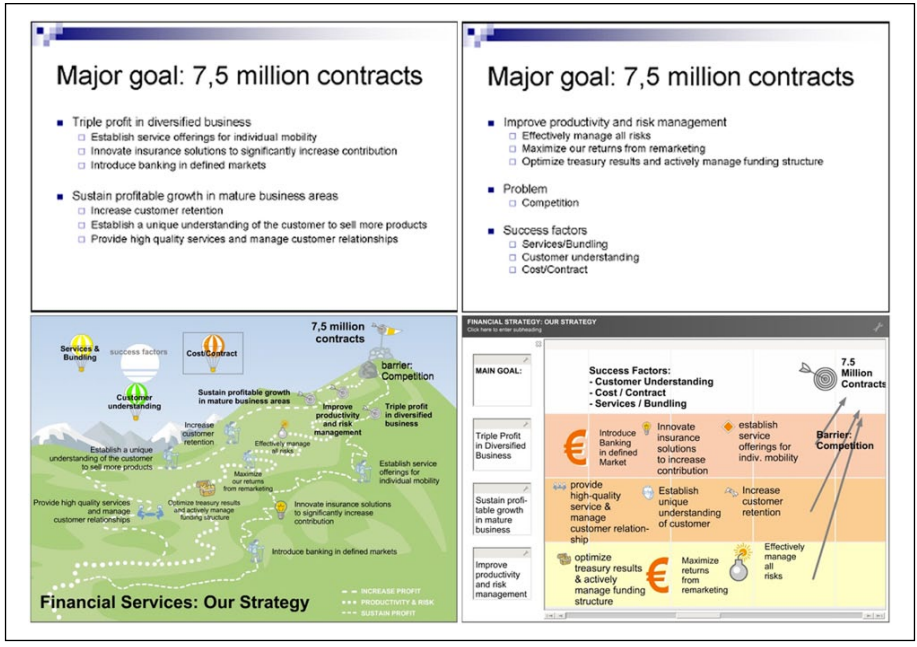


**Figure 4.** The three types of visual support that were used for the experiment: bulleted list, visual metaphor, temporal diagram (from top to bottom).

visualizations in the form of a *visual metaphor* and a *temporal diagram*, as shown in Figure 4.

As far as the experiment itself is concerned, its dramaturgy was as follows: The presenter gave an identical presentation three times, each time to a different segment (or one third) of the participants, and each time with a different support condition (slides/visual metaphor/temporal diagram). The presentation was conducted in the way that the visual support was projected on a large screen (3 × 2 m), and the presenter was explaining the strategy orally while referring to the visual support. The presenter was instructed to do the same presentation each of the three times in terms of enthusiasm, eye contact, and emotion. In addition, there was a person in the back of the room checking for consistency among the three conditions. We thought about recording the presentation beforehand on video and showing it this way, but this would have changed the entire setup and would have negatively affected the study's real-life setting, as well as the legibility of the slides. The audience did not receive handouts. There was only one visual stimulus for each group and the presentation was done in person by the presenter. The content was presented in identical order for all three conditions. Directly after the presentation a questionnaire, as shown in Appendix A, was handed out through which attention, comprehension, agreement, perception of the visualization, and the perception of the presenter were measured. After a one-hour distraction task,

in which subjects were asked to work on an unrelated case study, a second questionnaire, as shown in Appendix B , was handed out to measure the recall or retention of the strategy by the participants. We used one hour between the presentation and the recall test since other psychological recall tests have also used one hour (Shepherd & Ellis, 1973). In addition, the following variables were fixed and remained unchanged from one condition to the next: the presenter (identical person, dress, presentation style, intonation, body language, etc.), the environment (consistent lighting, screen size, screen placement), and the presentation duration (approximately 7 minutes). The duration of the presentation was chosen since it is realistic for a strategy presentation and allowed the presenter to explain terms and meanings of statements and give illustrative examples. This was the same for each of the three conditions. The presenter was chosen since he was familiar with the content of the strategy. The presenter of the strategy was also the lecturer of the MBA class, and therefore biases might exit regarding the perception of the presenter. Furthermore, the following variables were measured as covariates or control variables: subject background information, legibility, and an individual difference on a verbalizer-visualizer dimension of cognitive style, all of these with existing, prevalidated scales. Legibility is the extent to which the participants were able to see the slides due to their position in the room and the lighting conditions. We allocated seats for participants in the middle of the room in front of the projected visual stimuli to ensure that legibility was optimal and the same for all participants. In addition, we assessed the legibility through the first questionnaire, where it was explicitly addressed through a question.

The questions about the verbalizer-visualizer dimension of cognitive style measure the individual differences in habitual modes of processing cognitive events (Richardson, 1977). These items were included in the survey to test whether the visual presentation mode appealed more to people with a visual cognitive style than to verbalizers (which was not the case). The main results of the experimental follow-up surveys are presented in the next section.

## Results

In this section we examine the effects of the three conditions on the audience and report on our corresponding statistical analyses. The descriptive statistics of the sample for each condition show that the age and work experience of the subjects differ within a range of plus or minus one year from the total mean. For the level of strategy experience and subjects' English skills, the mean values differ only by plus or minus 0.1 for each condition compared to the total mean shown in Table 1.

Table 2 shows the means and standard deviations for each of the three conditions and the dependent variables attention, agreement, comprehension, and attention. The results show a clear pattern and *superiority of both visualizations for attention, agreement, and retention compared to the bulleted lists*. However, for the measurement of comprehension, the temporal diagram is slightly superior compared to bulleted lists, while the visual metaphor is for the only time the worst among the three conditions.

**Table 1.** Descriptive Statistics (Means and Standard Deviation) of the Sample.

| | Subjects' age (*M*) | Subjects' work experience (*M*) | Subjects' strategy experience (*M*) | Subjects' English skills (*M*) |
|---|---|---|---|---|
| Bulleted list | 35.0 | 9.6 | 3.1 | 4.1 |
| Visual metaphor | 34.3 | 9.8 | 3.1 | 4.1 |
| Temporal diagram | 35.7 | 12.3 | 3.0 | 4.0 |
| Total | 35.0 (*SD* = 5.4) | 10.6 (*SD* = 4.8) | 3.1 (*SD* = 0.9) | 4.1 (*SD* = 0.5) |

**Table 2.** Descriptive Statistics for Each Independent Variable.

| | Attention | | Agreement | | Comprehension | | Retention | |
|---|---|---|---|---|---|---|---|---|
| | *M* | *SD* | *M* | *SD* | *M* | *SD* | *M* | *SD* |
| Bulleted list | 3.2 | 0.9 | 2.9 | 0.8 | 1.3 | 0.7 | 6.2 | 2.5 |
| Visual metaphor | 4.0 | 0.8 | 3.4 | 0.6 | 0.9 | 0.7 | 8.0 | 2.6 |
| Temporal diagram | 4.6 | 0.7 | 3.5 | 0.9 | 1.4 | 0.7 | 7.9 | 3.3 |

**Table 3.** ANOVA Results for each Dependent Variable.

| Dependent variable | *F* (significance) | Outcome | Significance (two-tailed) |
|---|---|---|---|
| Attention | 17.6 (.0) | Visualizations ↔ control | .000** |
| Agreement | 3.1 (.5) | Visualizations ↔ control | .016* |
| Comprehension | 4.2 (.0) | Visualizations ↔ control | .306 |
| Retention | 2.9 (.1) | Visualizations ↔ control | .019* |

* $p < .05$ ** $p < .001$.

An ANOVA was conducted in order to find out whether the identified differences were of significance and of which level of significance. The results of the ANOVA displayed in Table 3 show significant differences between the visualization methods and the bullet point list method for attention, agreement, and retention. This ANOVA revealed a significant effect on attention ($p \leq .01$), agreement ($p \leq .05$), and retention ($p \leq .05$).

For comprehension, the difference between the two visualization methods and the bullet point list version is not significant, which was due to the fact that the measurement of comprehension was conducted through two multiple-choice questions only, one of which could have been answered without seeing the presentation. The overview of the results is shown in Table 4.

## *Control Variables*

The purpose of the control or covariate analysis is to account for the correlation of the control variables on the four dependent variables as well as on the two dependent

**Table 4.** Overview of the Results for the Dependent Variables Attention, Agreement, Comprehension, and Retention in Terms of Visualization Support Versus Bulleted List Support.

| | Bulleted list | | Visual metaphor | | Temporal diagram | | Visuals vs. bulleted list |
|---|---|---|---|---|---|---|---|
| | M | SD | M | SD | M | SD | ANOVA |
| Attention | 3.2 | 0.9 | 4.0 | 0.8 | 4.6 | 0.7 | .000 |
| Agreement | 2.9 | 0.8 | 3.4 | 0.6 | 3.5 | 0.9 | .016 |
| Comprehension | 1.3 | 0.7 | 0.9 | 0.7 | 1.4 | 0.7 | .306 |
| Retention | 6.2 | 2.5 | 8.0 | 2.6 | 7.9 | 3.3 | .019 |

variables of the additional explorative research. The analysis of the correlation was conducted by applying mediated regression analysis for those control variables that are scales and independent *t* tests for the nominal control variables. Overall, there is every reason to assume that the results reported represent valid statements

## *Measurement of the Perception of the Visual and the Perception of the Presenter*

The reason for measuring the perception of the visual itself and of the presenter is twofold: First, from a theoretical perspective, prior research indicates that the use of a visualization compared to no use of visualization in a speech positively influences the perception of the presenter by his or her audience. This was shown in the Wharton study and has been replicated (Oppenheim, Kydd, Carroll, & Carroll, 1981; Vogel, 1986). Second, from a practical point of view, the application of the visual metaphor in reality for the strategy communication of the financial services branch of an international car manufacturer has led to a positive perception of the visual among the staff of the company, but was not measured quantitatively and is based on only anecdotal subjective feedback from employees given to us over the course of several months (while conducting research in the organization).

The perception of the presenter and perception of the visual explorative dependent variables have both been measured based on eight semantic differentials items. These items have been selected out of a scale consisting of 11 items that has been previously used to measure the perception of the presenter (Oppenheim et al., 1981; Vogel, 1986). To check the validity of the scale consisting of only eight items, we conducted a factor analysis, which resulted in very acceptable and high factor loadings. The reliability was measured with Cronbach's alpha. Cronbach's alpha for the perception of the presenter was .930 and for the perception of the visual was .943. Both values were highest with all eight measures included; both values are far above the threshold of .8. Therefore, the total score for the perception of the presenter as well as for the perception of the visual was used rather than each item separately.

Based on the total averages, the descriptive statistics for the perception of the presenter and the perception of the visual are shown in Table 5. The ANOVA analysis was done with the same contrasts as for the measurement of the four dependent variables

**Table 5.** Descriptive Statistics for the Explorative Research on Perception of Presenter and Format.

| | Perception of presenter | | Perception of visual | |
|---|---|---|---|---|
| | *M* | *SD* | *M* | *SD* |
| Bulleted list | 4.3 | 1.2 | 3.8 | 1.2 |
| Visual metaphor | 5.3 | 0.9 | 5.2 | 0.9 |
| Temporal diagram | 5.7 | 1.1 | 5.7 | 1.1 |

attention, agreement, comprehension, and retention. The results in Table 6 show that the perception of the presenter is significantly *better* when the visualizations are used compared to when the condition with text only in the form of bulleted lists is used. This is true for both visualization conditions aggregated compared to the bullet point list condition. The same is true for the perception of the visuals. The perception of the display is significantly *better* when the visualizations are used, compared to the text-only bulleted list. This is true for both visualizations aggregated compared to the bullet point list condition.

The results for both the perception of the presenter and for the perception of the visual show a high level of significance. The presenter is held constant for all three conditions, while the researchers manipulated the visual support material, as the independent variable. Since the results indicate that the perception of the presenter is evidently dependent on the display condition, the question remains if the perception of the visual indirectly also affects the perception of the presenter. A Pearson correlation analysis was conducted to find out whether this correlation between the perception of the visual and the perception of the presenter exists. If this correlation is significant, a linear regression would be conducted. The result of the Pearson correlation analysis shown in Table 7 indicates that there is indeed a significant correlation ($p \leq .001$)

**Table 6.** ANOVA Results for the Part Explorative of the Research on Perception of Presenter and Visual.

| Dependent variable | *F* (significance) | Outcome | Significance (two-tailed) |
|---|---|---|---|
| Perception of presenter | 9.9 (.000) | Visualizations ↔ bullet point list | .000** |
| Perception of visual | 20.5 (.000) | Visualizations ↔ bullet point list | .000** |

** $p < .001$.

**Table 7.** Correlation Between Perception of Visual and Perception of Presenter.

| | | Perception of visual |
|---|---|---|
| Perception of presenter | Pearson correlation | .829** |
| | Significance (two-tailed) | .000 |

** $p < .001$.

between the perception of the presenter and the perception of the visual. In order to find out if the influence of the perception of the visual on the perception of the presenter was significant, and at which level, a linear regression was conducted. In this linear regression, the perception of the visual is the independent variable while the perception of the presenter is the dependent variable. The results of the linear regression are shown in Table 7. The results of the linear regression show an $R^2$ of .687 and an $F$ of 156.001, at a significance level of $p \leq .001$. This means that the perception of the visual can account for 68.7% of the variation in the perception of the presenter. Furthermore, there is less than a 0.1% chance that an $F$-ratio this large would happen by chance alone. Therefore, we have statistical evidence that the *perception of the visual is a very good and strong predictor of the perception of the presenter*.

## Conclusion

Strategy implementation is important for organizations since even a well-formulated strategy fails to achieve superior performance if it is not implemented. At the same time, the implementation of strategies is problematic due to the potential lack of attention, comprehension, agreement, and retention for the strategy content among employees and managers. Strategy communication is promising in overcoming these problems, but there is a lack of research on *how* to (re)present strategies effectively. Bulleted lists are mostly used because of their availability, but their effects are unclear. Visualization provides promising methods for improving strategy communication. However, the measurement of such methods was so far limited to anecdotal and qualitative feedback and there was a lack of empirical evidence on their merits. Hence, the aim of this study was to answer the research question of if the use of visualization, either a temporal diagram or a visual metaphor, is better than text in the communication of a business strategy—in terms of impact on the audience. To answer this question, the study provided empirical evidence through an experiment in which a realistic strategy of a financial services branch of an international car manufacturer was presented to experienced managers enrolled in an executive MBA program. The display of the strategy was manipulated by the researcher into text displayed through a bulleted list and two visualization methods which were a visual metaphor and a temporal diagram. The resulting effects were measured in terms of attention, comprehension, agreement, and retention. *The results of this study show that visualization was significantly better than text in terms of the achieved attention, agreement, and retention*. This implies that the use of visualization (i.e., spatially mapping the strategy content instead of merely listing it) has the potential to be better than bulleted text in the live presentation of business strategies, at least to middle managers (the participants present at the experiment) in Europe. Since the experiment took place in an executive MBA course setting, the results show that temporal diagrams and visual metaphors can also be used as powerful pedagogical tools. In fact, visual metaphors help to reach deeper thoughts and meaning of organization members in management development (Bento & Nilsson, 2009).

The fact that this research was not able to demonstrate significant differences between visualization and text in terms of comprehension and the lack of thorough

testing of comprehension is a major weakness of this study but should not be taken as an indication that no differences exist, but rather that the creation of the visuals and the measurement of comprehension need to be better understood and improved in future applications (e.g., future studies should conduct a major interrogation of comprehension with more than just two test questions). A future study should also test the long-term retention of the material presented (e.g., quiz them a week later).

With the additional explorative analysis we intended to measure the perception of the presenter and the perception of the visual. The results of this analysis show a superiority of visualization compared to text with regard to perception by the audience. *The perception of the presenter and the perception of the visual were significantly better when visualization was used compared to plain text slides*. Although we have used established semantic differentials, we acknowledge that they are not used optimally, as some items have problems with wording and are not anchored with semantically opposite words or do not have equally spaced concepts. As a more detailed finding regarding impression management, we found that the perception of the visuals accounts for more than two thirds of the perception of the presenter. These findings suggest that by using diagrams and visual metaphors instead of just text, the perception of the presenter by his or her audience can be improved. This research is the first known empirical test of different visualization methods to communicate a realistic strategy in an experimental setting, and this serves as an important addition to previous work within the field of strategy implementation, communication, and visualization. Nevertheless, there are limitations to this study, such as the relatively homogenous audience, consisting of mostly middle managers enrolled in an executive MBA program. Another limitation can be found in the fact that the presenter was also the course teacher, which could slightly bias the audience (although probably equally in each condition).

The creation of the three conditions and the use of color were not the focal point of this study. Hence, we did not use extensive design guidelines for the creation since the focus of this study was on the evaluation. In the future, however, we will collaborate with designers to eliminate these potentially distracting issues and increase the real-life appeal of the material used.

A final limitation that should be overcome in future studies concerns the strategy itself that was communicated during the experiment—the strategy of the financial services branch of an international car manufacturer. This strategy content may be overly industry-specific and at times difficult to understand for managers from other industries.

Future studies should thus extrapolate our findings by using different (and heterogeneous) audiences, different presenters (having differing presentations skills), and varied (functional, business and corporate) strategies. Such future studies could also examine the potential negative effects of visuals in the communication of strategies, such as the illusion of understanding or the question of how sustainable the achieved effects on the audience really are.

In spite of these limitations, the merit of this study is to show the benefits of the graphic rendering of a business strategy for communication purposes, and this in a setting that is at the same time close to reality (using a real strategy and real managers) and methodologically rigorous (through a controlled environment and statistical analysis).

## Appendix A.

*Questionnaire (issued immediately after the presentation).*

Please answer the following questions on the basis of what was stated or implied in the presentation.

1. Would you please rate your impression of the presenter on the following attributes:

| | | | | | | |
|---|---|---|---|---|---|---|
| Unprepared | | | | | | Well prepared |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Wordy | | | | | | Concise |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Confusing | | | | | | Clear |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Unpersuasive | | | | | | Persuasive |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Neutral | | | | | | Committed |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Not credible | | | | | | Highly credible |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Boring | | | | | | Interesting |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Weak | | | | | | Strong |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

2. Would you please rate your impression of the presentation support/visuals on the following attributes:

| | | | | | | |
|---|---|---|---|---|---|---|
| Unprepared | | | | | | Well prepared |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Wordy | | | | | | Concise |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Unprofessional | | | | | | Professional |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Confusing | | | | | | Clear |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Unpersuasive | | | | | | Persuasive |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Boring | | | | | | Interesting |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Weak | | | | | | Strong |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Unattractive | | | | | | Attractive |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

*(continued)*

## Appendix A. (continued)

3. What is the degree to which you focused your attention on the presentation as a whole as it was given?

| Never | Occasionally | Fairly often | Very often | Always |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

4. To what extent do you think this is a consistent strategy?

| None | Very little | Somewhat | Quite a bit | Completely |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

5. To what extent do you think the sub goals are in line with the major goal?

| None | Very little | Somewhat | Quite a bit | Completely |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

6. Which of the sub goals only indirectly supports the major goal?

Triple profit in diversified business
Sustain profitable growth in mature business areas
Improve productivity and risk management

7. Which of the sub goals implies the most risk?

Triple profit in diversified business
Sustain profitable growth in mature business areas
Improve productivity and risk management

8. How well do you feel you have understood the strategy?

| Not at all | Very little | Somewhat | Quite a bit | Completely |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

9. How well do you feel you can remember the strategy?

| Not at all | Very little | Somewhat | Quite a bit | Completely |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

*(continued)*

## Appendix A. (continued)

10. To which extent would you support the strategy presented?

| Not at all | Very little | Somewhat | Quite a bit | Completely |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

11. To which extent would you say that the strategy presented is of high quality?

| Not at all | Very little | Somewhat | Quite a bit | Completely |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

12. How would you rate the legibility (the degree to which you could see and read) the presentation support (visual aids)?

| Very poor | Poor | OK | Good | Very good |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

13. Do you have any comments on the presentation?

Please circle either TRUE (T) or FALSE (F) for the following questions

T F 1. I enjoy doing work that requires the use of words.
T F 2. My daydreams are sometimes so vivid that I feel as though I actually experience the scene.
T F 3. I enjoy learning new words.
T F 4. I can easily think of synonyms for words.
T F 5. My powers of imagination are higher than average
T F 6. I seldom dream.
T F 7. I read rather slowly.
T F 8. I cannot generate a mental picture of a friend's face when I close my eyes.
T F 9. I don't believe that anyone can think in terms of mental pictures.
T F 10. I prefer to read instructions about how to do something rather than have someone show me.
T F 11. My daydreams are extremely vivid.
T F 12. I have better than average fluency in using words.
T F 13. My daydreams are rather instinct and unclear.
T F 14. I spend very little time attempting to increase my vocabulary.
T F 15. My thinking consists of mental pictures or images.

*(continued)*

## Appendix A. (continued)

15. What is your name?

16. What is your age?

17. Sex: Male Female (Circle one)

18. What is your profession?

Employed with _____ years of experience

Student

Other, please indicate _____

19. How would you rate your English language skills?

| Beginner | Novice | Moderate | Advanced | Expert |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

20. Please indicate to which extent you have had experiences or knowledge regarding business strategies:

| None | Very little | Some | Quite a bit | A lot |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

Final remark:

Please do not discuss any aspect of this presentation with your fellow students until the end of the lecture. We want to get a fresh impression from everyone. Prior discussion may lead to possible distortions of the data. Thank you for your participation and cooperation.

## Appendix B.

*Questionnaire (given after a one hour distraction task).*

Please answer the following questions on the basis of what was stated or implied in the presentation.

1 What is the major goal of the strategy?

2 How many sub-goals exist?

3 Please indicate the sub-goals of the strategy:

4 Please indicate the sub-elements for each sub-goal:

5 Please name the success factors for the strategy:

6 Can you please indicate the major barrier of the strategy:

7 Please write down the strategy in your own words:

8 What is your name?

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