

# Updating the Behavior Engineering Model

by Roger Chevalier, CPT

It never ceases to amaze me to see the latest cause analysis model that borrows extensively from the work of Thomas Gilbert without giving him the credit he deserves. Sometimes a new category is added, typically there are some new descriptions, and perhaps even a dash of color, but somehow they forget to acknowledge the body of work they have built on.

Sir Isaac Newton said it best: “If I can see much farther, it’s because I am standing on the shoulders of giants.” We should remember to credit the contributions of those who came before us.

The Behavior Engineering Model (BEM) developed by Gilbert and presented in his landmark book, *Human Competence: Engineering Worthy Performance* (Gilbert, 1978), provides us with a way to systematically and systemically identify barriers to individual and organizational performance. The BEM distinguishes between a person’s repertory of behavior (what the individual brings to the performance equation) and the environmental supports (the work environment factors that encourage or impede performance).

	<b>Information</b>	<b>Instrumentation</b>	<b>Motivation</b>
<b>Environmental Supports</b>	<i>Data</i> <ul style="list-style-type: none"> <li>• Relevant and frequent feedback about the adequacy of performance</li> <li>• Descriptions of what is expected of performance</li> <li>• Clear and relevant guides to adequate performance</li> </ul>	<i>Resources</i> <ul style="list-style-type: none"> <li>• Tools and materials of work designed scientifically to match human factors</li> </ul>	<i>Incentives</i> <ul style="list-style-type: none"> <li>• Adequate financial incentives made contingent on performance</li> <li>• Nonmonetary incentives</li> <li>• Career-development opportunities</li> </ul>
<b>Person’s Repertory of Behavior</b>	<i>Knowledge</i> <ul style="list-style-type: none"> <li>• Systematically designed training that matches the requirements of exemplary performance</li> <li>• Placement</li> </ul>	<i>Capacity</i> <ul style="list-style-type: none"> <li>• Flexible scheduling of performance to match peak capacity</li> <li>• Prosthesis</li> <li>• Physical shaping</li> <li>• Adaptation</li> <li>• Selection</li> </ul>	<i>Motives</i> <ul style="list-style-type: none"> <li>• Assessment of people’s motives to work</li> <li>• Recruitment of people to match the realities of the situation</li> </ul>

Figure 1. Behavior Engineering Model (Source: Gilbert, 1978, p. 88).

<b>Environment</b>	1. Information	2. Resources	3. Incentives
<b>Individual</b>	6. Knowledge	5. Capacity	4. Motives

Figure 2. Updated Behavior Engineering Model Cells.

## An Updated Model

In presenting the model as shown in Figure 1, we have learned a lot from our students that led us to update the model. Our work in presenting our program in house at one high-tech company gave us insight into ways in which the model could be made more comprehensive as well as scalable from the individual to the organization itself.

Figure 2 shows how we have adapted some of the terms used by Gilbert to reflect the way we typically speak about performance; in the figure they are numbered to identify the order in which the causes are identified and remedied.

## Using the Updated Model

As was the case for the original BEM, the updated model as shown in Figure 3 focuses our attention on the distinction between environmental and individual factors that affect performance. Environmental factors are the starting point for analysis because they pose the greatest barriers to exemplary performance. When the environmental supports are strong, individuals are better able to do what is expected of them. We look to environmental causes first because, in the words of Geary Rummler and Alan Brache, "If you pit a good performer against a bad system, the system will win almost every time" (Rummler & Brache, 1995, p. 13).

<b>*Environment</b>	<b>Information</b> <ul style="list-style-type: none"> <li>Roles and performance expectations are clearly defined; employees are given relevant and frequent feedback about the adequacy of performance.</li> <li>Clear and relevant guides are used to describe the work process.</li> <li>The performance management system guides employee performance and development.</li> </ul>	<b>Resources</b> <ul style="list-style-type: none"> <li>Materials, tools, and time needed to do the job are present.</li> <li>Processes and procedures are clearly defined and enhance individual performance if followed.</li> <li>Overall physical and psychological work environment contributes to improved performance; work conditions are safe, clean, organized, and conducive to performance.</li> </ul>	<b>Incentives</b> <ul style="list-style-type: none"> <li>Financial and non-financial incentives are present; measurement and reward systems reinforce positive performance.</li> <li>Jobs are enriched to allow for fulfillment of employee needs.</li> <li>Overall work environment is positive, where employees believe they have an opportunity to succeed; career development opportunities are present.</li> </ul>
<b>Individual</b>	<b>Knowledge/Skills</b> <ul style="list-style-type: none"> <li>Employees have the necessary knowledge, experience, and skills to do the desired behaviors.</li> <li>Employees with the necessary knowledge, experience, and skills are properly placed to use and share what they know.</li> <li>Employees are cross-trained to understand each other's roles.</li> </ul>	<b>Capacity</b> <ul style="list-style-type: none"> <li>Employees have the capacity to learn and do what is needed to perform successfully.</li> <li>Employees are recruited and selected to match the realities of the work situation.</li> <li>Employees are free of emotional limitations that would interfere with their performance.</li> </ul>	<b>Motives</b> <ul style="list-style-type: none"> <li>Motives of employees are aligned with the work and the work environment.</li> <li>Employees desire to perform the required jobs.</li> <li>Employees are recruited and selected to match the realities of the work situation.</li> </ul>

\*We have adapted the BEM to provide a more efficient method for troubleshooting performance and for discovering the most important opportunities for improving individual performance. Like the original model, the updated model shown here serves as a diagnostic tool for troubleshooting performance problems. It is important to remember that cause analysis does not direct us to the best solutions for correcting the problem, but rather provides a framework for discovering underlying causes.

Figure 3. Updated Behavior Engineering Model (Adapted from Gilbert, 1978, p. 88).

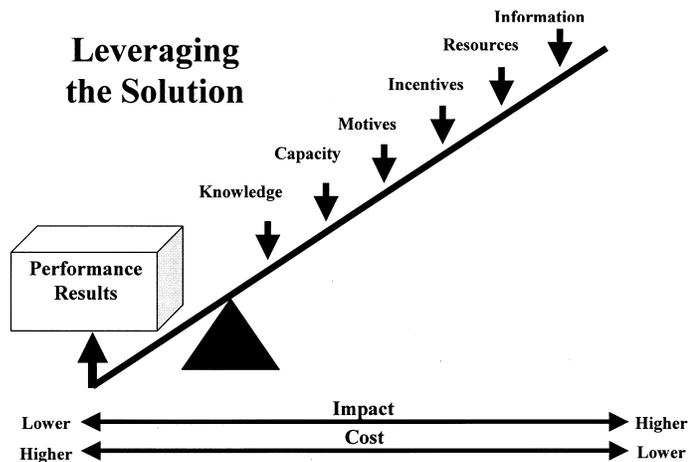


Figure 4. Leveraging the Solution (Adapted from ISPI, 2001, p. 6.3).

The support given by the work environment is divided into three factors that influence performance: information, resources, and incentives. Information includes communicating clear expectations, providing the necessary guides to do the work, and giving timely, behaviorally specific feedback. Resources include ensuring that the proper materials, tools, time, and processes are present to accomplish the task. Incentives ensure that the appropriate financial and nonfinancial incentives are present to encourage performance. These apply to the worker, the work, and the workplace.

Individuals bring to the job their motives, capacity, knowledge, and skills. Individual motives should be aligned with the work environment so that employees have a desire to work and excel. Capacity refers to whether the worker is able to learn and do what is necessary to be successful on the job. The final factor refers to whether the individual has the knowledge and skills necessary to do a specific task.

The model gives us the structure we need to assess each of the six factors—information, resources, incentives, motives, capacity, and knowledge and skills—that affect individual and group performance on the job. We should review these factors in the order described in Figure 2, since the environmental factors are easier to improve and have a greater impact on individual and group performance. It would also be difficult to assess whether the individual has the right motives, capacity, and knowledge and skills to do the job if the environmental factors of information, resources, and incentives are not sufficiently present.

We will leverage our solutions based on the potential impact that a change would make and the cost associated with that change as illustrated in Figure 4. In leveraging the solution, we can improve performance by addressing the information present in the work environment; we can do this by communicating clear expectations, providing the necessary guides to do the work, and giving timely, behaviorally specific feedback. This can be

done at relatively low cost and has a great impact on performance. Similarly, we can address shortfalls in the resources necessary to do the job by ensuring that the proper materials, tools, time, and processes are present. This is also relatively inexpensive and has a great influence on performance. We can see that if we work at the knowledge level of the individual, the solution will be expensive and does not have the impact that we get when dealing with the environmental issues.

### Cause Analysis Worksheet

Conducting a thorough cause analysis will help better define the reasons why a gap in performance exists. The starting point with the Cause Analysis Worksheet is identifying the individual's or organization's present level of performance and the desired level of performance. The difference between where the organization or individual is and where they want to be is the performance gap. Another useful step is to identify a reasonable goal, something that can be accomplished in a short time that moves the organization in the direction toward where it wants to be. This should be defined clearly with measures of quality, quantity, time, and cost delineated.

We next assess the impact of the environmental factors and then move to the individual factors in the order described in Figure 2. Environmental factors such as information, resources, and incentives are usually cheaper to fix than individual factors. Motives, capacity, and knowledge are more costly to address and require greater effort. Even if we were to successfully change the individual factors, performance would most likely not improve if environmental factors remained unresolved.

The process begins by asking questions to identify how each of these factors affects the performance gap. Developed by Kurt Lewin, force field analysis provides a methodology for identifying and weighting the relative strength of the factors that contribute to the present level of performance (Lewin, 1947).

Driving forces are those factors that are already working to close the gap between the present and desired level of performance. These are identified and evaluated as to their relative strength on a +1 to +4 scale. Restraining forces are those factors that work against us as we try to close the gap between the present level and the desired level of performance. These are identified and evaluated as to their relative strength on a -1 to -4 scale. To graphically depict the forces, we use opposing arrows for the driving and restraining forces (see Figure 5).

Figure 6 depicts a one-page worksheet that brings gap analysis, cause analysis, and force field analysis into a useful performance aid. Whether we are working with an individual or a group, the worksheet gives the needed structure to guide questions as we identify the driving and restraining

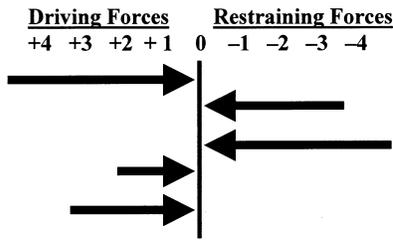


Figure 5. Force Field Analysis.

forces. When the worksheet is complete, we have a picture of the performance gap and the factors working for and against us in trying to close that gap.

### Case Study: Identifying the Causes

The following performance improvement intervention started the way most do, with a request for training. The company provided software products and services for very large financial organizations and government agencies. It recently decided to develop products and services for medium-size financial institutions and formed a sales team to bring these products to market.

While the sales manager was looking for training to enhance the selling skills of his sales team, he was open to a broader solution to build systems that would systematically track and continuously improve employees' performance. Not only would the solution have to contain selling and sales management systems to support the training the sales team got, but it would have to bridge the gap between the sales team and the customer service people in another division.

The sales manager had joined the company two months ago. While he had some experience with the products and services offered by the company, he had little sales experience. He was very enthusiastic about the new products and services, as his previous employer had purchased the new product three months before. He saw the potential of the product and wanted to be a part of the team that would bring it to market. He sold his interest in his former business to his partners and re-invested the

money to become a partner in the new company as well as the sales manager.

In an interview with the sales manager, the following information was revealed:

- The six salespeople hired had a wide range of sales experience and knowledge of the products and services being offered. Two of them had been involved in the product's development but knew little about sales. Two of them had excellent track records in selling software and technical products but knew little about the new products and services being offered. Another had some experience with the products and services and some sales experience. The last member of the sales team had some experience in real estate sales.

Present Level of Performance: \_\_\_\_\_

Desired Level of Performance: \_\_\_\_\_

Reasonable Goal: \_\_\_\_\_

Factors	Driving Forces				0	Restraining Forces			
	+4	+3	+2	+1		-1	-2	-3	-4
<b>Information</b>									
clear expectations	.	.	.	.		.	.	.	.
relevant feedback	.	.	.	.		.	.	.	.
relevant guides	.	.	.	.		.	.	.	.
performance mgmt system	.	.	.	.		.	.	.	.
<b>Resources</b>									
materials/tools	.	.	.	.		.	.	.	.
time	.	.	.	.		.	.	.	.
clear processes/procedures	.	.	.	.		.	.	.	.
safe/organized environment	.	.	.	.		.	.	.	.
<b>Incentives</b>									
financial	.	.	.	.		.	.	.	.
other incentives	.	.	.	.		.	.	.	.
enriched jobs	.	.	.	.		.	.	.	.
positive work environment	.	.	.	.		.	.	.	.
<b>Motives</b>									
motives aligned with work	.	.	.	.		.	.	.	.
employees desire to perform	.	.	.	.		.	.	.	.
expectations are realistic	.	.	.	.		.	.	.	.
recruit/select the right people	.	.	.	.		.	.	.	.
<b>Capacity</b>									
capacity to learn	.	.	.	.		.	.	.	.
capacity to do what is needed	.	.	.	.		.	.	.	.
recruit/select right people	.	.	.	.		.	.	.	.
emotional limitations	.	.	.	.		.	.	.	.
<b>Knowledge/Skills</b>									
necessary knowledge	.	.	.	.		.	.	.	.
necessary skills	.	.	.	.		.	.	.	.
proper placement	.	.	.	.		.	.	.	.
cross trained	.	.	.	.		.	.	.	.

Figure 6. Cause Analysis Worksheet.

- The sales manager had tried cross-training the salespeople by sending them out together on sales calls in which he would try to match people with different backgrounds. He would also go on calls with each salesperson to observe and provide feedback. He was not happy with the results and felt he was running out of time. The company had not made a sale since the CEO had made the deal with his former company.
- The sales manager indicated that the group had three months with which to obtain one sale per salesperson; this would allow the company to break even and provide each salesperson a living wage. Salespeople had a base salary and worked on commission; they were taking advances against future commissions.
- The software product was very expensive, more than \$100,000. Additionally, customers paid about \$5,000 a month for related services. While the sales manager's old company had the software in place for only two months, the increased profits would pay off the initial investment in six months and then start producing a substantial profit from that point on.
- There were no tracking systems in place to manage the leads obtained from three sources: current customers, large financial institutions that referred smaller companies to them; trade shows; and government reports that would identify and qualify potential customers. Each salesperson followed up on leads, but there was no overall tracking system in place.
- The selling process was not defined. Since the only sale was unique, with the CEO selling the product and service to an old friend, there was no model of the selling process that could be followed.
- The best leads were generated by the large financial institutions, which invited their customers to sales presentations. What had

been discovered is that only one of the decisionmakers needed for the sale would typically attend. The salespeople needed to reach company CEOs, CFOs, and IT managers for a sale to be approved. Each of these individuals had different information needs to make their part of the decision.

- Interviews with the salespeople indicated that they were aware of the goal of one sale per salesperson in three months. They were becoming concerned about making the goal. They were well equipped with laptop computers and demo programs but lacked a structured way to approach the selling process and analyze their progress with prospects. They received feedback from

### Cause Analysis Worksheet

**Present Level of Performance:** *A sales group of mixed readiness levels, with an inexperienced sales manager, in danger of floundering.*

**Desired Level of Performance:** *A trained, confident, productive and continuously improving sales team*

**Reasonable Goal:** *One sale per sales person per month in three months*

Factors	Driving Forces					Restraining Forces				
	+4	+3	+2	+1	0	-1	-2	-3	-4	
<b>Information</b>										
clear expectations	.	.	.	.		←	←	←	←	.
relevant feedback	.	.	.	.		←	←	←	←	.
relevant guides	.	.	.	.		←	←	←	←	.
performance mgmt system	.	.	.	.		←	←	←	←	.
<b>Resources</b>										
materials/tools	.	.	.	.	→					.
time	.	.	.	.	→	←	←	←	←	.
clear processes/procedures	.	.	.	.		←	←	←	←	.
safe/organized environment	.	.	.	.	→					.
<b>Incentives</b>										
financial	.	.	.	.	→					.
other incentives	.	.	.	.	→	←	←	←	←	.
enriched jobs	.	.	.	.	→					.
positive work environment	.	.	.	.	→					.
<b>Motives</b>										
motives aligned with work	.	.	.	.	→					.
employees desire to perform	.	.	.	.	→					.
expectations are realistic	.	.	.	.		←	←	←	←	.
recruit/select right people	.	.	.	.	→					.
<b>Capacity</b>										
capacity to learn	.	.	.	.	→					.
capacity to do what is needed	.	.	.	.	→					.
recruit/select right people	.	.	.	.	→					.
emotional limitations	.	.	.	.	→					.
<b>Knowledge</b>										
necessary knowledge	.	.	.	.		←	←	←	←	.
necessary skills	.	.	.	.		←	←	←	←	.
proper placement	.	.	.	.	→					.
cross trained	.	.	.	.		←	←	←	←	.

Figure 7. Completed Cause Analysis Worksheet.

each other and when the sales manager went on a sales call with them. While they liked the sales manager and the job itself, they were becoming discouraged.

- The salespeople were a very mixed group. While the team together had what it needed to be successful, each individual was lacking some knowledge and skills necessary to be successful. Guidance was limited at best and feedback from their prospects was nonexistent. Everyone wanted to do a good job and appeared to be highly motivated but did not know what it would take to be successful. There was no performance management system in place to clearly define the activities needed to be successful.
- Because of the time constraints, the intervention would have to be designed and implemented within two weeks.

The Cause Analysis Worksheet was used to guide the gathering of information and to display the overall picture. It combines gap analysis, cause analysis, and force field analysis to develop a graphic depiction of the situation and the forces affecting it. Figure 7 on page 12 is a completed Cause Analysis Worksheet that displays the information from the case study.

Once this picture of the performance gap and the factors working for and against closing the gap was developed, the strategy for closing the gap became one of adding to or strengthening driving forces and minimizing or removing restraining forces.

### **What Really Happened**

As a result of the systematic cause analysis with the sales manager and his salespeople, everyone involved could see that training was necessary, but only as part of a more comprehensive solution. The cause analysis was completed and reported in three days. The intervention was designed and developed during the following week.

The initial phase of the intervention included four hours of leadership and coaching training for the sales manager and the other managers associated with the customer service process. While the stated goal of the workshop was to deliver needed leadership skills to the various managers, the unstated goals included assessing their perceptions of what was needed, setting goals for the intervention, and building a team for these managers.

Since coaching sales and customer service are all applications of leadership, the training programs were designed around performance aids derived from Situational Leadership® (Hersey, Blanchard, & Johnson, 1996, pp. 188-256) to assist managers in the performance coaching process and employees in their sales and service roles. By capturing the parallel processes of coaching, sales, and service in three similar performance aids, the basis for creating an integrated system of sales management was established.

Sixteen hours of consultative sales and customer service training were delivered in a weekend workshop. A consultant provided the structure by presenting the various sales and customer service models; participants cross trained each other as they moved from the generic models to practical courses of action.

Two sales management systems were developed from the coaching and sales performance aids and the employee input given during the training programs. The systems focused on the means (how sales people were perceived by their clients) as well as the ends (how clients moved through the sales funnel to become customers).

## *The Cause Analysis Worksheet brings the concepts of gap analysis, cause analysis, and force field analysis together....*

A client and customer survey, derived from the sales performance guide, was developed to gather information from clients and customers regarding the selling process and the value of the products and services being offered. As soon as a lead was declared dead, a one-page survey was sent to the failed prospect. A more comprehensive two-page survey was sent to customers after the purchase was made, the software installed, and the first month of service provided.

When the surveys were returned, a copy was immediately given to the salesperson. The sales manager's administrative assistant would analyze the feedback received for each sales person and prepare a monthly summary for the sales manager, who would then provide feedback on selling tendencies and ways for each salesperson to become more effective.

A parallel survey was developed to gather information every three months from the salespeople on the leadership they were receiving from the sales manager. The net effect was to develop an inter-related survey system for the systematic assessment and continuous improvement of the sales and coaching processes. Ongoing customer service surveys were later developed to bring that division under the same system.

All sales managers have a difficult leadership task in that they do not routinely observe much of the work done by their salespeople. The client and customer survey results gave the sales manager information with which to coach the salespeople to improve their performance. Before the surveys, the

sales manager was limited to his own infrequent observations of performance; now he had direct feedback from clients and customers regarding the performance of each salesperson.

The client and salesperson feedback contained in the various surveys also served to identify specific knowledge and skill deficiencies in the sales team as a group. These were remedied with short training sessions held during the weekly sales meetings, presented by the sales manager, one of the salespeople, or the outside consultant.

## *Prescription without diagnosis is malpractice.*

Another element of the system was the creation of weekly sales meetings to reinforce the idea that the salespeople were members of a team rather than just individuals working on their own. Whenever possible, salespeople who were on the road phoned in to participate in the one-hour meeting. The agenda allowed salespeople to describe their progress and get credit for their victories by ringing a bell for each victory.

The sales meetings were designed to shape team performance by shaping group norms. While the emphasis was on assessing progress and reinforcing success in the selling process, the final part of the agenda allowed each member of the sales team to talk about what was happening in his or her personal life to further build esprit de corps. This team-building process was complemented by having salespeople attend various marketing programs to work together and with clients.

The combination of these interventions provided the needed training and built a basic sales management system that helped the fledgling sales team surpass all sales goals during the first two quarters following the training. The program also helped develop a strong foundation for future success. Bringing the customer service team under the same systematic assessment and continuous improvement survey system the following quarter helped to integrate the sales and customer service functions.

During the third month, the sales team made five sales, one less than was needed to meet the goal. After several conversations between the consultant and the sales manager, the decision was made to terminate the one salesperson who had not made any substantial contribution to any of the five

sales. They ended the third month with five sales for the five sales people.

## Conclusion

Gilbert's BEM has been a valuable tool for systematically identifying barriers to individual and organizational performance. With some updating and the addition of a performance aid to guide its use, we have a more clearly defined process for identifying the causes that contribute to a performance gap. The Cause Analysis Worksheet brings the concepts of gap analysis, cause analysis, and force field analysis together in a job aid that can serve as useful tool to guide the assessment process for performance improvement professionals. 🏠

## References

- Dean, P.J. (Ed.). (1999). *Performance engineering at work* (2nd ed.). Silver Spring, MD: International Society for Performance Improvement.
- Gilbert, T.F. (1978). *Human competence: Engineering worthy performance*. New York: McGraw-Hill.
- International Society for Performance Improvement. (2001). *Online institute: Principles & practices of human performance technology participant manual*. Silver Spring, MD: International Society for Performance Improvement.
- Hersey, P., Blanchard, K.H., & Johnson, D.E. (1996). *Management of organizational behavior: Utilizing human resources* (7th ed.). Upper Saddle River, NJ: Prentice Hall.
- Lewin, K. (1947). Frontiers in group dynamics: Concept, method, and reality in social science, equilibria and change. *Human Relations*, 1(1), 5-41.
- Rummler, G.A., & Brache, A.B. (1995). *Improving performance: How to manage the white space on the organization chart* (2nd ed.). San Francisco: Jossey-Bass.

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With more than 25 years' experience in performance improvement, Roger is a former Vice President of Century 21 Real Estate Corporation's Performance Division and a former training director for the U.S. Coast Guard's west coast training center. Roger earned a PhD in Applied Behavioral Science as well as two MS degrees in Personnel Management and Organizational Behavior. Roger may be reached at rogerc@ispi.org.