The Space of Influence: Developing a New Method to Conceptualise Foreign Information Manipulation and Interference on Social Media

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Abstract: *Foreign information manipulation and interference (FIMI) on social media is a fast-evolving threat to democracies. However, there is a growing need to systematically conceptualise the phenomenon. General Morphological Analysis seeks to explore the totalities of a complex problem, but is restricted by simplification. Using and modifying the method expands the morphological space. This expansion and relying on statistical calculation expose internal interdependencies of the phenomenon. Operation design is largely dependent on five parameters: 'spread strategy', 'information channelling', 'market targeting', 'presented source', and 'operational openness'. These parameters are more likely to affect other parameters and thereby define significant aspects of a FIMI operation.*

Keywords: *Foreign Information Manipulation and Interference, FIMI, Social Media, General Morphological Analysis, Propaganda, Information Warfare, Operation Design, Operation Analysis*

Introduction

Foreign information manipulation and interference on social media—hereafter referred to as FIMI, borrowed from the European External Action Service (Strat.2 2023)—is fast emerging as a threat to democratic stability, social cohesion, and trust in many societies. Some phenomenological work is beginning to emerge, but FIMI still seems a wicked problem (Rittel & Webber 1973). It should be useful, then, to attempt to map out the internal mechanisms and dynamics of the problem and to shed some more light on the phenomenon.

There is certainly space for conceptual work. A 2020 paper on combating disinformation on social media points out the dearth of threat modelling (Shu *et al.* 2020). In addition, EUvsDisinfo's year in review admits, "many of aspects of the phenomenon remain elusive" (2021). In the great wash of development that characterises the digital arena, and the fuzzy science that attempts to circumscribe the psychology of influence, manipulation, and interference, this is not a surprise.

Conceding that the praxis mutates at breakneck pace and the underlying technology 'moves fast and breaks things', researchers are beginning to attempt to elevate the understanding of the phenomenon. There is indeed excellent work arising from several institutions. The European External Action Service, which pilots the EUvsDisinfo project, has begun to answer its own challenge. Their "1st EEAS Report on Foreign Information Manipulation and Interference Threats"

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(2023) does well to argue a new defensive framework and conceptual understanding of FIMI. Other defensive frameworks of note include the DISARM Framework created by the eponymous Foundation (DISARM Foundation), and James Pamment's work in crafting a common language and understanding for the EU on this threat (2020). Regular readers of this journal may also have seen my colleague Arild Bergh's (2020) description of the cyber kill chain approach to understanding FIMI, an approach that has gained steam in recent years.

These and others represent forays into the phenomenological perspective on FIMI—as does this paper. It contributes to this strand of research by proposing to label FIMI's components, not as a known entity, but as an interactive system.

Methodology

The method utilised in this paper is a novel one. It departs from a known methodology that seeks totality (General Morphological Analysis, hereafter GMA) and applies to it new syntheses and analyses.

This section explains the GMA method in brief, thereafter turning to problems with using this method to address the question at hand. After this, the modified method is presented, before finally the limitations of the methods are discussed.

The general method

GMA has previously featured in this journal, and there are entire papers dedicated solely to explaining and exemplifying its use (see, for example Ritchey 2018; Álvarez & Ritchey 2015), so, in the service of brevity, a limited presentation suffices here.

Attributed to the astronomer and physicist Fritz Zwicky, GMA is in his own words "totality research" (Zwicky 1969, p. 30). The method seeks to examine "the total set of relationships contained in multi-dimensional, non-quantifiable, problem complexes" (Ritchey 2011). This is achieved through four steps (Álvarez & Ritchey 2015):

1. Select a set of parameters, each with their own set of values (in this paper 'modes') that in sum frame the problem at hand.
2. Construct a morphological field with the parameters set up against each other.
3. Carry out a cross-consistency assessment (CCA) by comparing all of the parameter values with each other in a cross-consistency matrix.
4. Examine the remaining consistent combinations to yield a series of 'configurations'.

In step one, the selection of accurate parameters and modes is crucial. These should be of a kind that encapsulate as much of the territory of the problem at hand as possible. As an aside: the terms most often used are 'parameters' or 'categories' for the overarching set titles, and 'values', or sometimes 'states' for the components of those sets. In this paper, due to the respectively numerical and political meanings of 'value' and 'state', the term 'mode' is employed in their place. Thus, herein a 'parameter' consists of alternative 'modes', and a combination of 'modes' across the series of parameters entails a 'configuration', as displayed in **Table 1**, below. This table is also an example of step two.

Parameter A	Parameter B	Parameter C	Parameter D	Parameter E	Parameter F
Mode A1	*Mode B1*	*Mode C1*	*Mode D1*	*Mode E1*	*Mode F1*
Mode A2	*Mode B2*	*Mode C2*	*Mode D2*	*Mode E2*	*Mode F2*
Mode A3	*Mode B3*	*Mode C3*		*Mode E3*	*Mode F3*
Mode A4				*Mode E4*	*Mode F4*

Table 1: Example of morphological box with parameters listed horizontally, each with a set of modes where the highlighted path of modes represents a configuration

In step three, setting up the cross-consistency matrix consists of constructing a space in which each of the parameters and modes can be checked for consistency against the rest of the parameters and modes. This is done by employing a Boolean 'consistent' or 'inconsistent' judgement on each intersecting modal pair. Ritchey (2018) refers to three different types of inconsistencies: logical contradictions, empirical constraints, and normative constraints, but does not differentiate between them after the judgement is made. An example of this is given in **Figure 1**, below. This step aids in dramatically scaling down the number of potential configurations.

		Parameter A				Parameter B			Parameter C			Parameter D		Parameter E			
		Mode A1	Mode A2	Mode A3	Mode A4	Mode B1	Mode B2	Mode B3	Mode C1	Mode C2	Mode C3	Mode D1	Mode D2	Mode E1	Mode E2	Mode E3	Mode E4
Parameter B	Mode B1	X	X														
	Mode B2			X	X												
	Mode B3		O	X	X												
Parameter C	Mode C1	X	X	X			X	X									
	Mode C2	X	X		X	X											
	Mode C3		O			X		O									
Parameter D	Mode D1		O		X	X		O	X		O						
	Mode D2		X	X						X							
Parameter E	Mode E1	X		X		X		X	X				X				
	Mode E2	X	X	X		X	X		X			X					
	Mode E3		X	X		X		X		X	X	X					
	Mode E4		O		X			O	X		O	O	X				
Parameter F	Mode F1		X					X		X		X			X		X
	Mode F2	X		X	X		X		X	X		X			X	X	
	Mode F3	X	O	X			X	O			O	O	X	X		X	O
	Mode F4	X			X	X			X		X	X			X	X	

Figure 1: Example of the cross-consistency matrix, where inconsistent pairs are registered with 'X's, and the configuration exemplified in **Table 1** is represented by 'O's

The fourth step consists usually of a table listing the entire series of consistent configurations. Often, configurations in this step can be grouped and categorised into possible solution-spaces that address the original problem.

In this way, the method has described the space of possibilities within the scope of the problem. GMA has long been an asset for qualitative investigations in a range of sciences (see Álvarez & Ritchey 2015 for an extensive list of uses). In the field of defence research, it is a method of discerning distinct sets of scenario types to aid in military planning (Johansen 2018). Used capably, this is a fruitful approach for well-defined problems.

Pitfalls and problems

Faced with so-called wicked problems (Rittel & Webber 1973), the conventions of GMA can be limiting. The fundamental issue here is that choosing sets of parameters and modes in large part itself defines the problem. Indeed, the first maxim of the wicked problem is that it cannot be objectively formulated. As Rittel and Webber note: "every specification of the problem is a specification of the direction in which a treatment is considered" (1973, p. 161). If GMA seeks to identify "the total set of possible relationships contained in a given problem complex" (Álvarez & Ritchey 2015, p. 29), the totality of those relationships depends wholly on the selected parameters and their modes. In this sense, it becomes clear that, while GMA is well suited to explaining well-known problems, it may be less suited to more unmapped terrain.

In short, the method hinges rather precariously on the careful selection of the handful of parameters and their modes. Ritchey (2018) describes a usual number of parameters as between seven and twelve, though Johansen (2018), in his exploration of scenario classes, uses only four.

The oft-stated reason for aiming for few parameters and modes is that even a handful of these yield extraordinarily large numbers of potential configurations. For example, Ritchey maintains that the normal range of seven to twelve parameters usually returns "between 50,000 and several million configurations" (2018, p. 82). Therefore, the standard method may not provide a simple enough model of a less well-understood problem to be manageable.

The selection of these parameters carries heavy consequences on the ensuing analytic process and requires deep understanding of the phenomenal bounds. When these bounds are poorly understood, the essentialist conventions on parameter setting narrow the exploratory scope to what is already known or presumed.

The modified method

It is clear that GMA must be modified somewhat in order to be useful here. A proposed method is therefore to use the basic setup of GMA (the definition of certain parameters and their modes and setting up the cross-consistency matrix), but without some of the model's strictures. For instance, employing as many parameters as is wished as well as indiscriminately spanning out these parameters' possible modes will push the boundaries of the analysis out into uncharted spaces.

Since the large number of parameters and modes results in an astronomical number of final configurations, the goal of the analysis departs from GMA. Whereas GMA seeks this list, the modified method instead seeks to expose the relationships between the parameters and modes, how they interact and influence one another. It should be noted at the outset also that since the purported 'totality' of a wicked problem is impossible to achieve, the new method does not claim the Zwickian totality. Instead, the selection of parameters and modes should primarily be informed by which qualities the researcher wishes to see interact, bearing in mind that some interactions are counterintuitive.

As previously noted, the general method aims for simplicity by applying a Boolean 'consistent' or 'inconsistent' judgement in the cross-consistency matrix. However, it is possible to employ a third, middling quality:'possibly consistent'. It is important to note that these judgements are judgements of possibility. Remembering Ritchey's (2018) classification of inconsistencies, it could be argued that an 'inconsistent' judgement refers to a logical contradiction, in that such a combination of modes is logically invalid. A 'possibly consistent' judgement on the other hand is perhaps empirically or normatively uncertain while logically valid. A 'consistent' judgement is a decision that a modal interaction is logically, empirically, and normatively sound. Taking advantage of this added nuance, these judgements can be scored, for example as 2 for 'consistent', 1 for 'possibly consistent', and 0 for 'inconsistent'.

Calculations

The result is a cross-consistency matrix populated by values, which allow for some rather basic statistical scoring. In this paper, the following scores were calculated:

1. The Parameter Relational Score (PRS);
2. The Mode Consistency Score (MCS);
3. The Parameter Average Consistency Score (PCS_{Avg});
4. The Parameter Average Relational Score (PRS_{Avg});
5. The Parameter Absolute Consistency Score (PCS_{Abs}); and
6. The Parameter Span Score (PSS).

The Parameter Relational Score: The PRS shows the level of compatibility between two parameters. This is set up as a table mirroring the morphological table, with only the parameters in the axes. The score in the resulting fields is derived from taking the total score of the intersecting modes of each parameter and dividing it by the number of cells intersecting. The score is then standardised to 1 by dividing the final score by 2 (since logically, the maximum score given to judge consistency is 2). The formula (where *M* represents a total mode score and *n* represents the number of modes in the parameter) is as follows:

$$PRS = \frac{1}{n}\sum_{i=1}^{n} M_i/2$$

If the PRS is 1, the two parameters can be considered fully consistent, in that all of their modes can function in tandem. These parameters are independent of each other; utilizing a specific mode in one parameter has no bearing on the selection of a mode in the other. Conversely, a PRS below 1 indicates that the two parameters are restricted in their interaction, with only some modes working together. These parameters are therefore more dependent on each other, suggesting that the selection of one mode can restrict the selection of the other parameter's modes.

The Mode Consistency Score: The MCS indicates how consistent a given mode is with all other modes. The score is calculated by adding all of the values of a mode and dividing the sum by the total possible sum of that mode (where all interactions are considered consistent). The formula (where *V* represents a single mode intersection value and *n* represents the number of mode intersection values for the mode) is as follows:

$$MCS = \frac{\sum_{i=1}^{n} V_i}{\sum_{i=1}^{n} 2_i}$$

A high MCS score points to a mode that is possible in many different configurations and that is largely independent from other mode selections. A low score shows a mode that restricts configurations and is more dependent on other mode selections.

The Parameter Average Consistency Score: The PCS_{Avg} score shows the average consistency of a parameter with the entire range of other parameters. This is calculated by summing the mode consistency scores of each of a parameter's modes and dividing this by the number of modes available in that parameter. The formula (where *MCS* represents the MCS score calculated above and *n* represents the number of modes in the parameter) is as follows:

$$PCS_{Avg} = \frac{1}{n}\sum_{i=1}^{n} MCS_i$$

A high PCS_{Avg} denotes a parameter that is highly variable in its interactions with other parameters, and that is largely independent in mode selection. A low PCS_{Avg} points to the opposite: that a parameter is restricted in its interactions and is more dependent on other parameters for mode selection.

The Parameter Average Relational Score: The PRS_{Avg} is similar to the average consistency score in that it also describes the average consistency of a given parameter with all other parameters. This score is calculated by averaging all of a parameter's relational scores from the relational table. The formula (where *PRS* represents the PRS score calculated above and *n* represents the number of parameter intersections for the parameter) is as follows:

$$PRS_{Avg} = \frac{1}{n}\sum_{i=1}^{n} PRS_i$$

As in the previous calculation, this calculation indicates the parameter's variability in consistency with other parameters. A high PRS_{Avg} therefore again shows a highly variable and independent parameter in terms of mode selection. A low PRS_{Avg} shows a more restricted and dependent parameter.

The Parameter Absolute Consistency Score: The PCS_{Abs} is a percentage showing the portion of a parameter's interactions with other parameters that are absolutely consistent (that is, receiving a score of 1 in the relational calculation). The formula (where PRS_{Abs} represents the number of PRS scores in a parameter scored to 1 and PRS_{Tot} represents the total number of PRS scores for that parameter) is as follows:

$$PCS_{Abs} = \frac{PRS_{Abs}}{PRS_{Tot}}$$

The score again shows the level of a parameter's variability and independence from other parameters' mode selection. A high PCS_{Abs} indicates variability and independence, whereas a low PCS_{Abs} indicates restriction and dependence.

The Parameter Span Score: The PSS shows the difference in mode consistency within a given parameter. It simply subtracts the lowest mode consistency score from the highest mode consistency score within a parameter. The formula (where MCS_{Max} represents the highest MCS score of a parameter and MCS_{Min} represents the lowest MCS score of the same) is as follows:

$$PSS = MCS_{Max} - MCS_{Min}$$

The resulting score represents the span of consistency within the parameter. A low PSS indicates that the mode selection within this parameter has few restricting and dependent consequences for consistency with other parameters. A high PSS indicates that the selection of modes has larger consequences on restriction and dependence on consistency with other parameters.

Utilizing these scores sheds some light on the relationships between parameters and between modes. The modified method's advantage is that it indicates qualities like parameter restriction, variability, dependence, and independence. If the analysis is supplemented with cases with few known modes, it may also be used to extrapolate unknown modes. Certain patterns in the data may also yield interesting hypotheses to be explored by further research and analysis.

The modified method summarised

In sum, the modified method follows the first part of GMA in terms of its methodological construction, but breaking a few rules at the outset allows for an alternative analytical goal. The innovation allows for an accounting of the internal dependencies of phenomenal components. The modified method in short becomes:

1. Select a set of parameters that interact within a phenomenon, each with its own set of modes.
2. Construct a cross-consistency matrix, and carry out CCA, comparing all modes against all other modes for 'consistent', 'possibly consistent', or 'inconsistent' judgements.
3. Transpose values onto the judgements and carry out statistical calculations on those values.
4. Examine the results to discover the relationships between the parameters and modes.

Limitations to the method

There are definite limitations to the value this modified version of GMA. While GMA purports to seek total descriptions of problem complexes, this method cedes such an ambition in favour of exploring connections and interactions. In one sense, the subjective selection of parameters and modes can be seen as a weakness, especially in describing wicked problems. However, the method does seem effective for seeking out the internal dynamics of the parameters and modes entered. This method can still offer valuable insight to difficult analyses.

The cross-consistency assessment is also a somewhat subjective exercise. This could be addressed by introducing properly scored and standardised empirical data into the model. It is this author's impression that such frameworks of FIMI are in development. Perhaps aided by these and artificial intelligence or machine learning processes to parse the data, the method could truly shine.

Another qualification to keep in mind is that quantitatively manipulating qualitative primary data may result in findings that have the appearance of objective decimal places and standard deviations, but that in reality are fuzzier and more subjective. This does not undermine the findings as such, but is an important point to keep in mind.

Nevertheless, if a simple qualification is granted, the value of the method is clear: this is not the definitive and complete exploration of FIMI, but rather an attempt at exposing its internal logic.

Lastly, but far from least, the method has yet to be validated. A worthwhile attempt at validation would certainly be impolite to the word count requirements asked for here. However, it would be useful to see a standalone paper looking to validate the method by applying it to known and pre-analysed cases. Likewise, attempts at plugging the method into systems utilizing artificial intelligence or machine learning could provide some very interesting results. Other researchers have indeed used such tools in applying GMA to the problem of FIMI (for example, Kapusta & Obonya 2020).

Analysis Using the Modified Method

It is now possible to examine FIMI through this modified morphological analysis method. First, parameters and their modes are defined. Second, the morphological field is discussed. Third, the cross-consistency matrix is constructed and scored. Fourth, the relational table and statistics are calculated.

Parameters and modes

The first step is to identify parameters and modes. The overarching goal here is not to be as economical as possible, but to be greedy. A useful way to find parameters is to bring to mind variable qualities of an overarching kind. That is to say, researchers must find a category of descriptors where the category will within itself hold all possible kinds of operations. However, as opposed to traditional GMA, it is not so important here to aim for a total set of descriptors. Whichever parameters are selected will be tested for interactions; the set's completeness is not important.

An obvious example of a category or parameter is 'operation ownership'. All FIMI operations are owned by either a state or a non-state actor. Similarly, 'temporal duration' is a good example. All operations have a duration, be it days, months, or years long. Further along, less obvious parameters crop up, such as 'lateral coordination'—to what extent the influence operators are totally or partially coordinated, or not coordinated at all. The modes should express the range of qualities under each of these parameters.

In the case of FIMI, 18 parameters were identified, each with a share of the total 51 modes. These were devised after a review of relevant literature and examination of the empirical record (see, for example, Global Engagement Center [2020] Howard *et al.* [2018] and Paul & Matthews [2016] for general descriptions; and Evangelista & Bruno [2019] Nimmo *et al.* [2019] Nimmo *et al.* [2020] and Rodriguez [2020] for more empirical cases). A list with explanations is found in **Table**

2, below. Again, it should be pointed out that this selection of parameters and modes is subjective and not necessarily total.

List of Parameters and Modes with explanations					
No.	**Parameter**	**Explanation**	**No.**	**Mode**	**Explanation**
1.	Operation ownership	*Type of actor perpetrating influence operation*	*a.*	state	*Operation owned and run by a state actor*
			b.	non-state	*Operation owned and run by a non-state actor*
2.	Temporal duration	*The duration of the operation*	*a.*	years	*Long-term operations*
			b.	months	*Medium-term operations*
			c.	days	*Short-term operations*
3.	Market targeting	*The geographical market of the operation*	*a.*	global	*Global market*
			b.	national	*National market*
			c.	local	*Local market*
4.	Audience targeting	*The intended audience*	*a.*	all	*Everyone in the market*
			b.	most	*Most people in the market*
			c.	some	*A few in the market*
5.	Target familiarity	*Influence actor's level of knowledge about target*	*a.*	deep	*Influence actor has detailed and up-to-date knowledge about target*
			b.	shallow	*Influence actor has vague and cursory knowledge about target*
6.	Specificity of aims	*The type of aim intended*	*a.*	concrete	*Manipulating direct decisions*
			b.	abstract	*Manipulating public discourse, for example*
7.	Operational openness	*Whether the operation is hidden or open*	*a.*	covert	*Hidden operation, high OPSEC*
			b.	overt	*Open operation, low OPSEC*
8.	Platform strategy	*Number of social media platforms used*	*a.*	multiple	*Multiple platforms used*
			b.	single	*Only a single platform used*
9.	Lateral coordination	*Level of coordination between influence operators*	*a.*	total	*Total coordination between influence actors*
			b.	partial	*Some coordination between influence actors*
			c.	none	*No coordination between influence actors*
10.	Information channelling	*Structure of messaging and sources intended for influence*	*a.*	multi-layered	*Multiple messages and sources interacting to enact influence*
			b.	redirect	*Message redirects to a single source*
			c.	prima facie	*Only a message, no sources provided*
11.	Presented source	*Presented originator of messaging and sources*	*a.*	native	*Message or source presented as belonging to state being influenced*
			b.	foreign	*Message or source presented as belonging to a foreign state*
12.	Messaging language	*Language primarily used in messaging*	*a.*	native	*Messaging is primarily in the native language of market/audience*
			b.	world	*Messaging is primarily in a world language understood internationally*

13.	Information legitimacy	*Whether information presented is factual or not*	*a.*	factual	*Messaging and sources present factual information*
			b.	non-factual	*Messaging and sources present non-factual information*
14.	Quantity of messaging	*Relative amount of messaging sent out*	*a.*	high	*Many messages sent out*
			b.	low	*Few messages sent out*
15.	Messenger type	*Type of messenger used*	*a.*	deep legends	*Elaborately constructed inauthentic personae*
			b.	sockpuppets	*Simple, inauthentic personae created or captured*
			c.	proxies	*Other personae loosely connected to operation owner*
			d.	automated profiles	*Machine-like profiles designed for specific tasks*
16.	Message type	*Type of content used as message vehicle*	*a.*	post-text	*The text of a social media post itself*
			b.	links	*Link to a source website*
			c.	video	*Video-based media such as clips*
			d.	audio	*Sound-based messaging*
			e.	hashtags	*Thematic topics designed to trend and spread*
			f.	memes	*Often humorous pictures with text designed to spread*
17.	Source type	*Type of source used for the information*	*a.*	governmental	*Official statements from influence actor's government or apparatus*
			b.	established media	*Article, audio or video in established or traditional media*
			c.	alternative media	*Article, audio, or video in non-traditional media, such as news blogs*
			d.	social media	*Social media post or series of posts, either genuine or manufactured*
			e.	other	*Other sources such as forgeries, hack and release, or photographs, for example*
			f.	none	*No source used, messaging only*
18.	Spread strategy	*Planned mode of dissemination*	*a.*	synthetic	*Influence actor takes major part in dissemination*
			b.	organic	*Dissemination occurs naturally in unwitting population*

Table 2: List of parameters and modes with explanations

Discussion of the morphological field

Setting up the morphological field is not a step in the modified method. It is useful here to briefly explain why.

As previously indicated, trying to set this list of parameters and modes up in the classical way has its challenges. In this case, the field is 18 parameters wide and rather unfit for printing. Indeed, the field resulting from this would be so busy as to render the extraction of functioning configurations meaningless. They would be too many and often too similar to inform configuration selection. The field in this sense represents an 18-dimensional space that, in GMA, would ideally describe the totality of FIMI on social media. This is neither possible, nor the aim of this modified method.

Before inconsistencies are weeded out, the 51 modes within 18 parameters in the model amount to an insurmountable 2 x 3 x 3 x 3 x 2 x 2 x 2 x 2 x 3 x 3 x 2 x 2 x 2 x 2 x 4 x 6 x 6 x 2 = 35,831,808 configurations. And so, since the identification of configurations is not the goal of the modified method, setting up the field does not yield much in terms of usefulness.

The cross-consistency matrix

The cross-consistency matrix, like the morphological field, is also fairly unwieldy with this number of parameters and modes. However, it is what sets in motion the analysis. The point here is to set up a two-axis matrix, where all of the parameters with their modes are lined up in each axis. This results in two comparisons of every mode against all other modes, so duplicates can be eliminated.

With the given inputs, 1,178 judgements must be made. The resulting matrix is shown in **Figure 2**, below. How judgements are marked in the table varies somewhat in GMA. Due to coding conventions that simplify the transposition of judgements to values, a specific form is used in this case, where each of the three judgements are signified. Of course, it is even simpler to code the judgements straightaway as ‘2’, ‘1’, and ‘0’. The transposed matrix is not shown, as it simply mirrors the original matrix with a numerical key.

		Operation ownership		Temporal duration			Market targeting			Audience targeting			Target familiarity		Specificity of aims		Operational openness		Platform strategy		Lateral coordination			Information channelling			Presented source		Messaging language		Information legitimacy		Quantity of messaging		Messenger type				Message type						Source type					
		state	non-state	years	months	days	global	national	local	all	most	some	deep	shallow	concrete	abstract	covert	overt	multiple	single	total	partial	none	multi-layered	redirect	prima facie	native	foreign	native	world	factual	non-factual	high	low	deep legends	sockpuppets	proxies	automated profiles	post-text	links	video	audio	hashtags	memes	governmental	established media	alternative media	social media	other	none
Temporal duration	years	X	X																																															
	months	X	X																																															
	days	X	X																																															
Market targeting	global	X	O	X	X	O																																												
	national	X	X	X	X	X																																												
	local	X	X	O	X	X																																												
Audience targeting	all	X	X	X	X	X	X	X	X																																									
	most	X	X	X	X	X	X	X	X																																									
	some	X	X	X	X	X	X	X	X																																									
Target familiarity	deep	X	X	X	X	X	X	X	X	X	X	X																																						
	shallow	X	X	X	X	X	X	X	X	X	X	X																																						
Specificity of aims	concrete	X	X	O	X	X	O	X	X	X	X	X	X	X																																				
	abstract	X	X	X	X	-	X	X	O	X	X	X	X	X																																				
Operational openness	covert	X	X	X	X	O	X	X	X	X	X	X	X	X	X	X																																		
	overt	X	X	X	X	X	X	X	X	X	X	X	X	X	O	X																																		
Platform strategy	multiple	X	X	X	X	X	X	X	O	X	X	X	X	X	X	X	X	X																																
	single	X	X	O	X	X	O	X	X	X	X	X	X	X	X	X	X	X																																
Lateral coordination	total	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	X	X																														
	partial	X	O	X	X	X	X	X	X	X	X	X	X	X	X	X	X	O	X	X																														
	none	X	-	X	X	X	X	X	X	X	X	X	X	X	O	X	X	X	X	X																														
Information channelling	multi-layered	X	X	X	X	O	X	X	O	X	X	X	X	X	X	X	X	-	X	O	X	X	O																											
	redirect	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	O	X	X	X	X	X																											
	prima facie	X	X	X	X	X	X	X	X	X	X	X	X	X	O	X	O	X	X	X	X	X	X																											
Presented source	native	X	X	X	X	X	O	X	X	X	X	X	X	X	X	X	X	-	X	X	X	X	O	X	X	X																								
	foreign	X	X	X	X	X	X	X	X	X	X	X	X	X	-	O	X	X	X	X	X	X	X	X	X	X																								
Messaging language	native	X	X	X	X	X	-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-																						
	world	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	O	X																						
Information legitimacy	factual	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	O	X	X	X	X	X	X	X	X	X	X	X	X	X																				
	non-factual	X	X	X	X	X	X	X	X	X	X	X	X	X	O	X	X	O	X	X	X	X	O	X	X	O	X	O	X	X																				
Quantity of messaging	high	X	X	O	X	X	X	X	O	X	X	X	X	X	X	X	X	X	X	O	X	X	X	X	X	X	X	O	X	X	X	X																		
	low	X	X	X	X	X	X	X	X	X	X	X	X	X	O	X	X	X	X	X	X	X	X	O	X	X	X	X	X	X	X	X																		
Messenger type	deep legends	X	X	X	X	-	X	X	O	X	X	X	X	X	X	X	X	-	X	X	X	X	X	X	X	X	X	-	X	X	X	X	O	X																
	sockpuppets	X	X	X	X	O	X	X	X	X	X	X	X	X	X	X	X	O	X	X	X	X	X	X	X	X	X	O	X	X	X	X	X	X																
	proxies	X	O	X	X	O	X	X	X	X	X	X	X	X	X	X	X	O	X	X	X	X	O	X	X	X	X	O	X	X	X	X	X	X																
	automated profiles	X	X	X	X	X	X	X	X	X	X	X	X	X	O	X	X	X	X	X	X	X	X	O	X	X	X	X	X	X	X	X	X	O																
Message type	post-text	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	O	X	X	X	X	X	X	X	X	X	X	X	X	X												
	links	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	O	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X												
	video	X	X	X	X	O	X	X	O	X	X	X	X	X	X	X	X	X	X	X	X	X	O	X	O	O	X	X	X	X	X	X	X	X	X	X	X	X												
	audio	X	X	O	O	O	X	X	O	X	X	X	X	X	X	X	X	X	X	X	X	X	O	X	O	-	X	X	X	X	X	X	X	X	X	X	X	X												
	hashtags	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	O	O	X	X	X	X	X	X	X	X	X	X	X	X	X												
	memes	X	X	X	X	O	X	X	O	X	X	X	X	X	X	X	X	X	X	X	X	X	O	-	O	X	X	O	X	X	X	X	X	X	X	X	X	X												
Source type	governmental	X	-	X	X	X	X	X	X	X	X	X	X	X	X	X	-	X	X	X	X	X	X	X	X	O	-	X	-	X	X	X	X	X	X	X	X	X	X	X	X	X	O	-						
	established media	X	O	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	O	-						
	alternative media	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	O	X	X	X	X	-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	O	O						
	social media	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
	other	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	O	X						
	none	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	X	X	X	X						
Spread strategy	synthetic	X	X	O	X	X	O	X	O	-	O	O	X	X	X	O	X	-	X	X	X	X	O	X	X	X	X	X	X	X	X	X	X	X	O	X	O	X	O	O	X	X	X	X	X	X	X	X	X	X
	organic	X	X	X	X	O	X	X	X	X	X	X	X	X	X	X	X	X	X	O	X	X	X	X	X	O	X	O	X	X	X	X	X	O	X	X	X	O	X	X	X	X	X	X	X	X	X	X	X	X

Figure 2: Cross-consistency matrix, where 'X' indicates consistency, 'O' indicates possible consistency, and '-' indicates inconsistency

The judgements made should be fairly intuitive after examining empirical and conceptual literature. An explanation is nonetheless offered for the interactions found to be inconsistent.

Non-state actors are judged to be inconsistent with no lateral coordination and governmental source types. This is because a non-state actor is assumed to have less of a sprawling organization and therefore a higher degree of internal coordination. Obviously, non-state actors also do not have access to governmental outlets.

Operations lasting only days are found to be inconsistent with abstract aim specificity and deep legend messenger types. Abstract aims are understood to require longer, more sustained campaigns that are achieved over time. Deep legend messenger types also require time for cultivation, and a case can be made that these are messenger types of such investment value that using them and risking their discovery for short campaigns is unlikely.

A global market targeting precludes using a native messaging language (as opposed to a world messaging language) since of course a global audience requires a globally understood language. Also, if the audience targeted consists of all members of a market, using a synthetic spread strategy is deemed ineffective.

A foreign presented source makes having concrete aims specificity highly unlikely. This is because concrete change in democratic societies is almost always reserved for internal, sovereign processes.

If a campaign is run overtly, this precludes a series of other modes. Synthetic spread run overtly is seen as disingenuous and manipulative and therefore not effective. Overtly using deep legends also runs the risk of spoiling these valuable assets and is deemed illogical. For the same reason, multi-layered channelling is seen as precluded since it would expose a level of control that would betray manipulation. Again, in the same vein, total lateral coordination would signal the same. It is also not possible to present the source as native if the operation is overtly run by a foreign actor. On the other hand, a covert campaign cannot present from a governmental source, as such links would be hidden.

If multi-layered channelling is used to present the information, it stands to reason that simple message types, such as memes or post-texts, would be disqualified. In another measure, the source type cannot be none. The source type cannot be none also if the channelling is of a redirect type.

Conversely, if using *prima facie* channelling, source types are limited, such as alternative and established media, and other source types. Additionally, as social media at this time largely eschews audio messaging alone, this type of messaging is seen as inconsistent with *prima facie* channelling.

In terms of presented sources, if it is native, it is seen as impossible that the source itself can be governmental since the native government easily could disprove such a thing. For foreign presented sources, deep legends are precluded again because their value lies in embedment. Native language messaging is also not consistent with a foreign presented source.

For obvious reasons, link message types cannot have no source type, and meme message types are—perhaps optimistically—disqualified from governmental and established media source types.

The relational matrix and statistical calculations

Using the above scored cross-consistency matrix, where in essence all modal interactions are scored, the data is ready to be analysed.

To start, a new matrix is created. In this relational matrix, only the parameters are represented in the axes, so that each parameter interacts with all other parameters. Again, duplicates can be removed. Using the formula described earlier, the PRS can now be calculated. Each PRS can be represented in the relational matrix where parameters interact. This matrix can be seen in **Figure 3**, below. The PRS and the relational matrix show the degree to which two parameters are consistent with each other across their modes.

	Operation ownership	Temporal duration	Market targeting	Audience targeting	Target familiarity	Specificity of aims	Operational openness	Platform strategy	Lateral coordination	Information channelling	Presented source	Messaging language	Information legitimacy	Quantity of messaging	Messenger type	Message type	Source type
Temporal duration	1,000																
Market targeting	0,917	0,889															
Audience targeting	1,000	1,000	1,000														
Target familiarity	1,000	1,000	1,000	1,000													
Specificity of aims	1,000	0,778	0,833	1,000	1,000												
Operational openness	1,000	0,917	1,000	1,000	1,000	0,875											
Platform strategy	1,000	0,917	0,833	1,000	1,000	1,000	1,000										
Lateral coordination	0,750	1,000	1,000	1,000	1,000	0,917	0,750	1,000									
Information channelling	1,000	0,944	0,944	1,000	1,000	0,917	0,667	0,917	0,944								
Presented source	1,000	1,000	0,917	1,000	1,000	0,625	0,750	1,000	0,917	1,000							
Messaging language	1,000	1,000	0,833	1,000	1,000	1,000	1,000	1,000	1,000	1,000	0,625						
Information legitimacy	1,000	1,000	1,000	1,000	1,000	0,875	0,750	1,000	0,917	0,917	0,875	1,000					
Quantity of messaging	1,000	0,917	0,917	1,000	1,000	0,875	1,000	0,875	1,000	0,917	0,875	1,000	1,000				
Messenger type	0,938	0,833	0,958	1,000	1,000	0,938	0,750	1,000	0,958	0,958	0,750	1,000	1,000	0,875			
Message type	1,000	0,861	0,917	1,000	1,000	1,000	0,958	1,000	0,917	0,639	0,958	1,000	1,000	1,000	1,000		
Source type	0,875	1,000	1,000	1,000	1,000	1,000	0,917	1,000	0,972	0,694	0,917	0,917	1,000	1,000	1,000	0,847	
Spread strategy	1,000	0,833	0,833	0,667	1,000	0,875	0,875	0,875	0,917	0,917	0,875	1,000	1,000	0,875	0,813	0,917	1,000

Figure 3: Relational matrix showing the PRS of each interacting pair of parameters; colour intensity indicates lower PRS

Continuing, using the previously described formulae, the researcher can now obtain the MCS, the PCS_{Avg}, the PRS_{Avg}, the PCS_{Abs}, and the PSS. An overview of these scores for the parameters and modes of FIMI is shown in **Table 3**, below.

<table>
<tr><th>Parameter span</th><th>Percent absolute consistent</th><th>Parameter average relation</th><th>Parameter average consistency</th><th>Parameter</th><th>Mode</th><th>Mode consistency</th></tr>
<tr><td rowspan="2">0,082</td><td rowspan="2">76,47 %</td><td rowspan="2">0,969</td><td rowspan="2">0,959</td><td rowspan="2">Operation ownership</td><td>state</td><td>1,000</td></tr>
<tr><td>non-state</td><td>0,918</td></tr>
<tr><td rowspan="3">0,125</td><td rowspan="3">47,06 %</td><td rowspan="3">0,935</td><td rowspan="3">0,931</td><td rowspan="3">Temporal duration</td><td>years</td><td>0,938</td></tr>
<tr><td>months</td><td>0,990</td></tr>
<tr><td>days</td><td>0,865</td></tr>
</table>

0,104	35,29 %	0,929	0,938	Market targeting	global	0,917
					national	1,000
					local	0,896
0,010	94,12 %	0,980	0,986	Audience targeting	all	0,979
					most	0,990
					some	0,990
0,000	100,00 %	1,000	1,000	Target familiarity	deep	1,000
					shallow	1,000
0,051	41,18 %	0,912	0,923	Specificity of aims	concrete	0,898
					abstract	0,949
0,122	41,18 %	0,895	0,888	Operational openness	covert	0,949
					overt	0,827
0,041	70,59 %	0,966	0,969	Platform strategy	multiple	0,990
					single	0,949
0,094	41,18 %	0,939	0,944	Lateral coordination	total	0,969
					partial	0,979
					none	0,885
0,073	29,41 %	0,904	0,872	Information channelling	multi-layered	0,844
					redirect	0,917
					prima facie	0,854
0,061	35,29 %	0,887	0,898	Presented source	native	0,929
					foreign	0,867
0,051	82,35 %	0,963	0,964	Messaging language	native	0,939
					world	0,990
0,041	70,59 %	0,961	0,969	Information legitimacy	factual	0,990
					non-factual	0,949
0,010	52,94 %	0,949	0,954	Quantity of messaging	high	0,949
					low	0,959
0,064	41,18 %	0,928	0,941	Messenger type	deep legends	0,904
					sockpuppets	0,968
					proxies	0,936
					automated profiles	0,957
0,089	52,94 %	0,942	0,928	Message type	post-text	0,956
					links	0,956
					video	0,944
					audio	0,911
					hashtags	0,933
					memes	0,867

0,133	58,82 %	0,949	0,941	Source type	governmental	0,867
					established media	0,933
					alternative media	0,944
					social media	1,000
					other	0,967
					none	0,933
0,092	29,41 %	0,898	0,893	Spread strategy	synthetic	0,847
					organic	0,939

Table 3: Statistical calculations per parameter and mode

Findings

What has been uncovered is a series of scores that can say something about FIMI, its bounds, and inner workings. There are three levels of findings. Something can be said for individual modes, individual parameters, and for parameter interactions.

Modes

The first thing to be said about the modes is that there are five modes in this conception of FIMI that are entirely consistent with all other modes. These five are ‘state operation ownership’, ’national market targeting’, ‘deep target familiarity’, ‘shallow target familiarity’, and ‘social media source type’. This means that any FIMI operation can use these modes without limiting any other mode selections. Practitioners should therefore take note that, if an operation is known to be using one of these five modes, no other modes can be extrapolated from that fact. For example, an operation owned by a state can use practically any mode in any other parameter.

On the other hand, an operation characterised by an ‘overt operational openness’ is the most limited in selecting other modes. This would seem to suggest that, if a practitioner is interested in mapping out the parameters and modes of an operation, one of the most salient questions to pose should be about ‘operational openness’.

A little less limiting but still significant are the modes of ‘multi-layered information channelling’, ‘synthetic spread strategy’, ‘*prima facie* information channelling’, and a ‘temporal duration’ spanning only days. In short, modes with relatively low MCSs are more limiting in which other modes the operation abides by and the converse is also true.

Parameters

The analysis of individual parameters offers more insight than that of their modes.

Firstly, there are two measures of average parameter consistency, one through MCS and another through the relational matrix. As with the modes themselves, these measures indicate the level of limitation or restriction a parameter can imbue on mode selection.

A high score in the PRS_{Avg} or PCS_{Avg} suggests a parameter with modes that are consistent with many other modes. In this analysis, ‘target familiarity’ as a parameter is fully consistent with all others. In one sense, this means it is irrelevant. It is, perhaps most likely, a weakness in parameter selection, but it could also describe a surprising fact: that whether or not an aggressor is familiar with its target or not is irrelevant to the type of FIMI operation constructed, if not its success.

Other parameters that approach high scores here are ‘audience targeting’, ‘information legitimacy’, and ‘platform strategy’. This suggests these parameters are less valuable to practitioners if they were to seek to discover unknown operational modalities.

Parameters with low PRS_{Avg} or PCS_{Avg} scores suggest, as can be expected, the opposite: that modes in these parameters are more restrictive to other mode selections. Parameters of this kind are ‘operational openness’ (as also pointed out in the modal analysis), ‘information channelling’, ‘spread strategy’, and ‘presented source’. Identifying these parameters in an operation should, in theory, provide grounds for further extrapolation of other modes used.

The measure of absolute parameter consistency is also useful in this same way. Whereas the PRS_{Avg} and PCS_{Avg} measures show how one parameter interacts with the others on average, this measure (the PCS_{Abs}) indicates how many of these interactions are consistent and thereby also how many are inconsistent. Again, a high percentage here suggests that the parameter is rather consistent with most or all of the other parameters through their interacting modes. And again, ‘target familiarity’ is fully consistent. ‘Audience targeting’ and ‘messaging language’ also are quite often consistent with other parameters. Like in the above measures, this shows their limited usefulness in extrapolation.

On the other hand, ‘information channelling’, ‘spread strategy’, ‘presented source’, and ‘market targeting’ are parameters that rarely are fully consistent with other parameters. That is to say that the modes within these parameters are often in conflict with modes in other parameters. So these parameters are restrictive on a broad range of mode selections.

Finally, in terms of individual parameters, the PSS measure shows the level of difference made on consistency when choosing a parameter’s mode. A high score shows the degree to which mode selection in this parameter can sway consistency. At the top are the parameters ‘operational openness’, ‘source type’, and ‘temporal duration’. These parameters are potentially quite meaningful in their mode selection in terms of which other parameters’ modes are selected. ‘Target familiarity’, ‘quantity of messaging’, and ‘audience targeting’ are parameters that have less of a consequence on consistency by their mode selection.

Parameter interactions

The analysis on parameter interactions is based on the relational matrix and the associated PRS. This valuable visualization shows which specific parameter interactions are the most consistent or inconsistent, or rather free and restricted. With a high PRS, the two interacting parameters are mostly consistent, meaning that the selection of a mode in one parameter is mostly independent from the other. On the other hand, a low PRS suggests the opposite, that many of the modal interactions with the two parameters are restricted, and that therefore mode selection is more dependent between these.

On the lower end of the spectrum, the interaction between ‘presented source’ and ‘specificity of aims’ as well as the interaction between ‘messaging language’ and ‘presented source’ are fairly restricted. This makes sense: the presented source of the information indeed restricts which language the message is presented in. Likewise, the type of aims of an operation also places limits on which source the messaging seems to emanate from.

Somewhat restricting is also the interaction between 'message type' and 'information channelling'; 'operational openness' and 'information channelling'; and 'spread strategy' and 'audience targeting'. What this indicates is that the choice, for example, of a kind of information channelling or audience targeting is somewhat tied to the choice of types of messages, of operational openness, or spread strategy.

There are many possible readings of the relational matrix, and many details that can be worked out. For instance, it is interesting that 'audience targeting' as a parameter is fully consistent with all other parameters apart from 'spread strategy', which restricts it considerably. This indicates that 'audience targeting' betrays very little about the type of FIMI engaged, except for what kind of 'spread strategy' is used.

Discussion

It is important to keep in mind exactly what the method exposes. By using the cross-consistency matrix, the method is primarily able to expose relationships between select, categorised modes of FIMI. Examining these links through a set of formulas allows something to be said for the average relationships of a mode or parameter, whether the mode or parameter allows for a wide range of consistent interactions or not. Modes and parameters with fewer possibilities of consistent interactions that restrict further mode selection become fault lines of the concept and valuable descriptors of its content.

In general, it can be said that parameters with a low percentage of absolutely consistent interactions, that is a low PCS_{Abs}, are significant parameters, in that they interact restrictively with a broad range of other parameters and thus have relatively substantial impacts on mode selection across the board. If the categorization of significance is set at a minimum PCS_{Abs} of 50% (as in the parameter is restricted in its interaction with more than half of the other parameters), the following set of parameters can be considered significant: 'spread strategy', 'information channelling', 'market targeting', 'presented source', 'operational openness', 'lateral coordination', 'messenger type', 'specificity of aims', and 'temporal duration'.

Another kind of parameter to keep an eye on are those that have a high PCS_{Abs}, and yet a relatively low PCS_{Avg}. These parameters are selectively restrictive, and examining those restricted interactions can show specialised relationships between parameters, in that they interact only with a few others. If a cut-off is set for PCS_{Abs}/PCS_{Avg} at greater than 0.8, with a returned value of 1 exempted, the selective parameters can be defined as 'messaging language' and 'audience targeting'.

Parameters with a high PCS_{Abs} and a high PCS_{Avg} should be considered less significant parameters, in that they do not influence mode selection meaningfully. If a lower limit of 0.8 is established when multiplying the two scores, then 'audience targeting' and 'target familiarity' can be said to be relatively insignificant parameters. As is evident, defining in this manner can also catch selective parameters that should be exempted. Thus, 'target familiarity' remains the only insignificant parameter.

Parameters that have modes of relatively equal MCS contribute less to the differentiation and specificity of a FIMI operation. From the perspective of a FIMI taxonomy, they are virtually arbitrary. Parameters of this kind are demonstrated by having a low PSS. Note that in defining a parameter as arbitrary, this does not mean it must be insignificant. It simply denotes that the mode selection within the parameter has little bearing on its PCS_{Avg}. These arbitrary parameters can be said to have a PSS of lower than 0.05, which would then establish ‘quantity of messaging’, ‘information legitimacy’, ‘platform strategy’, ‘audience targeting’, and ‘target familiarity’ as arbitrary.

Conclusion

In this paper, a case has been made for the need to contribute to conceptual understandings of FIMI. GMA was then referenced as a useful methodological tool for spanning out the canvas and finding totalities. However, it was found that GMA works best for known landscapes in that the analysis must be limited to be of use. Essentialism simplifies concepts that are known, but simplifying the unknown too often reduces explorations into inventories of the familiar. Therefore, a modified method was necessary. Resisting the restraint of GMA and instead expanding the list of parameters and modes could better show the inner workings of FIMI. The resulting data could then be manipulated by statistical calculations to try to gain insight.

The main thrust of the analysis has been to find out which parameters and modes are more independent, freer in their application and selection, and which are more restricted, and dependent on other selections. The analysis suggests that the most significant parameters in terms of their impact on FIMI types are ‘spread strategy’, ‘information channelling’, ‘market targeting’, ‘presented source’, ‘operational openness’, ‘lateral coordination’, ‘messenger type’, ‘specificity of aims’, and ‘temporal durations’. These factors most comprehensively shape the operation. Of these, the first five—except for ‘market targeting’—also show very low average consistency with other parameters, and the first four show a low degree of absolute consistency with other parameters. Practitioners seeking to categorise or type FIMI operations should therefore pay special attention to these first five parameters.

It is these qualities and their expression that in the main describe the phenomenon. How the information is disseminated, the way it is layered and channelled, which market is targeted, who is presented as the source, and how covert or overt the operators act are the fundamental questions that inform the largest part of the concept as described by the selected parameters.

Other parameters of interest are ‘messaging language’ and ‘audience targeting’, which serve as selective parameters, indicating few but salient details. These are pointed indicators of specific selections elsewhere, especially ‘spread strategy’, which is the only restricted interaction for ‘audience targeting’. Thus, a practitioner eager to find whether the operation utilises an organic or synthetic spread strategy can utilise knowledge of which audience is targeted.

The method, as it is used here, is of course not validated. Future studies could perhaps attempt to use the method to investigate known cases of FIMI operations to test its validity. In addition, implementing the method with the aid of machine learning or other artificial intelligence could possibly prove to be useful.

What is clear nonetheless is that this method may prove useful in showing how the concept’s internal parts interact. It is necessary to illuminate the phenomenon to inform practitioners and decision makers in how to view, discover, counter, and deter the threat in social media.

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