EXPERT SYSTEMS AND THEIR IMPACT ON THE FIRM: 
THE EFFECTS OF PLANPOWER USE ON THE INFORMATION-PROCESSING 
CAPACITY OF THE FINANCIAL COLLABORATIVE 
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ABSTRACT 

Expert Systems and Their Impact on The Firm: 
The Effects of PlanPower Use on The 
Information-Processing Capacity of the 
Financial Collaborative 

Expert Systems (ESs) have the potential to make competitive difference in industry, academic, and government, yet there is little knowledge of how to manage these complex software tools. New activity in the field is booming, as a result of civilian and government programs which are investing more time and money in ES development. Early initiatives, aided by improvements in computer hardware and software, have successfully created ESs to rival human experts within some narrow problem domains. 

The study is guided by the notions of organizational programs as defined by March and Simon, and the information-processing capacity of the firm, as defined by Galbraith, to organize, describe, and compare the effects of ES use across the site. 

It was clearly shown that, within the definition, the information-processing capacity of the PlanPower site did increase from pre-ES to post-ES. The interesting implication of the increased information processing capacity was that the firm (The Financial Collaborative) seemed to gobble up the capacity and create new issues and concerns. Instead of the task becoming more certain and more simple, as one might expect with increased information-processing capacity, the task mutated and the firm began to operate with a higher need for information-processing capacity. 

The ES seemed to increase the effectiveness and efficiency of the user firm. The price of the benefits was an increased rigidity in the task. In considering ESs, a manager should be concerned not only with the ES itself, but with the process by which the ES is adapted, and the overall process of creating and using the ES. In addition, the manager needs to consider the effects of the ES on the uncertainty associated with the task and should consciously manage that uncertainty to foster the level of adaptation necessary to keep the ES alive and viable in the organization. 

INTRODUCTION 

The Financial Collaborative (TFC) is a small, expertise-intensive and relationship-oriented financial planning firm whose ES is to serve individuals with incomes of six figures or more who also have a net worth of over $1,000,000. In late 1985, TFC's immediate needs centered on increasing its ability to write financial plans and to service clients better. TFC looked to PlanPower for help. PlanPower is an expert system which is designed to help financial planners create more accurate and comprehensive financial plans in less time. 

In this article, the term "expert systems" means software systems which address ill-structured problems, that is, those problems for which no exhaustive or optimal solution can be delivered successfully. Moreover, these systems mimic the problem-solving behavior of the expert. 

THE COMPANY SETTING 

PlanPower was created and is marketed by Applied Expert Systems of Cambridge, Massachusetts (APEX). The Financial Collaborative (TFC) uses PlanPower regularly to help provide its clients with financial-planning services and products. 

There had been a close relationship between the APEX and TFC—a connection largely forged by Jim Joslin. Joslin was one of five co-founders of TFC in 1980 and, in 1983, was a co-founder of APEX. He was one of the core experts consulted in the development of the PlanPower concept and knowledge base. APEX looked to TFC as an example of a firm which created excellent plans. Many of the planning assumptions and much of the planning philosophy in PlanPower were similar to TFC's approach. The earliest beta-site for the software and its first successful implementation was also at TFC. In order to understand how and why PlanPower is used at TFC, it is helpful to know the goals, organization, and business of both firms.
APEX

APEX was founded to apply AI techniques to business opportunities in the financial-services industry. Dr. Fred Lucioni, a PhD from the Massachusetts Institute of Technology in computer science and one of the company's founders, brought fifteen years experience with INDEX systems--a provider of information systems consulting and decision support software--to the new company. Other people involved in the company included Dr. Randy Davis, a professor at MIT's Sloan School of Management, and Richard Karash, a co-founder of another software company called Management Decision Systems, which had successfully created and marketed decision-support software.

Since its founding, APEX has offered financial-planning products and services, including a personal computer-based financial planning aid. From 1984 to 1986 the company had grown from a core group of 20 people to a staff of over 70. Many of the new employees have been hired to support the roll out of PlanPower--its first expert-system-based product.

APEX is unwilling to present specific financial results to the public, but did divulge that a number of institutional investors are backing the company, including: Travelers Insurance, Chemical Bank, Beneficial Corporation, and ITN Information Systems Group. In June 1986, APEX received an additional $8 million of financing which raised estimates of total capital invested in the company to between $15 and $25 million. Much of the money was spent on PlanPower development costs.

The Financial Collaborative--The User Firm

The Financial Collaborative (TFC), the user of PlanPower, aims at serving individuals with incomes of six figures or more whose net worth is well over a $1,000,000. The company prides itself on being a premier financial-planning firm--one of New England's best. Located in an elegant office town house on Union Wharf overlooking Boston Harbor, the Collaborative evinces an air of "new-tech rich" where personal computers and mahogany desks blend in an elegant ambiance. The office helped communicate TFC's philosophy of quality, professionalism, and managed growth to its wealthy clientele.

The firm was incorporated in 1980. Fred Pryor, TFC's president, related its strategy:

The Financial Collaborative was founded on one concept--quality. We aim to become the "trusted financial advisor" of individuals with high net worth and income--preferably income over $2,000,000 or above in net worth and $300,000-plus in income. We have other clients, but we perform best for a person with complex finances.

To achieve this end, TFC was founded by a team of five financial experts with experience in each of the important areas of financial planning. Fred Pryor was experienced in estates, trusts, and administration; Jim Joslin had over twenty years experience as a portfolio manager and investment advisor; Warner Henderson was an insurance agent with more than ten years experience in insurance, investments, and tax shelters; Steve O'Neill possessed an extensive background in personal estate planning and real estate, and Gordon Snyder was a tax attorney.

The five principals each owned twenty percent of the firm. They wanted to grow TFC's client base to between 110 and 160 individuals with high net worth. Ultimately, each principal hoped to be able to receive about $100,000-150,000 in compensation from TFC yearly.

In terms of reputation, the founders of TFC wanted to be known as one of the premier planning firms in the Northeast. Pryor expounded on their strategy:

Our marketing is "word of mouth." It may cause us to grow slower, but we think it allows us to grow better. An advertisement in a magazine is not going attract the person we want into the type of relationship we prefer. A recommendation from a satisfied customer is our best advertisement.

Since 1980, TFC's client base has grown to 83 clients; the average net worth was $2.5 million. By 1985, TFC had net income of $320,000--two-thirds from fees, one-third from commissions.

The Issue--Financial Planning

PlanPower is an expert system which is designed to help financial planners create more accurate and comprehensive financial plans in less time. Broadly defined, personal financial planning is the creation of a systematic set of monetary objectives and action plans for an individual or a family. There are many components in a comprehensive financial plan. Ideally, it begins with an analysis of the client's financial and estate goals. These goals are tempered by the person's or a family's income and net worth. The analysis includes many considerations:

- tax planning
- investment advice
- education planning
- retirement planning
- estate planning
- insurance planning
- legal planning--wills, trusts, etc.

Interest in the planning field had increased dramatically during the 1980's. From 1980-1986, the membership of the Institute of Certified Financial Planners, a trade organization, grew from 1,108 to 17,637.2 Deregulation of the financial markets, along with a growing...
consumer-awareness of financial concerns, fueled expansion. A study conducted by SRI International, a research firm based in Menlo Park, California, estimated that, by 1990, twelve million people in the United States would be wealthy enough to warrant financial planning. Further, SRI estimated that over 25,000 professional financial planners would be needed to service that market. APEX hoped to address this high level of perceived market demand with PlanPower.

For many people, a well-executed financial plan can make a significant difference in their long-term financial planning. By lowering taxes, market-  
all expenses, and providing sound investment advice, To date, there is no consensus on financial planning. Philosophies, techniques, and content vary widely.

Financial planners routinely make judgements regarding the likely return and risk of different investment vehicles, in effect, predicting the future. A financial planner weaves a fabric of recommendations which makes up a plan which takes into account the issues listed above (e.g. tax planning, investment advice, insurance needs, etc.) and their financial ramifications. There are additional, subjective complexities in creating a comprehensive financial game plan: Even if there were an accepted model for all financial planning, individual difference and preferences could still alter the plan. For example, many TFC clients owned their primary residences outright—no mortgage remaining. It often made sense for such a client to borrow money against the unencumbered house. This common practice not only sheltered income from taxes because the borrower could deduct the interest on the home loan, but also provided investable capital. However, many clients would “not borrow one dime” against their houses for investment purposes regardless of the strength of the logic behind the financial arguments. Many strong, emotional, non-economic considerations can permeate the planning of an estate.

TFC ORGANIZATIONAL STRUCTURE

By 1985 and prior to the installment of PlanPower, there were eleven people in TFC: five professionals, four para-planners, one data administrator, and a secretary. As president, Pryor was responsible for day-to-day management of the firm. He and Warner Henderson were the most active in TFC. The other three principals spent two or more days a week in residence, but they also pursued outside interests. Mary Zelek, Trish Brajer, Jean Williams, and Marilyn Edgerton, were all “para-planners” which meant that they work to support one of the five principals in managing and servicing his clients. Zelek worked with Pryor, Brajer with Joslin, Williams with Henderson, and Edgerton with O’Neill.

Connie Wyllie was receptionist and secretary. Willow Reilly was data administrator, which meant that she was responsible for keeping client files up to date. For example, every time a client filled out his or her tax return, he or she would send a copy to TFC which was used by Reilly to update the client’s file. Often she found errors made by the client’s accountant. Making the client aware of such errors, impressed the client with TFC’s thoroughness.

The organization was especially well staffed relative to the size of its client base. As Gordon Snyder noted:

Compared to other planning firms, we are "top heavy." I know one guy who calls himself a financial planner and has over 700 clients—all on his own. We have much more talent coming to bear on each client and we perform more comprehensive service.

TFC’s Processes

At TFC there are five important, interrelated business tasks: (1) transactions (2) review of existing clients, (3) product review and inventory, (4) creation of plans for new clients and (5) presentation of plans to clients. The principals had hoped that the PlanPower system could help with the first four processes, but especially with the fourth task—creation of plans for new clients.

New Clients and Planning

Planning for a new client usually began with the client sitting down and discussing his or her planning needs with one of TFC’s principals. Then the client filled out a two-page data form which gave some basic family facts, financial goals, and other pertinent information.

After this initial contact, Pryor and Henderson met to determine the fee and the "fit." There is an art to determining which clients would be "a good fit," that is, which clients would be willing to give accurate, timely data and would seriously consider TFC’s recommendations. TFC did turn some clients over to other planning firms because of "poor fit."

Once Pryor and Henderson "accepted" the client, they decided which of the five TFC principals should become the senior person responsible—the "client administrator." The client administrator was to stay informed about all client activity and shepherd the client through TFC’s planning process to assure good service. If the client signed on, he or she paid 1/2 the fee up front, with 1/2 to be paid at delivery of the final plan.

Many different inputs went into the creation of a financial plan: client data, expert opinion, planning, and research. Data accuracy was critical to the entire process. Some clients gave data promptly, but for many
it was the most grueling part of the entire planning process. Mary Zelek recounted an extreme case:

When I asked one of our clients to provide the data for the plan, he gave me three phone numbers—one for his attorney, one for his banker and one for his accountant. That one took a lot of digging.

Getting client data was one of the worst bottlenecks in the planning process. Many aspects of the data collection required an understanding of planning. For example, the client might give the para-planners a series of financial documents full of jargon and complexities which were only decipherable by a knowledgeable reader.

When sufficient data to obtain a reasonably complete picture of a person's financial situation was collected, the client administrator, the para-planners, and Willow and Connie, put together a 1-2 page Client Profile. This included a balance sheet containing all assets and liabilities, funds flow statement, and a synopsis of the client's goals and personal issues—the building blocks for a plan.

Systems at The Financial Collaborative

Henderson had taken the lead in developing personal computer-based systems for the preparation of plans, creation of exhibits, and client tracking. There were three primary systems in his design. One helped in the management of text documents. The second was a group of Lotus 1-2-3 templates for financial planning, product tracking, and client fee estimation. The third was a set of small database files used for tracking client status.

Every time a bit of data was changed or a Lotus template altered, it was recorded and dated using logging procedures set up by Henderson. He also kept revising the "basic" 1-2-3 templates to reflect changes in assumptions which the firm used in planning, or changes in tax laws, etc. Almost all of the financial exhibits which clients received in their plans were generated by Henderson's 1-2-3 models.

TFC's philosophy of integrated financial planning was embodied in the firm's organization and processes. Every Wednesday, all five principals gathered around an oblong conference table to convene the "Wednesday Meeting," as it was known as TFC. At this meeting, they designed and reviewed the cases for the day. They worked on one, and, occasionally, two new plans, along with existing client reviews, product reviews, and general business. Stephen O'Neill noted the importance of the Wednesday meetings to the firm:

our distinctive competence is that every client is reviewed by the entire team of experts at our Wednesday meetings. The knowledge that comes to bear at the time on that person's financial affairs, is as good as, or better than, any other planning firm.

It was at the Wednesday meeting that the interconnection between planners occurred. Input by each planner was provided—a team effort. The Wednesday meeting also served as an efficient use of the principals' time because all could examine and interact on the plan together and quickly. Also, the Wednesday meeting allowed firm members to share new planning information and keep in regular contact.

There were some guiding principles which the planners used for each client: asset diversification, risk tolerance, and life-cycle phase. The asset diversification model was based on the notion that wealthy individuals should diversify their holdings in counter-cyclical investments—thus reducing investment risk. The categories in TFC's model were: fixed income (bonds); American (American equities); international (international equities); natural resources (oil, agriculture, etc.); real estate; and tangibles (gold, stamps, antiques, etc.).

At the Wednesday meeting all planners would review the 1-2-page Client Profile and suggest changes in light of the guiding principles and the client's specific needs. The first meeting mapped broad changes to be tested and researched. Subsequent meetings traced specific actions and products. Three-to-five iterations through the Wednesday meeting were typical for a new Client Plan.

Client needs varied. Some had very simple financial situations in which the primary issues and actions were almost self evident. Others had finances with many interrelated and complex issues. It was the latter type which the principals enjoyed most. As Gordon recounted:

When we get working on a tough case everyone is interested—the planning most enjoyable. The challenge of a new and different financing problem is fun.

The para-planners took notes on the planner's suggestions and followed them through by gathering new data, running the numbers, and making sure all recommendations tied together. Sometimes it meant going back to the client or designing new solutions. Mary Zelek noted:

I love figuring out how to do a complex financial plan. To develop the numbers, do the analysis, and design the solution—that's challenging.

When the plan had progressed through the Wednesday meetings enough times, the written plan was begun. Often the report could be as
long as 100 pages, covering a wide range of client issues. The text usually served two purposes: it explained basic concepts of asset diversification, life-cycle, risk, etc., and it gave a precise accounting of the individual's financial situation, TFC's recommendations, and rationale.

From the founding of the firm until September of 1985, the plan writing had been done by one person--Pam Patton. Patton had been skillful in assembling the plan parts into a coherent whole. Her prose was concise--her style businesslike. Often she had been the contact point for the client and her dual role as plan writer and client contact person had kept her on top of the issues and the plan current.

When Patton had the report completed, all the principals presented the plan to the client. Generally, Pryor began the presentation and was followed by the other four principals, each explaining his own area of expertise. The presentation usually took 4 to 5 hours in all.

It was a challenge to keep the plan current. Often, clients made changes between the date they gave their data to TFC and the date of the presentation. Changes caused TFC to make adjustments up to the last minute to reflect the client's current status. In extreme cases, one of the para-planners might be modifying and proofing text and exhibits outside the presentation room during a presentation. Henderson's Lotus 1-2-3 spreadsheets were instrumental in allowing rapid update of a client's exhibits and text.

By early 1985, two things had changed. First, the volume of clients had been straining Patton's capacity to generate plans. Then Patton left the firm in July 1985 to pursue other interests. Since Patton's departure, TFC had shifted to generating "mini-plans" around specific issues. Client presentations were targeted on specific topics and only 30-60 minutes long. TFC scheduled three-to-five presentations for each client to deliver the entire plan.

The Immediate Need for PlanPower at TFC--Plan Writing

The principals at TFC had hoped that PlanPower would help them in all parts of the planning process. Most pressing in late 1985, was their need for a plan writer. They felt that the mini-plans had been effective, but they wanted to get back to complete plans and single presentations.

By Henderson and Pryor's approximations, their planning capacity had remained approximately the same without Patton. At any given time, TFC had 3-5 new client plans "in the works" with a 7-10 client backlog. Each year, they added 10-15 new clients, and their renewal rate on existing clients was about 95%. Pryor estimated that they created between 12 and 15 new plans per year. The average fee per client for the initial plan was approximately $6,000-8,000 with wide variation ($500-$25,000). The retainer fee was customarily 50% of the initial plan cost--renewed or revised yearly.

THE PLANPOWER SOLUTION

TFC took delivery of the PlanPower system during the last week of November 1985 and began using it immediately. When PlanPower came to TFC, Warner Henderson worked closely with Willow Reilly and Connie Wyllie to learn the system and its strengths and limitations. Henderson expressed his feelings in November 1985:

I think PlanPower will allow better planning meetings. Now the meeting begins with data. After PlanPower, the meetings will begin with the PlanPower plan as the base line--an improvement. Yet, we will need to invest a considerable amount of time and effort with the system before we can tell if its a success for us.

Because there were no standards in financial planning, the APEX system "took a stand" on the "correct approach" to the task. The core philosophy of the system was similar to that of TFC--that is, asset diversification and the investment pattern that the asset-diversification model implied was the driving force behind the logic of the system.

PlanPower provided coverage of all the areas involved in the creation of a financial plan: estate planning, insurance, tax advice, etc. It was broad and detailed in its knowledge but, in any one area, it was not as knowledgeable as an expert in that area. Overall, it performed well for most planning situations which it was expected to encounter. Yet, because there were no standards in the field, nor were there any figures on the number of people who had "standard" financial issues, the specific applicability of the PlanPower system to all the possible types of planning situations was unknown.

There were three basic components to PlanPower: the knowledge representation system, the expert framework, and the computed text. In the knowledge framework, information was represented in terms of objects and their financial characteristics, bonds, stocks, employment criteria and descriptions of family members were examples. The system contained over 200 classes of objects and accessed nearly 2,000 characteristics associated with the objects. The multiple attributes allowed the system to take many factors into account when choosing tools to meet a particular financial objective.

In the expert framework, the rules of analysis--which had been gathered from a panel of experts--were encoded to analyze and
manipulate the data objects and make trade-offs to create solutions. As a product release stated:

The APEX framework does real planning, not just diagnosis. It simulates and tests its recommendations in a consistent and integrated way, i.e., it will model all the buy-and-sell transactions required to implement its recommendations.

The third component, computed text, generated prose which was "ready to be viewed by the client."

The PlanPower software ran on a Xerox 1186 workstation, a computer specially built to run LISP, a language common to expert systems software. Physically, the Xerox 1186 had a large screen with very high resolution. Many "windows" could be opened to view different client data or perform different tasks on the client's data simultaneously.

The Xerox 1186 did have the capability to run IBM personal computer software, but there was no compatibility between PlanPower data and any other data. For example, one could run Lotus 1-2-3 on the 1186, but PlanPower could not read the data residing in existing Lotus 1-2-3 spreadsheets.

Using PlanPower

Financial planning using PlanPower began with entering the data into the system. Depending on the level of detail, this process could take from 30 minutes to 3 hours per client. There were many default values, and few required data, so even a complex plan could be sketched quickly for a preliminary analysis.

After data entry, one could ask for the "observations," a process which usually took ten to twenty minutes. In this analysis, the system provided observations on the client's position, such as, "Mr. Mulcahey's leverage is low, with a debt to equity ratio of 1.0 to 1.1." These were no recommendations in this "pre-planning scenario," as it was called.

Next, the user could ask for recommendations. This process could take anywhere from 10 minutes to an hour or more, depending on the complexity of the plan. In this stage, the system went through a person's entire financial situation and generated a series of specific recommendations, known as the "after-plan scenario." The observations and recommendations, or "obs and recs," provided an overview of what the plan would look like and where the recommendations came from.

Often, after the obs and recs had been created, some experimentation was done with the plan. The planner could go in and simulate client transactions, such as buying stock or selling land. This would create a new pre-plan case from which new obs and recs could be generated.

Four types of documents could be made from the after-plan scenario: summary, presentation, complete, and custom. (See Figure 1 for a diagram of the basic plans available.)

The summary plan, which provided a brief overview of the summary exhibits and text, was intended for use by the planner. Its wording and appearance were not designed for client viewing. The presentation plan, as its name indicated, was designed to be used in a basis for a client presentation. The complete plan, which has 40-to-100 or more pages of text, graphics, and tables integrated together, was the most complete standard plan.

If the TFC planners desired, they could create a custom plan by assembling the plan components into a "template," as it was called. In a template, a planner chose the exhibits, text, and charts to include. However, the time and effort to create such a template was warranted only if it could be used for a number of clients. Otherwise, it was easier to make changes to the text in a word processor which was also integrated as part of PlanPower.

Any of the four documents could be edited in the PlanPower word processor. This method was often faster than making changes and re-running a plan. However, care had to be taken to check the consistency of the plan, because when a number or recommendation was changed in the word processor, the implications of that change were not reflected in the other planning exhibits or recommendations. These other changes had to be made by hand.

The user had considerable flexibility in inputting assumptions about the economy, the planning parameters, and the client. The assumed inflation rate and the yield on different investment categories were two of the many assumptions which could be specified by the user. There were also a number of "influence points" where the planner could "turn-off" or "turn-on" certain recommendations by entering the appropriate data. A simple example was client's preferences: Every investment category had a data item which recorded the client's "preference" toward the investment. More specifically, each investment had a rating of "APPROVED" or "DISAPPROVED." If the planner marked oil and gas tax shelters DISAPPROVED for a particular client, then the plan would never recommend that type of investment for that client. After using PlanPower for a number of
plans, a planner could learn the interactions of the influence points and their effects on recommendations.

TFC did not have access to view or change the rules of thumb which the system used. If the user wanted to change the recommendations of the system, he or she would have to work within the available variables.

**PLANPOWER**

The Financial Collaborative received PlanPower on Friday, November 22, 1985 and began using the system on Monday, November 25, 1985. Of TFC's five major tasks—transactions, review of existing clients, product review and inventory, creation of plans for new clients, and presentation of plans to clients—the fourth task, new client planning, was most influenced by the use of PlanPower. The first three seemed largely unchanged by use of the ES.

At the highest level of analysis, the new-client planning organizational process map had five steps—See Figure 2:

**Figure 2**

Within the large and complex organizational program depicted in Figure 2, the last three steps—plan design, plan writing, and presentation—seemed most affected by the use of PlanPower. Consequently, the discussion which follows centers on the last three phases of the TFC new-client planning process before and after PlanPower use.

**Pre-PlanPower Plan Design**

Plan designing at TFC took place during the Wednesday meetings. This weekly gathering was the planning pulse of the firm and was orchestrated to bring together different expert views of the client's financial situation. From a business perspective, it was the combination and active involvement of the different specialists which differentiated TFC from a mediocre planning firm. TFC management felt that the integrated, informed talents of the five individuals at the table on Wednesday was the primary reason TFC could charge $2,000-$30,000 per plan and still have satisfied customers.

Each plan passed through the Wednesday meeting repeatedly. The first meeting for a new client began with a crisp 1-2 page brief on the client's finances, goals, and issues. Initial plan design came quickly as the experts identified major gaps in the client's financial fabric.

In between Wednesday meetings, the para-planners would run the numbers and check the specific implications of the broad investment strategies. As the plan iterated through the process, the initial strategy became progressively refined and detailed. Usually, after three to four iterations, a plan was ready to be written. However, there were delays. Some clients stopped in mid-planning, others put the whole process on hold, and still others were just reluctant to obtain the needed data. Consequently, elapsed time ranged between 5 and 7 weeks or more before the planner was ready to begin writing the plan.

**Pre-PlanPower Plan Writing and Presentation**

Writing of the mini-plans occurred on an ad-hoc basis. After the client's finances had been through the Wednesday meeting a few times, the important client issues were identified and a presentation document was drafted to address the immediate problems. Usually only 2-15 pages in length (1-5 pages of text and 1-10 exhibits), the mini-plans were written by the para-planner, the principal involved with the client, and the specialist in the area.

Presentation of the mini-plans was also ad-hoc. Fred Pryor estimated that a client could have anywhere from 3-6 mini-plan presentations given to him or her depending on the size and severity of the issues. Each time, the planners attempted to tie the mini-plan recommendations into an overall picture for the client. Henderson and Gordon Snyder (the principal with a specialty in tax law) noted that this issue-oriented planning allowed for fast closure on specific concerns. However, they, like Pryor, expressed consternation over the mini-plan approach because the presenters had to repeatedly re-educate the client by sketching out the overall plan in order to provide context for the current mini-plan issue. They hoped PlanPower would help them return to full plans.

**Post-PlanPower Plan Design**

PlanPower was inserted into the TFC process flow right after data collection and right before plan design. Soon after the introduction of PlanPower, the nature of the Wednesday meeting changed. This occurred in two stages. In the first stage, new client's financial picture was introduced to the Wednesday group by means of the observations and recommendations document from PlanPower. The major difference between the 1-2 page brief and the PlanPower document was that the latter contained specific solutions which were generated by the ES for every planning issue. The meeting thus began with a set of recommendations in addition to the complete client data.
The arrangement and nature of the PlanPower recommendations were unfamiliar to Pryor, Snyder, and O'Neill. Because Warner Henderson and Jim Joslin were the principals of the firm most familiar with the logic of the system, they played a central role in introducing and describing the PlanPower plan. When one of the planners or para-planners asked why a particular recommendation was given by PlanPower, Warner or Jim would explain the logic behind the recommendation. If necessary, Warner would call APEX after the meeting and report back to the group with further explanations later in the week.

The meeting focus shifted from one where the principals made suggestions to one where the principals asked questions about why PlanPower suggested a particular solution. In effect, the process had changed from one of design to one critique. In addition, Warner and Jim educated the planners to the reasoning behind the recommendations.

After PlanPower's preliminary use in the plan-design step, it became apparent that there was a problem. The process of reviewing the PlanPower plan did not "feel right" to the principals at TFC. As Warner Henderson said:

When we put the PlanPower observations and recommendations first, people turned off their creativity. All the suggestions were already made, at least in basic format, and people generally added to the recommendations, or quietly assented. They did not really "get into" the planning unless PlanPower made a mistake or did not have logic to address a particular problem. When solving a new problem, the old spark returned. We got involved!

Even though there was no direct evidence that plan quality had been eroded, Henderson was concerned about the long-term effects of a loss of interest in the planning meeting:

The issue of people "turning off" is important for us. Consequently, we decided to put the PlanPower recommendations at the end of the planning meeting - an additional planner if you will. That seemed to work much better, with PlanPower providing a checklist and reminding us of the basics.

In the second stage of PlanPower use, the PlanPower exhibits and observations were used as input to the process, but the recommendations were moved to the end of the meeting. This shift in the use of planning input reflected Fred and Warner's careful attention to detail. The atmosphere of the meetings was a crucial mechanism to help keep the planners active and involved in the design process, which was a critical success factor for their business. By moving the recommendations to the end of the meeting, Fred and Warner re-established the design focus of the Wednesday meeting.

PlanPower Usage

After the arrival of PlanPower, Warner Henderson immediately began putting client data through the system so that a summary PlanPower plan could be run and used as input for the first Wednesday meeting on new clients. In effect, PlanPower output became the major input to the plan design stage - supplanting the 1-2 page client brief.

In the past, the plan design process was the same for all clients. With PlanPower, the process of became differentiated. As of July, 1986, there had been 10 plans put through PlanPower. From the descriptions in the interviews regarding these 10 efforts, three distinct types of process flow emerged:

1. ES only
2. modified ES
3. by hand

In "ES only," the data was put into the system and the ES created the entire plan. Of the first ten plans, two were ES only - presented to the client with only minor changes. At the other extreme, there were some clients suited for the "by hand" process. Since the installation of the system, only one case had been done entirely without PlanPower. It was a relatively simple case, and it was decided that it was more efficient to design the plan the old way because it was not worth the time to enter the data into the ES.

The ES-modified route presented some interesting challenges because the PlanPower logic was not accessible to the user. Often the planners would have a particular set of recommendations in mind for a client. PlanPower might generate a plan with some slightly different recommendations. There were two ways that the planners modified the output. First, if the changes were minor, it was sometimes possible to change the output in the PlanPower word processor. This method became cumbersome if there were many changes, because all the numbers and recommendations in the PlanPower plan were interrelated. Consequently, one could only go so far before the data and facts were so disrupted that it was easier to start fresh than to continue "repairing" the current attempt.

The second way to modify the plan was to try to determine the logic behind the recommendations and change the input to influence the output. Early in TFC's use of PlanPower, the planners had a particularly challenging experience trying to enter stock options into the planning system because PlanPower did not have the ability to model that particular asset. Consequently, Warner, Mary, and Connie
made recommendations which were not what the planners wanted or were incorrect from the planners point of view, it might take significant digging, both on the phone with APEX and by trial and error, to discover ways to fix it. Because the actual written plan which PlanPower created was such an integral part of the planning process, TFC often took the time to create hybrid input so that the plan could be presented as a whole with the correct recommendations. This hybrid system--part ES, part by hand--seemed to be the most time-consuming and frustrating activity of all.

PLANNING CAPACITY--PRE- AND POST-PLANPOWER

The last issue to be examined in light of PlanPower use is the capacity of the TFC organization to plan. All in all, capacity of the TFC system increased. Pre-PlanPower, the amount of planning activity flowing through the firm varied widely, with the majority of activity falling around tax time when clients came for help and just before year-end when clients scrambled to make amends. On a yearly basis, the firm accepted about 10-15 new clients per year. The fall-off rate was approximately 5-7%. The existing client base was approximately 80-85, and, given its rate of growth and fall-off, net growth was approximately 10 clients per year.

Post-PlanPower, it was too early to see the effects on the client-base additions, because it would take years to discover trends in the number of clients added. The strongest concrete indicator of increased capacity was the reduced cycle time of the plans through the process. Fred Pryor, TFC president, estimated that the time needed to create a plan shortened from 4-5 weeks to 3-4 weeks with the use of PlanPower. In reviewing archival data, Pryor's impression was supported. In fact, the effect seemed to be much more pronounced than he estimated.

Pryor kept a record of important dates and fee information on every client the firm ever had. According to this data, the average time between the collection of client information and the delivery of the final plan--here called the cycle time--was 15 weeks. For the four cases, post-PlanPower, it had shrunk to only 9 weeks.

The difference is even more striking when one remembers that pre-PlanPower data are based on almost five years of data, whereas the post-PlanPower data are based on a period from November 1985 to May 1986. The latter period was collected during TFC's two busy times of the year--end of year and tax time. During these periods, the planners have many non-plan-writing demands on their time, such as giving advice to clients on specific transactions. The shortening of the cycle time may be even more pronounced over the entire year.

The large difference between the archival numbers and Pryor's estimate can probably be attributed to the fact that Pryor was only referring to the active planning time and did not include the extra time needed to schedule the presentation meeting. Most of TFC's clients were wealthy, busy people and delays in scheduling meetings were common. Hence the discrepancy between the recorded dates and Pryor's recollection seems reasonable. Even if the decrease is only one week per plan, it would allow the planners to generate at least one or two more plans per year--given a 10-15 week cycle time.

Another indicator of increased capacity was that Pryor, Henderson, and the other principals at TFC were thinking of providing more service to the existing client base. Service might take the form of more types of product offerings or more planning by using PlanPower for yearly or bi-yearly plans. In July 1986, alternatives were in review. Before PlanPower was installed, the principals had felt that the organization was "at capacity." Only after the system was up and running, did they think of creating new revenue sources.

POST-PLANPOWER INFORMATION-PROCESSING CAPACITY

Galbraith defines the information-processing capacity of an organization to be the diversity of the outputs, the number of different input resources, and the level of task performance. For example, an organization which has a high diversity of outputs, a high level of task performance, and a large number of inputs, has a high level of information-processing capacity. The determination of the information-processing capacity of The Financial Collaborative, consisted of evaluation of the three components which make up information-processing capacity. In the current discussion, inputs includes the people (division of labor), data, and systems used in the execution of the task. Outputs are those things which result from the task that help others do their work--a definition consistent with Galbraith. Task performance is a subjective, overall assessment--made by this researcher--of the effectiveness and efficiency of the task organization. This assessment takes into account all available objective measures of performance combined with the subjective assessments of the employees and the managers using and managing the ES.
PlanPower at The Financial Collaborative (TFC), shows an increase on all three information-processing capacity components. Table 1 provides a tabulation of the inputs, outputs, and task performance components for the pre- and post-PlanPower financial planning process at TFC.

Table 1*

<table>
<thead>
<tr>
<th>Inputs - Increased</th>
<th>Outputs - Increased</th>
<th>Level of Task Performance - Increased</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experts consulted</td>
<td>Investments</td>
<td>Expect draft plan after a few days</td>
</tr>
<tr>
<td>Trade publications/guides</td>
<td>Transaction Advice</td>
<td>Highest quality possible</td>
</tr>
<tr>
<td>Principals</td>
<td>Money management</td>
<td>3-6 weeks after client data received</td>
</tr>
<tr>
<td>Warner's 1-2-3 templates</td>
<td>Full, integrated plan with more exhibits</td>
<td>make plan (Warner's estimate), 12 weeks archived data</td>
</tr>
<tr>
<td>Client Data</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*The designations before each item on the list are indicators of the direction and the strength of the change in that category. For example, + is the same, ++ is strongly increased, - is decreased, etc.

Inputs

After the use of PlanPower, the inputs to the planning process at TFC were greater. For example, the client data file was the central repository of information. The core of the client data file was the data booklet which was given to the client at the start of the planning process. The data booklet to be used as input for the PlanPower process was more detailed, almost twice the length of the previous data-gathering document (35+ pages versus 20+ pages).

Because the client data booklet for the PlanPower system was still undergoing minor revisions at the time of this study, TFC did not give it to its clients. However, after PlanPower had been introduced at TFC, Connie Wyllie began to use the data booklet as a guide for the data input and as the main document for client data. Wyllie and Henderson both said that the PlanPower data booklet was more thorough and, when completed, would allow for faster planning.

As Connie Wyllie said:

The PlanPower data booklet is excellent for gathering all the relevant data. If we can get clients to fill that out correctly, then planning should be a breeze.

Warner Henderson commented:

Once the bugs get ironed out of the PlanPower booklet, the system would be a big help. If we can get our entire client base up and on the system and keep them up to date, it would give us the ability to do any sort of interim planning we wanted to do. We might decide to do a plan each year for a client, or for some clients, when a major issue or change came up, such as a divorce, death, etc., we could run an entirely new plan on the spot.

Another change in the input to the planning process was the use of dual-data entry system at TFC. Because the PlanPower system was new and more cumbersome and time-consuming to use for small calculations than the 1-2-3 templates which Warner Henderson created, all client data was put into both systems. This double-data input allowed TFC personnel to verify the numbers by comparing two sets of data. Furthermore, all the exhibits created by PlanPower were created from the same database of numbers and all the different exhibits from net worth through expense projections matched to the dollar. Pre-PlanPower, when creating exhibits using Henderson's 1-2-3 templates, each template required its own data entry. The exhibits were not integrated and drawing from a common database, as they did in PlanPower. Consequently it was more possible for the numbers in Henderson's exhibits to vary from one to another than it was with PlanPower. In this instance, the database which the ES PlanPower required caused more inputs to the data part of the planning process.

Another change in the input to the process brought about by PlanPower was the use of the PlanPower observations and recommendations as an input to the planning process. This short document (usually 5-20 pages) was viewed as the input from the "sixth planner."

Consultation with the APEX product support and design group was an almost continual dialogue, and certainly a new input to the process. Henderson, Wyllie, and Zelek all stated that, when they were planning with the system, it was not uncommon to call APEX daily or more often. Most often, the planners called asking about the logic behind an observation or recommendation. This information was particularly important in making the PlanPower plan understandable to the TFC principals.

Other major inputs to the planning process, such as outside experts consulted and the participation of the principals, did not seem to change. Every member of TFC noted no major additions or deletions in those two inputs to the planning process. Overall, there was an increase in the inputs to the planning process at TFC.

Outputs

The outputs from the planning process have also increased since the before-planning stage. First, the firm switched from presenting a
series of mini-plans to the client to a fully integrated, single plan. Before PlanPower's introduction, the company was delivering "mini-plans" to its clients in which issues were addressed on a one-by-one basis. They felt unable to create complete plans for clients without a replacement for their plan writer, Pam Patton. Post-PlanPower, the firm returned to generating entire plans which were at least as comprehensive as TFC's previous "full plans." The post-PlanPower plans began with the PlanPower output as the base upon which exhibits and other material were added, resulting in a longer, more detailed document.

Another increase in the output was the generation of more plans. Once the data was entered for a particular client, it was possible to generate any one of four standard outputs: observations and recommendations (used as an input to the planning process--described above), the summary plan, the presentation plan, and the full plan.

In practice, the planners used the summary plan and the full plan for internal review. In their presentation to the client, they used the presentation plan output and gave the client a copy of the full plan. As of July 1986, the different plans and their content were just beginning to be explored with regard to their marketing possibilities. For example, it was thought that it might be worthwhile to use the summary plan for interim mailouts of planning service—a once-a-year summary of financial position and issues. An effort was also made to customize the full plan to TFC's desires. The number of outputs—in terms of plans and their applications—had gone up—overall an increase in outputs.

Task Performance

Task performance also increased from pre- to post-PlanPower. One important change was that the cycle time was lower. As noted above, Fryor felt that the savings were one week per plan. Archival data showed that the benefit in turnaround might be even greater—on the order of four weeks per plan. The discrepancy might be due to the fact that Fryor was referring only to planning time, while the archival data included the time needed to schedule a presentation. Nevertheless, Fryor's estimation and the archival data pointed to the same conclusion—shorter cycle time.

The principals at TFC felt that PlanPower was helping them to do their job better. Henderson and Fryor both said that they were worried about the amount of investment in time and effort they were making in the system and they knew that an overall assessment of the efficacy of their effort would not be known with certainty until a few years had passed. However, their interim report on the system and its effect on task performance was definitely positive—task performance had increased.

CHANGES IN THE PROGRAMS AT TFC

Overall, the major benefit of using PlanPower was a return to full plan writing without having to hire an additional plan writer. The cycle time had shortened and the quality of data entry and review had also improved because client data was put into both the 1-2-3 templates and the PlanPower system. The cost of the better data was the double-data-entry on all the numbers associated with a plan. (See Table 2.)

All in all, the principals felt that PlanPower was a success in the short term. However, they were unsure of its long-term benefits. PlanPower would be a success if the learning and effort which had been put into the PlanPower introduction could be leveraged across their existing client base by allowing them to provide more products and services more profitably. If the fundamental plan they offered continued to need significant customization or shoehorning into the system, its future and value were not good. The principals estimated that it would take one to two years of use before they knew the consequences of their PlanPower experience.

Footnotes


2"Financial Planning." Wall Street Journal, Special Section, 12/2/85, p. 4D.
The documents mentioned here are the most commonly used in creating a new plan. There were many other document options.

Bibliography


