

Is Function Analysis Essential to Value Management?

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Introduction

Purists argue that Function Analysis is an essential part of a Value Management study. Most practitioners would agree however, that though fundamental, the concept can be difficult for participants to understand and as a consequence the time allowed for it at a workshop is often not enough.

Sometimes, introducing Function Analysis at a workshop can unleash time munching frustration and resentment among participants and can force a workshop temporarily or permanently off the rails if it is not managed well.

For these reasons there is the temptation for clients and participants (and some facilitators) to avoid prolonged analysis of functions during a workshop.

Function Analysis is a subject of considerable debate in Value Management circles and practitioners have different opinions as to its importance and how and when it should be used. If it is important to the value management method then how can it be made easier to understand and apply?

What is it?

References tell us that the word “function” is all about “purpose” and “proper work”; “Analysis” is the separation of a concept or thing into its component parts for examination. Function analysis in the context of Value Management can therefore be considered as *“identifying the component functions of an entity that has a purpose and analysing them for cost and worth”*.

Although the words are familiar, the concept of Function Analysis is difficult to grasp; a complicating factor being that functions tend to group at different levels in a hierarchy. It is easy to get confused about which level a function belongs on and whether it should be included in an analysis of cost and worth.

Is it Important to the Value Management concept?

The answer is “yes” and it lies in the basic reason for holding a Value Management Study - “to add value to a process, proposal, project or thing”. Adding value is generally understood to be achieving an increased level of functionality for no additional cost or achieving the same functionality for less cost. Value can also be added through a higher level of investment that results in a disproportionately higher level of functionality.

One way of defining cost is: *“the dollar investment required to achieve a functional outcome”*.

Defining value on the other hand demands a critical analysis of options and the dollar investment associated with each option to achieve a required functional outcome. A lower investment to achieve the same outcome is generally thought to be better value.

It follows that procuring a function may involve a range of options at varying costs but there is only one option that represents best value - function is inextricably linked to the concept of value.

A Value Management Workshop may be held to: *“facilitate better value system solutions by identifying and analysing the functions that make up the system, determining the cost and worth of the functions and then seeking the best value solution from alternatives”*. Function Analysis is the tool that allows this process to proceed and is pivotal to the determination of value. Without it we rely on judgement or the “gut feel” of our experience that in rapidly changing times may be out of date.

Why is it Difficult to Facilitate at a Workshop?

The concept seems straightforward so; what makes Function Analysis chancy in a Value Management Workshop?

Perhaps the answer lies in the perception of function and value from an individual perspective. For example; why did we buy the clothes we are wearing? What were the primary functions we paid for: modesty, durability, image, comfort or warmth?

All of these functions may be relevant to our purchase but which of us got the best value? Some people assign high value to the designer motif on a T-shirt, others believe it adds nothing to their requirements. We could argue for hours over who is wearing the best value clothing because many of us have bought for different reasons/functions?

If image (in the “T” shirt example) is agreed to be the only really important reason for buying a T-shirt; then the lowest price paid for this function will represent best value for the item (perhaps this is why bargain hunters mob sales counters where the words “Sale” or “Reduced” are advertised on a name brand – such words automatically trigger the notion of increased value for many people).

On the other hand functions such as image, warmth and comfort may all be considered necessary on a scale of priority. If this is the case then the lowest total price paid for all necessary functions collectively ranked for value will represent the best value.

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In a similar way, a Value Management facilitator must get collective agreement on the value of several functions (a system). This can be difficult since as explained above, the word “value” conjures up different pictures in the minds of individuals. To agree collectively which system represents the best value requires a group to firstly consider all of the functions and agree their importance.

So then, as well as knowing the functions of a system and their cost and worth, it is also important to know which functions are the most important; so that the value of the whole system can be assessed.

How should it be presented at a Value Management Study?

It is necessary to explain what Function Analysis is and to develop the process with participants so that they understand their role in determining which functions are fundamental to outcomes and which are not. Often participants need help in understanding what they are analysing or even what they are purchasing. Some participants need to be reminded of the “reason for the existence” of the project or process being analysed and to maintain a focus on functions - not things.

For example, few would disagree that a function of a light globe is to provide illumination (or light). However, it may depend on the system within which the light globe exists as to whether the illumination function is important or even if it should be considered in determining the system outcome and its value.

It can be argued that a function of a light globe is to provide safety, which is a valid output of the illumination function. Is the light globe important in this case, or is it just one means of providing the illumination function and hence the desired output of safety?

A key to successful Function Analysis is to keep the output function of the system clearly in mind, output function being the highest level function being considered. This function can be identified by asking; “why does the system exist?” In the above example the output function is to “provide safety”, not light.

Function Analysis may be considered as, “*breaking down an output function into its component functions and analysing them for cost and worth*”.

Consider the example of the accommodation related function - “***provide good working conditions***”. We can break this output function down by asking the questions: -

Level	Question	An answer
1.	How do we provide good working conditions?	By providing comfort
2.	How do we provide comfort?	By controlling the environment.
3.	How do we control the environment?	By providing air conditioning.
4.	Etc, Etc	

These functions are clearly on different levels and a hierarchy of functions has emerged. Other functions may fit just as well on the identified levels, the higher up the hierarchy the more answers to the questions - at levels 3 and below the options narrow.

For example, there are several ways of controlling the environment other than providing air conditioning and it may well be that an alternative may offer better value - but there is a limited number of ways to provide air-conditioning, as we know it.

The layering or hierarchy of functions can be the cause of Function Analysis “bogging down” a workshop if the facilitator is not able to control the analysis by maintaining focus on the output function.

Participants at a Value Management workshop can and do suggest any functions in response to the facilitator’s question, “how do we do that?” It is the facilitator’s responsibility to assist in determining which level the function belongs on and to assist in determining if the function has any relevance to the value of the output function.

Most Value Management facilitators will agree that finding the correct level of a function in the hierarchy can be achieved by asking the questions “*how?*” and “*why?*” In the example above an answer to the question “*why do we provide air-conditioning?*” must lie in the level immediately above, i.e. “*to control the environment*”. Conversely an answer to the question “*how do we control the environment?*” must lie in the function level immediately below, i.e. “*provide air-conditioning*”.

Keys to successful Function Analysis include:

1. **Know what the System is and its reason for existence.** If it is a building it will exist in order to accommodate services or functions.
2. **Do some preparation before involving participants.** Prepare a guide for keeping the Function Analysis process on track. It may be possible to carry out the analysis of key functions with a few key stakeholders prior to the workshop.
3. **Develop other functions from the key output functions, sort the functions into a hierarchy and discard those functions that have no practical relevance to the output function.** For example, “*provide higher salaries*” could be suggested as an answer to “*how do we provide good working conditions*”, but is it relevant to the system (a building) being analysed?
4. **Know what level to stop the analysis at.** In the air-conditioning example above it could be relevant to go to level 4 and answer the question “*how do we provide air-conditioning?*” - a number of different methods are available. However, another means of satisfying the question “*how do we control the environment*” may permit value decisions to be made at level 3.

Fast and Furious or Detailed Analysis?

This really depends upon the type of Value Management Workshop being facilitated.

High level analysis

At the highest level, Function Analysis may consist of only a few statements such as, “*the reason for the existence of this project is to make a return on investment*”. And, “*we will do this by, selling space, renting space and using space to provide services. The highest priority is the sale of space in order to get a quick return*”.

Another common form of high-level Function Analysis is to ask participants to list only the key output functions and assess whether they are “Essential”, “Highly Desirable” or “Nice to Have”. Where the study is primarily strategic or conceptual in nature and where the concept of value is not being considered in any depth this approach is quick and effective. Although generally no attempt to develop a hierarchy is made, the method is capable of determining the importance of functions by agreement of the participants.

This approach generally takes the form of (example):

In terms of providing good working conditions the building must:	Importance
1. Provide comfort	Essential
2. Have adequate staff parking	Nice to have
3. Provide a safe workplace	Essential
etc, etc	

This level of analysis makes it is relatively easy to determine performance information by then asking questions such as “What level of comfort is essential?”.

Function Hierarchies

For concept proposals where a more detailed analysis of value is required, a Function Hierarchy may be the most appropriate means of Function Analysis that is possible within a 2-day workshop. It is advisable for the facilitator to map out the basic function hierarchy before introducing it at the workshop because it may be a time stealer if participants have not previously been exposed to the process.

It generally takes the form of (example):

Function Hierarchy HOW? >	<WHY?	Cost \$,000	Totals \$
Provide good working conditions			770+
Provide comfort			170
Provide environmental comfort			170
Provide air conditioning		150	
Provide acoustic control		20	
Provide easy access			600
Provide access for disabled			400
Provide lift for disabled		300	
Provide 1.2m doorways		100	
Provide parking for 100 staff		200	
Provide a safe workplace etc etc		+	

The level of function lowers with increasing indent. The function of “*provide acoustic control*” is 2 levels below the function “*provide comfort*” and 3 levels below the function “*Provide good working conditions*”.

In addition to developing a hierarchy of functions this method allows prioritisation of functions at any level, the facilitator must be clear about which functions are on the same level since only functions on the same level can be prioritised.

Functions that are on the same level but derived from different higher-level functions should not generally be prioritised against each other. For example the functions provide “*air-conditioning*” and “*provide a lift for the disabled*” are both on level 4 but under different higher-level functions and therefore should not be prioritised against each other. In their case the higher-level functions of “*environmental comfort*” and “*disabled facilities*” are the functions where priority should be determined.

It is therefore best to prioritise in order of hierarchy, ie, level 2 functions, then the level 3 functions under each level 2 function and so on. In this way the workshop can determine the importance of the higher-level functions first and then the importance of sub-functions.

Only functions on the same level can be used to develop priorities, otherwise comparisons are not mutually exclusive. For example, the functions of “*provide comfort*” and “*provide easy access*” in the example above can be compared for priority because they are on the same level and both come under the same higher order function of, “*provide good working conditions*”.

On the other hand it is not possible to determine whether “*provide disabled facilities*” is more important than “*provide a lift for the disabled*” because these functions are not on the same level and one is a sub-function of the other.

Facilitators should also be aware that an analysis of risk might override service priorities. A function such as “*provide a safe work place*” should get high priority even if the function of “*provide good working conditions*”, under which it may fall may not be given a high priority by the participants. Risk criteria should therefore be applied separately.

FAST – Function Analysis System Technique

In a study where detailed value analysis of a process is required and where functions need to be accurately costed then the Function Analysis System Technique (FAST) is appropriate. It is generally necessary to carry out this level of analysis by working with several stakeholders within an organisation over an extended period of time to enable detailed identification and costing of functions. Complex processes cannot be adequately analysed for value in the context of a 2-day workshop.

The tried and proven FAST diagram is effective and permits very detailed analysis of the cost of functions and parts of any system.

When determining the cost of a process using this method the following influences on cost and value should be considered:

Capital investments;
Recurrent costs;
Revenues; and
Staffing or FTE implications

Depending on whether the system being analysed is a new project, a manufacturing process or an organisational process, all or some of these life cycle cost and value influences will be relevant.

For example, part of the process for allocating space within a TAFE College could be tested for value by using the FAST diagram shown below.

Fast Diagram - Process Leading to Room Allocation
(Before enrolments)

		How >					< Why	
		1	2	3	4	5	6	7
Function		Identify business purchased by Government.	Identify Resources (including space requirements) Established for all known delivery.	Timetables created in Timetabling system for known business (Roll Creation)	Rolls created & rooms nominated in Timetabling System.	Agree room Utilisation and quantification of available space.	Rooms allocated to Academic areas confirmed.	Finalise known room bookings
		Start of room Allocation process	Commercial business determined by Academic areas Govt and commercial business allocated to Academic areas	List of available accommodation provided to Academic areas	Draft room allocation based on history and new/changed requirements. Room utilisation checked to ensure minimal gaps	Room allocated if no dispute/ clash Room allocation disputes resolved in timetabling System in consultation with Academic areas		
				Complete 6 weeks before enrolments.	Complete 6 weeks before enrolments.	Complete 6 weeks before enrolments.	Complete 4 weeks before enrolments.	Complete 1 week before enrolments.
		Govt Account Manager.	Govt Account Manager. School Directors. Space Management Unit.	Space Management Unit. Program Mgrs.	Space Management Unit. Program Mgrs.	Space Management Unit. Program Mgrs.	Space Management Unit	Space Management Unit

From left to right the columns show key functions (highlighted) required to achieve the outcome function; which is “*finalise known room bookings*”. Also shown in the columns are other functions that occur at the same time as the key functions.

The resources required for all functions in the column are identified and listed and the number of FTEs required to carry out these functions is calculated. It should be noted that this task requires significant investment in time by the organisation to calculate how many FTEs are dedicated to the functions. The cost line allows the total cost (including FTE costs) to be calculated for each step of the process.

The FAST method is effective in identifying high cost elements of a process; additional function analysis effort can be then put in to find better value functional alternatives.

A Useful Tool to Assist With Function Analysis

The Microsoft Word outline function utilising a computer and data projector is helpful in producing function hierarchies. All participants are able to see the projected worksheet and are

able to assist in determining which functions are applicable and at what level they should be placed.

The IVMA could assist VM facilitators if it had a library of Function Hierarchies for the use of its members. In any case facilitators should retain function hierarchies they have developed; it will save time and cost next time a similar system needs to be analysed.

Is Function Analysis an Essential Part of the Value Management Job Plan?

Function analysis may take several forms; this paper revisits those that have been proved effective. Clients, participants and facilitators may seek short cuts but true Value Management is not possible if Function Analysis is not included in the Job Plan.