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## Abstract

*In this paper the author examines Linstone's Multiple Perspective methodology, which uses the TOP (Technical, Organizational and Personal) system of analysis, and employs it as a basis for formulating a general perspectives framework for systems analysis. This framework is then applied to a situation whereby a struggling online company is shown to have employed a perspective that led them to make incorrect predictions about the behaviour of the system. By employing the framework, the author is able to define the perspective employed by the company, show how the predictions the company was making were connected to the perspective employed, offer an alternative perspective, and then to use that perspective to offer alternative solutions to their problems.*

## Introduction

For approximately three decades Harold Linstone has been developing an approach to problems known as "Multiple Perspectives". Linstone's particular breed of Multiple Perspectives analysis is more commonly referred to as the TOP – or Technical, Organisational and Personal - methodology. He has explored this theory through his editorship of "Technological Forecasting and Social Change," three books (1984; 1999; Linstone & Mitroff, 1993), and in a number of papers (Linstone & Zhu 2000; Linstone et al, 2001).  Through this period TOP has seen only a few comparatively minor revisions – the essence of the theory has remained fairly consistent, although there have been some developments in the definitions and scope. One could argue, and the author would be inclined to do so, that this is because Linstone has developed a solid methodology which needs little further development for it to work within the bounds which he has set. However, it is when attempts are made to apply TOP outside of those boundaries that the limitations appear, and thus this paper will explore a possible line of development for TOP that, if successful, will result in the formation of a more flexible framework for Systems Thinking in general and Information Systems in particular. This new framework, called MP++, will hopefully be a useful extension of TOP, and as such can be employed to extend Linstone's work into a number of different situations.

## Defining TOP

TOP stems from three major influences: C. West Churchman, Edgar Singer & Graham Allison (Linstone, 2000). From Singer and Churchman comes the notion of the Singerian IS, in which it is proposed that every IS presupposes all other ISs. While from Allison comes the use of multiple models, which Allison used to examine the Cuban missile crises (1971). At the centre of TOP is the idea that a single perspective is insufficient to fully encompass the overall picture of a complex system – thus researchers need to apply more than one perspective. Those perspectives, Linstone argues, come in three flavours: Technical, Organisational and Personal. By applying each perspective researchers will be able to get a better idea of the system as a whole, and will be able to see causes and consequences which would not have been apparent had but a single perspective been employed.

### The Technical Perspective

According to Linstone, the Technical perspective (the T in TOP) covers all models that are based on "scientific" analysis. That is, models such as Game Theory (Von Neumann & Morgenstern, 1944), Behaviourism, Allison's Rational Actor model (1971) – in short, anything that is quantifiable. Note that, unlike the next two perspectives, the T perspective seems to encompass a

number of different models for understanding Information Systems, as many would argue that Behaviourism and Game Theory (as but two examples) are very different approaches, even though Linstone groups them under the single perspective.

### The Organizational Perspective

The Organizational – or "O" – perspective is quite different from T. In the Organizational perspective Linstone is examining the organizational structure of the system. He is therefore interested in the relationships between the various organizations, and the manner by which they operate. However, it is important to note that, particularly in his latest book (1999), Linstone is not looking solely at formal organizational structures, but also at informal ones. Although the O perspective could look at how various departments within the same organization interact, it could just as readily be used to examine the way teams of individuals with common interests work with other teams, even if those teams are not formally defined.

### The Personal Perspective

As one might expect, the Personal (P) perspective is interested in people. When applying the P perspective we examine the individuals who make up the system, focusing on "subjective" properties such as feelings, beliefs, and values.

### Combining T, O & P

Linstone encourages researchers to examine a system three times, using T, O and P as three separate perspectives to be applied. These perspectives are applied in *parallel*. By doing so he is not claiming that no one perspective is "right" or "wrong", and that all three are required to get a complete picture of the causes of a given problem in a complex system.

For example, if looking at a project definition problem within a web development company, a researcher would apply each of the three perspectives in turn. The T perspective might reveal that the specifications for the project were incorrectly calculated, thus causing the entire project to be incorrectly defined. Perhaps the target demographic was wrong – the web design company designed a site aimed at 17-21 year old males, when the client was after a site aimed at 24-35 year old men and women. Or alternatively the site structure was incorrect, leading users towards the wrong products. The next perspective, O, might show that there was a lack of procedures with which to discover and fix the problem within the company. It might also reveal that communication problems between management, the graphic design department, the programmers and marketing meant that those who interacted on a day-to-day basis with the clients were unable to express their concerns with the project's direction to those in charge. Meanwhile the P perspective, by focusing on the individuals within the company, may reveal that the person responsible for drawing up the specification suffered from a belief that he or she "knew" what the client really wanted, irrespective of the opinions expressed by the client. In addition the department heads may have chosen not to pass on the concerns of those who worked under them, believing that their staff were not in a position to "see the big picture". Each of these three perspectives offers a different set of "causes" for the problem. If but one of these perspectives was used cause which it would reveal would be correct, but the researcher would still lack the complete picture.

Linstone's TOP has been accepted and recommended in the works of a number of IS researchers, including Olsen (2001) who has been looking at the application of TOP to multiple criteria decision analysis; Wood-Harper who has recommended it as a part of Multiview2 (Wood-Harper et al, 1998) and looked at TOP in regard to business process reengineering (Wood-Harper et al, 1994); and Courtney (2001a, 2001b, 1998), who has, amongst other things, applied TOP to problem formation (Courtney et al 2001b) and organizational learning (Courtney et al 1998). Outside of IS it is paralleled in the work of the philosopher Karl Popper and the psychologist Sigmund Freud, and similar concepts occur in such fields as Archaeology, where Keith Muckelroy (1978) examines a sunken ship in terms of three, distinct perspectives – the ship as a machine (which we can regard as similar to the T perspective); the ship as an element in a military or economic system (O); and the ship as a closed community, where the archaeologist examines the remains in the hope of understanding more about the individual people on the ship (the P perspective). It is clear that TOP has had both a considerable impact within IS, and that the concepts are ones that have appealed to some outside of the systems thinking field. Certainly TOP warrants being considered part of the "Swiss army knife" of systems thinking tools.

## Perspectives Outside of TOP

There are a number of perspectives that do not fit into TOP, even if all one is trying to do is to categorize them. One such perspective was explored by Wieck and Roberts (1993) in their examination of aircraft carriers. By taking a holistic approach, they developed what they referred to as the "Collective Mind" model – a view by which they see the aircraft carrier as consisting of a large number of parts (people) who interact in such a way as to create a greater whole. Unlike such concepts as a "Group Mind" (another perspective which will similarly be impossible to categorize within TOP), the Collective Mind approach does not claim that the system itself is intelligent, but only that the individuals within the system are intelligent. However, by operating through "heedful" behaviours, some knowledge is seen as not residing in the individual, and is instead seen as residing within the "collective" or "group". Although this emphasise on the importance of individual intelligence may lead one to attempt to place the "Collective Mind" in the P perspective, the overall approach defies categorization.

Although Wieck and Roberts limit themselves to a fairly "rudimentary" concept of mind, where the system simply contains collective knowledge rather than group intelligence, we often see more extreme concepts in day-to-day life. Often people refer to an organisation, or even a whole country, as if it was an individual with its own mental states. When a government raises taxes, often people talk of the government "wanting" more money. If a country goes to war they may speak of the country "desiring" revenge. When a company engages in anti-competitive practices, they speak of the company "wishing" to dominate the field. People often personify systems, and, by doing so, they ascribe to them mental properties as if the systems were cognitive entities. Such practices, although arguably not a "true" representation of the way things are, have considerable explanatory power. And as such they have a role in assisting people to understand complex systems. But once more TOP is completely unable to encompass such concepts. They don't fit within the categories Linstone proposes, as personification is clearly not a T perspective, but the holistic approach which such perspective employ also knocks out O and P from consideration - thus TOP cannot assist us in defining them.

Moving away from collective minds and personifications, Linstone (1999) proposed the existence of another perspective that does not fit within TOP – the "Religious" or "R" perspective. This perspective takes a holistic and subjective approach, focusing on what Linstone calls the "spiritual/mythological/religious" perspectives of a system. The R perspective could, potentially, encompass the concept of Personification. Although not described in much detail, it demonstrates that Linstone also acknowledges that TOP is not going to be able to encompass the full range of possible perspectives. Kamsah & Wood-Harper (1998) also attempt to extend TOP by offering "E", or the Inter-organisational/Environmental perspective. There is room here for further debate, as this perspective may possibly be subsumed by O, but again it suggests the possibility of perspectives beyond TOP that need to be defined and categorized in their own terms.

Even perspectives that do fit (in a loose sense) within Linstone's categories can still be impossible to define within TOP. There is a tendency for individual researchers to continuously "cross the boundaries" of TOP when examining a system. They apply T, O and P perspectives concurrently, rather than in parallel. The resulting conglomerate is a new perspective that cannot be held in any single category.

For example, returning to the web development company mentioned earlier, the management of a large company may view the relationships between the programmers and designers through an O perspective, the marketing people through a P perspective, and the clients through a T perspective. In such a situation, management may see the clients as being goal-orientated purely rational beings, similar to Allison's previously mentioned "Rational Actor" model; marketing people (whom they may spend considerable time with) as individuals; and the programming and design staff as two separate units, looking at their interactions based on past behaviours. Of course, different staff in the same company would see things differently – if a staff member worked closely with the programmers, for example, they might see them through a P perspective, while they may see management through a T perspective.

As the one overall perspective employs aspects of T, O & P, but applies them in ways that TOP is unable to encompass, the resulting perspective cannot be categorized within Linstone's methodology. Especially given that Linstone's approach requires you to apply T, then stop, return to start, and apply O, before finally starting again and applying P. An attempt to apply all three at once, to different parts of the same system, is not a move that TOP is comfortable with.

In the end, TOP fails to define a given perspective for the simple reason that it was never intended to do this in the first place. TOP is a methodology primarily designed to reveal the causes of a problem in a complex system, through retrospective analysis (Linstone et al, 2001). What it is not is a system for revealing, except in the most general sense, how a given researcher viewed the system. Nevertheless, it is proposed that TOP provides a basis for the development of a framework that can do just that.

# Extending TOP to MP++

The essence of an extended Multiple Perspectives framework comes from Linstone himself. Linstone states:

> "TOP suggests that there is a critical distinction between how we are looking and what we are looking at." (Linstone & Zhu, 2001)

TOP does suggest that. What TOP doesn't do is fully realise that distinction. In TOP what you are looking at and how you are looking at it are intrinsically connected – when you look at the organisational structure of a system, you look at it in a certain way; when you look at the individuals in the system, you look at them in a certain way. What the author would like to suggest is that a theory is proposed that goes a step further than Linstone. This is achieved by completely separating *what* is being looking at from *how* it is being looking at, thus permitting a greater degree of flexibility as to how the researcher should combine the two. As shall be demonstrated, this flexibility will allow a much greater range in the defining of different individual perspectives.

## *What We Are Looking At In A System – The Object*

How we view the structure of the system in any given perspective is a central issue within both TOP and MP++. Linstone (1999) recognized three different approaches. These were:

a) The organisational structure of the system (O perspectives)
b) The people in the system (P perspectives)
c) The system as a whole (R perspectives)

This leaves T aside for now, as it isn't clear exactly what objects the T perspective is focusing on. This is because Linstone's T perspective covers so much ground. For example, Allison's Rational Actor model is placed in T by Linstone, and it looks at the organisational structure of the system; while Utility theory, also classified by Linstone as part of the T perspective, can be applied to individuals (Linstone, 1999).

In order to define what a given perspective is looking at, it is suggested that the system is broken up into "Objects". Each object is, for the purpose of the perspective, a discrete entity that is examined both singularly and in relation to the other objects. Exactly what those objects are is unimportant - what matters here is simply that they can be clearly defined.

As an example, consider the situation of a small, eight-person lobby group. Assume the particular lobby group is made up of representatives from 4 different member organisations. We'll call the lobby group Collective.NET. There are a number of options as to what we might use for Objects, and some initial choices are summarised in Figure 1. These are:

**Option 1: Holistic**. In this case the researcher would look at the lobby group as a single entity. This particular approach would be ideal for Linstone's R perspective, but it would also be useful with the previously discussed personification approach, as well as Wieck & Robert's Collective Mind perspective.

**Option 2: Member Organisations.** Given that there are 4 member organisations, it is possible to separate Collective.NET into four discrete objects, each one of which contains two representatives. This set of objects would fit neatly into Linstone's O perspective as one of the "formal" organisational structures. It would also work well with a T perspective that employs Allison's Rational Actor model, although that will be discussed that in more detail shortly.

**Option 3: Voting Blocks.** In Collective.NET, there is a tendency for people to vote upon common lines. One option would be to group them according to how they vote, thus giving an informal organisational structure. This structure may, or may not (and in this case it's a may not) be similar to Option 2.

**Option 4: Individual Members**. If each person is treated as an individual Object, the result is a structure that is identical to the P perspective offered by Linstone.
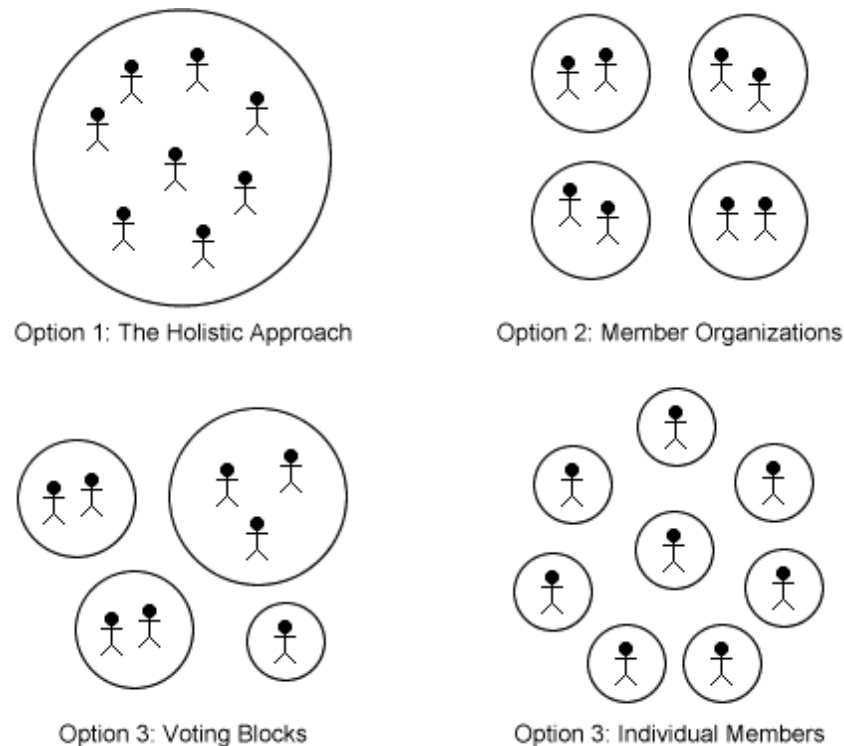
Option 1: The Holistic Approach    Option 2: Member Organizations

Option 3: Voting Blocks    Option 3: Individual Members

**Figure 1.  Proposed "Objects"**

Other potential sets of "Objects" may be based on Divisions/Departments, status, infrastructure assets, product mix and alternative strategies.

### How We Are Looking At The System – The Lens

How we look at the Object, or, to use a different term, which Lens is applied, is the second half of the equation. Linstone uses a number of different lenses, but he breaks them up into two categories - Objective (the T perspective) and Subjective (O and P). However to form a solid definition instead of a general category more precision will be required. Rather than just refer to the different lenses as "Subjective" or "Objective", it is suggested that they grouped them more specific categories. How specific they will need to be is something that needs to be explored. This will provide a number of different lenses, including:

**Rational Lens:** Similar to Allison's Rational Actor model, and in keeping with the work of Simon, (1957), the Rational lens presumes that the object will take the option which is best able to meet a set of pre-defined goals. Thus the application of the Rational Lens will involve calculating exactly what the goals of the object are, listing the options and their consequences, and using this chart to predict how it will act.

**Behaviourist Lens:** Behaviourist models work by examining how the object has acted in the past to various situations, and using that data to form laws of behaviour. Unlike the Rational Lens, the Behaviourist Lens makes no necessary presuppositions of the existence of goals or priorities in the system, but instead focuses on functional stimulus-response laws.

**BDI Lens**: BDI, or Beliefs, Desires & Intentionality, is included here as one possible subjective lens. The BDI Lens is similar to Folk Psychology, a term which is widely used within the Philosophy of Mind literature, to describe the "everyday" approach to understanding human behaviour. When using BDI, we presume that the object holds certain desires and that it wishes to meet those desires based on beliefs that it holds. It does not presume the degree of rationality that the Rational lens does, (although it does tend to expect some rationality), while it does presume the existence of internal states, unlike Behaviourism. (This use of

BDI can be distinguished from BDI in Agent Software – both are referring to the same Beliefs, Desires and Internationality, but in Agent Software there is presumed to be a "technical" account of how it works.)

Naturally these are but a very small subset of the range of possible lenses that can be applied. But for now they will do. Other Lenses, such as Game Theory (Von Neumann & Morgenstern, 1994) (which Linstone (1999) included under T) and Cybernetic Theory (Steinbruner, 1974) can be added at will. The aim of MP++ is not to define and categorise all possible Lenses, but to provide a framework into which any Lens can be readily incorporated.

### Putting Them Together

The major difference between Linstone's T.O.P. and the MP++ framework is not the addition of a Behaviourist lens and the suggestion of subsystem objects, but that a given Lens is not necessarily attached to any given Object. See Table 2 – the Objects are in the vertical axis (using the objects discussed in relation to Collective.NET), and the Lenses are on the horizontal. This enables any Lens to be related to any Object. The end result of this is that there is increased flexibility to define the essential characteristics of any perspective, remembering that the matrix can be extended as new Objects and Lenses are added. It is important to note here that the gaps exist in the table simply because not every perspective has been named – nor, for that matter, are they all necessarily going to be useful. Thus there is no particular need to "plug the holes" in the table.

**Table 1.  MP++ Applied to Lobby Group**

| | | Lens | | |
|---|---|---|---|---|
| | | Rational | Behaviourist | BDI |
| **Objects** | Holistic Approach | | CM | PER |
| | Member Organizations | RA | | |
| | Voting Blocks | | VH | |
| | Individual Members | RUR | | P |

Within Table 1, "CM" represents a possible location for Weick & Robert's Collective Mind approach - they use a holistic model, as their interest is in the knowledge contained in the system rather than in parts of the system, but they employ a behaviourist, rules-based lens. "PER" is where one might place a "Personification" model - it presumes that the system has desires, beliefs, wishes, etc, just like a person, and it uses as the Object the system as a whole. Allison's Rational Actor model appears as "RA", as Allison presumes (as the name suggests) a Rational Lens, but he applies it on an Organisational level. If a Rational Lens was applied to individuals within the system, the result would get "RUR" - where the individuals are treated as logical, rational "robots". An examination of how groups of people have voted in the past might result in VH, while Linstone's P perspective would be placed in the lower right corner - it looks at individuals, but it does so with a subjective lens.

This matrix approach also allows the possibility of attaching different Lenses to different Objects within the one perspective, thus creating the "conglomerate" perspective, employing aspects of T, O & P at the same time, which was mentioned earlier. Thus one might be able to view the users of an information system using a Rational Lens, the management through a BDI Lens, and the support staff using a Behaviourist Lens. This would, or so it is intend to show, certainly cover the problems encountered in the brief case study to follow. However, returning to the previous example of the web design company, we could define the Management's perspective as being:

| **Object** | **Lens** |
|---|---|
| Marketing staff | BDI Lens |
| Programming Staff | Behaviourist Lens |
| Design Staff | Behaviourist Lens |
| Clients | Rational Lens |

The test of this approach though comes through its application to real-life case studies. Thus:

# MP++ in Action

In March 2001 the author was requested to be involved in a series of discussions, along with a number of others, aimed at developing a strategy to revive an online company that was in dire need of assistance. The company was well aware of their troubles, and had implemented a number of solutions that were intended to revive their business. The solutions failed. It was suspected that it wasn't their solutions that were at fault, per se, but that rather they had been using a perspective that was perhaps not entirely suited to their situation. Their solutions were good ones – but only if their initial perspective was accepted. The problem faced was two-fold: a) how could their "perspective" be highlighted in such a way as to make it clear to them how that perspective was leading them to unsuccessful solutions, and b) how can a different perspective (or perspectives) be developed which would encourage the proposal of new solutions to the problems which they faced.

A couple of minor points should be noted here. The first is that reviving the company was not dependent on showing them the limitations of their perspective. It was quite possible for a number of alternative solutions to be proposed and implemented without the management of the company changing their approach to the problem at all. One could argue that this is the role of consultants - to provide management with new solutions, rather than to show them how to develop solutions on their own. It is even possible that simply providing new solutions will lead to an automatic change of perspective on the part of management. Nevertheless, the process that is about to be outlined has, it is believed, a degree of intrinsic value, irrespective of whether or not alternative processes might be equally successful. The second point is that although in many ways this example may seem trivial, and certainly the new solutions proposed should have been clear to any competent analyst without the use of MP++, it is also an example that clearly demonstrates how the choice of perspective influences the types of solutions proposed. Later research will look at applying MP++ to more complex information systems.

At any rate, the application of MP++ is going to require the completion of four steps.

1. Define the company's perspective
2. Show how the perspective influences their solutions
3. Develop a new perspective by "pushing the borders" of the original
4. Propose a new set of solutions based on this perspective

First, however, it would be useful to examine in more depth the various properties of the company concerned.

## *Properties of the Company*

The online company had only two products, and both took the form of being information provided to clients. Their primary business was in providing free information from a large database via the Internet to the general public, while selling advertising to interested parties. The information took the form of URLs and descriptions of various websites online, and was provided for them by the owners of those sites. When they discovered that they were in trouble, and that the revenues raised through the selling of advertising were insufficient to cover costs, they started offering a second product that they hoped to use to cover the losses from the first. This second product was, again, providing information from a database to clients, but this time they charged clients for access to the database, and the database contained radically different information. They provided free time-limited access with this second product, and believed that their client's "loyalty" would be sufficient to prevent them from abusing the system.

It didn't work. The second product lost money as quickly as did their first, dramatically increasing their problems. It was reasonably successful as far as numbers were concerned, but there was a massive amount of abuse by clients, who were misusing the time-limited access.

All of this is fairly typical for online businesses – there are a great number of organizations that provide information for free, and use the large number of "hits" that they then receive to attract advertisers. Equally, there are a great number of companies that charge subscribers for access to information. Nevertheless, this particular company had a few interesting aspects which distinguish it slightly from the norm:

a) They appealed to a very specific (and reasonably large) demographic.
b) There was a distinct lack of competition – there were few rivals for this demographic, and those rivals tended to have considerably smaller databases.
c) There was considerable loyalty on the part of many of the users.

d) The lack of competition and large demographic meant that the business received a great number of "hits".
e) The target demographics were well known for spending money on their interests, and covered a wide range of ages.
f) The business was fairly cheap to run – it had only two full-time staff, and two dedicated web servers.

Given this, it isn't immediately clear how they managed to get into so much trouble. Certainly the major concerns for this sort of business were covered – they had plenty of hits, low costs, and a degree of consumer loyalty. All they needed were the advertisers, and this was where they were failing. At the time, as now, the advertising dollar was hard to come by – online advertisers are not exactly desperate to place their advertisements on every available website, and competition for their money is fierce. So perhaps it isn't surprising that they had trouble getting funds. Nevertheless, many online businesses have managed to succeed, even in a difficult climate, and the combination of large numbers of hits, very low overheads, and an appealing demographic should arguably have resulted in a better situation than the one they found themselves in.

The issue at hand, though, is not whether or not they could have survived, but how they went about solving their problems. And to do that one needs to first define their perspective.

### The Company's Perspective

As has been shown, the first step in defining a perspective using the MP++ framework is to draw boundaries around the objects in the system. After numerous conversations with the business and the various people involved, it became clear that the management had being breaking the system into four separate components. These were:

- Advertisers outside of the community (AdO)
- Advertisers within the community (AdW)
- The business itself (Company)
- Users of their database (Users)

They employed a Rational lens for AdOs, and went on the assumption that the only goal of the AdOs was to sell products. Therefore it was assumed that AdOs would advertise on any web site that would allow them to be seen by a sufficiently large (and interested) audience. A simple, logical formulation that chose not to take into account any sort of "subjective" view of the AdOs. The AdWs, on the other hand, were seen quite differently – perhaps because they were members of the same community. They were treated using a BDI lens, and were offered special deals because it was felt that they deserved support, and would appreciate the extra assistance. The online company itself was viewed by management using a Rational lens again, so it was assumed that the role of the company was, first and foremost, to break even. They didn't wish to make large profits (although I doubt that the owners would have been upset if they had). The actions of the company would be those that managed to improve their financial situation. Finally, the Users of the company's services were viewed through a BDI lens, and thus were seen as having needs that should be met, and in return were expected to offer considerable loyalty and support to the company. As a complete package, we get Table 2.

**Table 2.  The Company's Perspective**

| Object | | Lens | |
|---|---|---|---|
| | | Rational | BDI |
| | AdO | X | |
| | AdW | | X |
| | Company | X | |
| | Users | | X |

As a result of this perspective a few things become evident in the behaviour of the company. The first was that they focused on hits when trying to attract AdOs – it was assumed that if their hits were high enough, the AdOs would want to advertise on their site. They chose to ignore issues such as the type of demographic to which they appealed, the "look and feel" of the web site, and the "professionalism" of their presentation. These things appeared to be regarded as insignificant, and of no real interest to the AdOs. Furthermore, their view of the AdWs meant that they focused on offering special deals, as they wanted to support and encourage the AdOs. And finally, their belief that the Users operated out of loyalty, and were grateful for the service provided

by the company, led them to believe that the Users could be trusted not to misuse the free trial period. They expected the support of their Users, and when it wasn't forthcoming they were distraught.

In summary then, the perspective employed by the company led them to implement three solutions:

a)  The development of the site in order to increase "hits", which they saw as being the only factor which would influence the AdOs. (Rational Lens).
b)  The creation of a new web site which would offer Users access to information, employing an "honour system" to limit abuse. (BDI Lens).
c)  The offering of more special deals to the AdWs in order to increase advertising from that sector. (BDI Lens).

### *An Alternative Perspective*

The key to developing a new perspective from an old one, when employing MP++, is to question the initial boundaries and lenses. Why, for example, are all the users considered as one object? Would it be better to separate them into subsystems? Why employ a Rational lens on the AdOs? What would happen if one were to use a BDI lens instead? Manipulating the MP++ matrix in this manner provides a number of different approaches.

As one possible approach, the first move might be to separate the Users into two groups – loyal, devoted users (l-Users), and the rest. The second step might be to employ a different set of lenses. Specifically, treating the AdOs subjectively, rather than through a Rational Man lens; treating the Users as Rational, rather than using a BDI lens; and employing BDI on the l-Users. The results have been tabulated in Table 3.

**Table 3.  An Alternative Perspective**

| | | Lens | |
|---|---|---|---|
| | | Rational | BDI |
| **Object** | AdO | | X |
| | AdW | | X |
| | Company | X | |
| | l-Users | | X |
| | Users | X | |

This perspective lends itself to different solutions to the company's woes. If the company looks at the AdOs as subjective agents, with desires and interests and all the rest, they will need to look for solutions other than merely offering statistics in order to convince AdOs to advertise on the website. Instead the company will need to focus on more intangible aspects of their site and make them more appealing – the look-and-feel of the web pages, the professionalism of the company, and so forth. Furthermore, by separating the Users into two groups it becomes clear that while the company might be able to count on loyalty from a percentage of users, another percentage may have simpler driving factors. Specifically, they want to get information from the site, and to do so for the least cost. So solutions based on the loyalty of the users will need to be tailored to count on having the support of only a percentage of the overall numbers. One suggestion that emerged from this perspective was to use the l-Users to provide a temporary injection of funds, through volunteer donations of money, goods and services – their support may potentially have been enough to fund the company for long enough to get longer-term solutions off the ground.

## Conclusion

MP++ is at a very early stage of development, and a lot more work is required to see if it is going to become a useful tool in IS research. It is offered here as a possible direction for further research. In particular, work will need to be done to establish exactly what lenses are possible, whether or not they do constitute different ways of looking at things, and whether or not they will then serve as a useful basis for defining individual perspectives. Presuming that this side of the research progresses as one might wish, there are still two more situations to apply MP++ to: the selection of appropriate perspectives based on limited amounts of information, and the use of it to compare and contrast different perspectives of the same information system. Furthermore, the

use of MP++ to define a single perspective, as was done in the above case study, is something that will need to be explored in more complicated situations.

Nevertheless, even in this early form MP++ has succeeded in its initial goals. It was able to encompass perspectives that TOP could not, and it seems to have been successful in offering some insights into the case study that was used here. It allowed the initial perspective to be defined, and once defined, that definition could then be used to show how the solutions that the management were developing emerged from their perspective on the problem. Furthermore, once a perspective was defined, the definition provided something to work with in order to try and create a new perspective from the old – one that did then offer alternative solutions to the problems. If nothing else, these small successes would suggest that further research is warranted.

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