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# MANAGERIAL RELEVANCE OF MODERATING AND MEDIATING VARIABLES/EFFECTS IN MANAGEMENT RESEARCH

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## **Abstract**

### **Purpose**

Being clear and specific on what moderating and/or mediating variables are included and what effects are observed in academic research helps the reader to better understand the academic research context and results. But in terms of managerial relevance, it is also important to do this in a way that it provides descriptive, goal and operational relevance to decision makers in practice, depending on the type of intended research. This article wants to provide “a question-based step-by-step guide” on how to make the analysis of moderating/mediating variables and their observed effects more managerially relevant.

### **Design/methodology/approach**

Based on a critical review of the literature, important criteria of managerial relevance are confronted with important aspects of theory building with respect to mediating and moderating effects, leading to best-practice insights and recommendations. Moreover, exemplary articles are used to illustrate these findings.

### **Findings**

The insights and step-by-step recommendations assist the academic researcher in making choices when analyzing moderators and mediators, by not only taking a theoretical perspective, but also a managerial (relevance) perspective. Adding moderators/mediators may for instance challenge the ‘core logic of managerial practice’ (in terms of thinking and decision making), even if it does not change the ‘core logic of a theory’ as such. In the other direction, academics (and their theory) may be challenged by practitioners, in the way they define moderators/mediators and their levels. The steps in this article relate to aspects such as measurability, controllability and role of moderators and mediators in managerial problem and decision contexts. In case of multiple moderating and/or mediating variables, the decision architecture for managers becomes more complex, especially when the effects are countervailing/opposite. Multiple studies in this article illustrate that in that case, making optimal decisions becomes a ‘balancing’ act for managers/decision makers and may even challenge their common beliefs (e.g., linear thinking).

### **Originality**

The guidelines on managerial relevance of moderating and/or mediating variables and their effects can be used by academic researchers and editors of academic journals, pursuing not only academic rigor, but also managerial relevance. Besides being a guide for managerially relevant output, it also helps in determining for which questions in the research process, input from practitioners or at least insights from practice (e.g., through sources such as business magazines and portals) may be needed. The guidelines may also be used for teaching purposes, complementing more theoretical articles that mainly focus on methodological/statistical issues of moderating/mediating variables and their effects.

**Keywords** Managerial relevance, Moderators, Mediators, Management research, Academic-practitioner gap

**Paper type:** Conceptual/best practice paper

## 1. Introduction

Being clear and specific on the variables considered and rejected/omitted in academic research helps the reader to better understand the research context, results, and implications, as well as the study limitations and directions for future research (Lehmann, 2020). But if the intention is to pursue both academic rigor and managerial relevance, this demands a broader perspective on managerial problem and decision contexts in which the academic research context and results may be embedded. In this article, we focus on the relevance of mediating and moderating variables and their effects in management (related) research. A huge number of articles from various disciplines have been published about how to formulate and test moderating and mediating effects to increase academic rigor (e.g., Cunningham and Ahn, 2019; Frazier *et al.*, 2004; MacKinnon and Luecken, 2008). But less attention has been paid to the managerial relevance of these moderating and mediating effects.

In bridging theory and practice, Laurent (2000) pleads for collecting more data from experts, managers, etc. at the start of the academic research process (e.g., through qualitative research). Talking with practitioners/managers allows to frame the academic research questions at a job context-specific level (Benoit *et al.*, 2019; Jaworski, 2011). In the same context, Zeithaml *et al.* (2020) recommend a theories-in-use approach, asking practitioners key questions about how they would define certain theoretical constructs when used in practice, as well as what are their perceptions about certain causal relationships between these constructs (antecedents and consequences, but also the role of mediators and moderators). At the same time researchers should know that managers rely on “mental” models of reality, common sense, and intuition to organize their knowledge and make decisions (Gary and Wood, 2011; Martignoni *et al.*, 2023). In this context, academic researchers should also challenge managers’ mental models/heuristics in having conversations with them (Markides, 2007; McGahan, 2007; Scherpereel, 2006a, 2006b). For instance, in their study, Liu *et al.* (2015) find that service firms have much to gain from being seen as transparent (in terms of accessible and objective information) by customers as it reduces customer uncertainty (a mediating variable) which in turn has a positive impact on purchase intention and willingness to pay a higher price. Moreover, firms’ ability associations moderate the effects of performance transparency. The authors state that through conversations with managers, they got the impression that firms generally have been wary of performance transparency. By examining the potential mechanism of how and the potential boundary condition of when positive effects of a service firm’s performance transparency can be observed, the authors show that this caution may be unwarranted.

It should at least allow the researcher to better describe the assumptions made about all possible moderators and mediators that play a role in practice. Are these variables controlled or included in some way or simply omitted in the academic research? Also in a later research stage, when writing the managerial implications of an academic study, it may be easier for researchers to indicate the exact boundaries of the managerial recommendations, considering possible managerial decision contexts. Academic researchers should at least be able to indicate for what specific managerial context(s), the causal relationships found in their study are trustworthy. This is not only a concern of external validity (that is the extent to which findings of a study can be generalized to other contexts), but also a matter of internal validity (Leviton, 2015).

In this ‘step-by-step guide/best practice’ type article, a managerial perspective is taken on the way academic researchers should frame their research in terms of moderating and/or mediating variables that characterize causal relationships. It starts with an analysis of important criteria of managerial relevance (as already discussed in the literature). These criteria are then confronted with important

aspects of theory building with respect to mediating and moderating variables and their effects. This confrontation leads to step-by-step recommendations for making moderating and/or mediating effects in academic articles more managerially relevant. As Aguinis *et al.* (2023, p. 63) state: “presenting recommendations as a sequential series of decisions or actions allows researchers to consider them one at a time, thereby decreasing the complexity surrounding the recommendations and facilitating their use”. Moreover, each step contains various questions to be answered by the academic researcher. Lastly, exemplary articles have been used to illustrate the most important findings and recommendations. This increases the readability and usability as a ‘step-by-step guide/best practice’ type paper (Bernerth and Aguinis, 2016; Aguinis *et al.*, 2023).

To develop this step-by-step guide, a critical review of the literature was performed. As Snyder (2019) argues, an integrative/critical review approach can be useful when the purpose of the review is not to cover all articles ever published on the topic but rather to combine different perspectives. In this case, we combine a theoretical perspective on moderating/mediating variables and effects with a managerial (relevance) perspective on them. Articles about managerial relevance and/or the theory of moderating/mediating effects were selected, based on:

- 1) their influence in these specific academic research domains (in terms of the number of citations) and/or
- 2) their critical view or uniqueness, adding extra perspectives/dimensions

By confronting theoretical dimensions about moderators/mediators with managerial relevance dimensions, a step-by-step guide was developed.

From a theoretical point of view, this study contributes to current literature, by taking a managerial perspective on ‘known’ theoretical principles about moderators and mediators, whereby managerial practice complements and/or challenges theory and vice versa. Adding moderators and mediators may for instance challenge the ‘core logic of managerial practice’ (in terms of thinking and decision making), even if it does not change the ‘core logic of a theory’ as such. In the other direction, academics (and their theory) may be challenged by practitioners, in the way they define moderators/mediators and their levels. From a practical point of view, the insights and recommendations in this article may help in bridging the academic-practitioner gap, involving practitioners more in the academic research process or at least knowing how academic results can make more sense to practitioners or challenge them.

This article is structured as follows. In section 2, ‘managerial relevance’ dimensions of academic research are discussed. In section 3 ‘theoretical’ principles about moderating variables and their effects are confronted with the managerial relevance dimensions of section 2, leading to a set of guidelines. The same is done in section 4 for mediating variables and effects. In sections 3 and 4, exemplary articles are used to illustrate the most important findings and recommendations, as described in the step-by-step guides. In the concluding section, the main contribution of this study is emphasized, together with limitations and future directions for future research.

## **2. Managerial relevance of academic research**

Jaworski (2011, p. 212) defines managerial relevance as ‘the degree to which a specific manager in an organization perceives academic knowledge to aid his or her job-related thoughts or actions in the pursuit of organizational goals’.

Besides appeal (that is managerial interestingness and importance of research issues) and timeliness (that is availability of research results in time/when needed), various dimensions of managerial relevance can be distinguished (Cornelissen and Lock, 2005; Schauerte *et al.*, 2023; Varadarajan, 2003):

- Goal relevance, demanding that the researcher focuses on outcome variables that managers/practitioners wish to influence and can measure. Outcome variables may relate to immediate goals (e.g., at a business unit level) and/or overarching goals (e.g., at the corporate level), in which the immediate goals are embedded.
- Descriptive relevance, demanding that the researcher formulates and captures phenomena in all their aspects (as it occurs in practice/managerial contexts), in terms of the included variables and the causality between these variables.
- Operational relevance, demanding that the researcher can provide specific and actionable implications/recommendations, focusing on decision variables that a manager/practitioner can manipulate.

These three dimensions also drive the way research insights and recommendations can be used by managers/practitioners. The greater the descriptive, goal and operational relevance, the more decision makers (managers/practitioners) may be inclined to use the research insights and recommendations for indirect conceptual use (for a better understanding) and/or direct instrumental use (for problem solving) instead of a more symbolic use only (Cornelissen and Lock, 2005; Grossmann-Hensel *et al.*, 2022).

The way theory is used will also depend on the type of academic research performed (Schauerte *et al.*, 2023). For instance, “big picture” research in which an overarching issue is synthesized, classified, and tested or research explaining why a specific relationship holds, will often lead to symbolic or conceptual use. Problem-solving research on the other hand, in which actionable recommendations are given for a specific problem, will often lead to more instrumental use. As Vermeulen (2005) states, the academic research questions that are asked in the first place and the constructs that are taken into consideration will highly condition the possible managerial relevance. If theory is built to be used in practice, constructs should be in line with how practitioners/managers perceive and use them (Suddaby, 2017; Rossiter, 2011). Academic researchers often focus on specific variables and their relationships at a certain point in time or over a certain period. Managers however often cannot isolate variables and are in a permanent state of change, in which they must achieve things through other people, overcome barriers, cope with uncertainty, and operate in line with organizational goals (Hatchuel, 2001; Henderson, 2007; Logman, 2007; Otnes *et al.*, 2006; Pettinger, Ch. 1, 2001; Riege, 2005). For instance, marketing efforts cannot be isolated from other operations and human resources when focusing on the delivery of customer value in a service environment (Hughes *et al.*, 2012). The same holds for the causal relationships studied in terms of (internal) validity. They will only make sense to managers/practitioners if it is clear how these relationships are embedded in their own managerial context. After all, as one of the goals of theory is to eliminate some of the complexity in the real world, evaluating a theory is not about academic rigor ‘versus’ managerial relevance, but about academic rigor ‘and’ managerial relevance (Bacharach, 1989) Causal relationships become more complex if mediating and/or moderating variables are involved and that is often the case in managerial problem and decision contexts. Therefore, the introduction of mediators and moderators not only often forms the basis for theoretical extensions (Aguinis *et al.*, 2017; Colquitt and Zepata-Phelan, 2007), but also helps in increasing descriptive relevance for practitioners.

In academic articles, which don’t have a clear problem-solving goal in the first place, academic propositions, and recommendations (as formulated in managerial implications sections) often remain vague in terms of actionability, lowering both goal and operational relevance (Logman, 2007). November (2004) gives the example of a proposition that states that market orientation is an

important determinant of profitability. This is an unconditional causal statement that may even be seriously misleading, as there is for example no explanation as to how much effort should be put into obtaining a market orientation, nor the extent to which the cost of doing this will affect profitability. More refined insights on antecedents, mediators and moderators are often needed to come up with recommendations that make sense to managers/practitioners.

Unlike researchers, practitioners and especially managers are not looking for general research propositions and/or frameworks, which give them big picture insights only, but often are more interested in what should be done in their job context. This observation is in line with the increased need for more 'prescriptive' academic research (Worrall *et al.*, 2007) or what some call more 'actionable' research (Pearce and Huang, 2012). This means that recommendations should be about decision variables that practitioners/managers can manipulate and outcome (goal) variables that they want to influence. In making recommendations more actionable, researchers should have a clear insight into the decision architecture of managerial problem contexts (Martin, 2007; Sibony *et al.*, 2017). A decision architecture provides insight into the decision order, possible decision levels, the role of a decision in the decision-making process and the possible interrelationship between decisions. Moreover, as managers make for instance investment type decisions (yes, or no?), resource allocation decisions (how much?) or more complex/new decisions (what is possible?) (Sibony *et al.*, 2017), managerial recommendations will make more sense if they help them in answering these kinds of questions.

In the next sections we discuss by means of question-based steps how managerial relevance can be increased by academic researchers, when dealing with moderating and/or mediating variables and their effects.

### **3. Managerial relevance of moderating variables and effects**

Moderating variables or moderators (often reflected in product terms in a model) influence the strength and/or direction of the relationship between an independent (X) and dependent (Y) variable. Mixed findings across academic studies about the sign of a certain causal relationship often indicate that moderators are at play. They often form the basis for so called meta-analyses in academic research. Misleading moderation effects can occur when an independent and a moderator variable correlate and when the true nature of the relationship between the independent and a dependent variable is nonlinear (Daryanto, 2019). Moreover, omitting moderating variables may create biases in estimates (Busenbark *et al.*, 2022). A bias will even occur if a false moderator is included that is correlated with the true omitted moderator or if the true moderator is included in the estimated model, not as a moderator but as an independent variable only. Many methodological/estimation solutions have been proposed in the literature to deal with the omitted variable bias. Busenbark *et al.* (2022) claim that not all omitted variables create a "substantive" bias, and more important even the proposed estimation remedy can be more detrimental than the bias itself. But besides statistical concerns, a research model should reflect the reality that it wants to describe as good as possible. And if there are reasons to believe, based on empirical/managerial evidence, that moderation effects are at play, they should be included.

Subsequently, various dimensions of the managerial relevance of moderating variables and their effects will be discussed. They relate to questions that academic researchers should ask themselves (see figure 1).

(Insert figure 1 here)

Moderators in a relationship will be relevant for a decision maker/manager if they relate to his/her questions of interest (Söderlund, 2023). This may be:

- 'Who' questions (e.g., the moderating impact of customer segments targeted by the company)
- 'Where' questions (e.g., the moderating impact of countries in which a company operates)
- 'When' questions (e.g., the moderating impact of seasonality)

Using a theory-in-use approach (Zeithaml *et al.*, 2020), asking practitioners these kinds of 'who', 'where' and 'when' questions, helps in identifying relevant moderators or at least in knowing whether moderators as suggested by theory make sense in practice. This leads to the first step with the following questions to be asked by an academic researcher:

**Step 1: Assessing the relevance of moderators (Descriptive and goal relevance issue)**

- Do moderators as proposed by theory (e.g., based on a literature review) make sense to practitioners, from a 'who', 'where' or 'when' question perspective?
- Are there other moderators, mentioned by practitioners, which may affect the main relationship between the independent (X) and dependent variable (Y) under study?

Mathematically, Z moderating the relationship between X and Y is identical to X moderating the relationship between Z and Y. Dawson (2014) gives the example of the impact of job training on performance, which is found to be positive and becomes more positive when job autonomy is greater. But a manager may be more interested in the following question: What is the impact of the job autonomy level on performance and how does this depend on job training? This leads to:

**Step 2: Assessing the role of moderators in managerial decision-goal architectures (Goal and operational relevance issue)**

- Is swapping the independent variable and a moderator more in line with the specific questions and goals of practitioners?

An additional question is to what extent a moderator can be controlled/manipulated by the decision maker/practitioner. At least the decision maker should be able to measure the moderator (Söderlund; 2023) within his/her specific managerial context. For example, perceived risk is one of the moderators in the customer satisfaction-loyalty relationship (Tuu *et al.*, 2011), but is it possible to identify the perceived risk of customers by the decision maker himself (using the same multi-item scale for risk perception in practice that was used by the academic researchers)? Will customers be willing to provide that information to a company or is it possible to derive it indirectly through other objective or subjective measures (Söderlund, 2023)? In some cases, moderators may be more directly measurable and controllable by the decision maker. For instance, the detailedness of delivered information on an augmented reality device (which can be directly controlled by the company) moderates the relationship between the consumer's controllability of the information and the perceived comprehensiveness (Hoffmann *et al.*, 2022). This leads to:

**Step 3: Assessing the measurability and controllability of moderators (Operational relevance issue)**

- To what extent can a moderator be measured by a practitioner? (partly or completely; directly or indirectly)
- Can a moderator be measured on an objective or more subjective basis?
- To what extent can a moderator be controlled/manipulated by the practitioner?

Another question of managerial relevance relates to the range and specificity of the moderator levels considered by the academic researcher. Using categorical moderating variables or categorizing continuous moderating variables into subgroups, which is often done in academic research, may lead to a loss of information, not only influencing the interpretation of the moderator, but also reducing the variance of the moderating variable and causing a downward bias in the estimated moderating effects (Aguinis *et al.*, 2017). Moreover, a minimum-maximum restriction of a moderating continuous or categorical variable may make moderating effects seem smaller than they are or may even render



them statistically nonsignificant (Aguinis *et al.*, 2017). Therefore, academics should have a clear insight into what range and what specific levels of moderators apply in practice. This leads to:

**Step 4: Assessing the relevance of moderator levels (Descriptive and operational relevance issue)**

- Are the range and the specificity of the moderator levels in line with levels that apply in practice?

Academic researchers also need to be explicit in their expectations and the results about the direction and size of the effects of an independent on a dependent variable across the ranges of the moderating variables involved (Edwards, 2009; Li *et al.*, 2019). As Li *et al.* (2019) state: 'If the theoretical model in question suggests moderation in which the relationship between X and Y depends on Z, it is inconsistent to offer a binary X-Y direct effect hypothesis without, at the very least, specifying the value of Z for which the authors expect that relationship to hold.' Causal effects of an independent variable on a dependent variable may even be significant at some levels of the moderators and not significant at other levels or even have the opposite sign (Gatignon, 2014, p. 409).

Moreover, taking a managerial perspective, researchers should be aware that 'multiple' moderators may be involved in practice, that each may induce different moderation effects. In case of a synergetic effect, a moderator enhances the causal effect of the independent variable on the dependent variable, while in case of a buffering effect it reduces the causal effect. In case of a substitution effect, a moderator may even reverse the effect between the independent and dependent variable. A managerial context may be that complex, that some of these effects occur at the same time. They may be complementary or competing/countervailing. For instance, van der Borgh and Schepers (2018) study conservative selling behavior (CSB) of salespeople, meaning that faced with a new product context, salespeople may maximize their efforts to sell existing products before engaging in efforts to sell the new products, due to a certain risk aversion. In their study they find that new product radicalness increases CSB (positive effect), while new product orientation and long-term rewards decrease CSB. The authors also find that new product information to salespeople as provided by a sales manager acts as a moderator, however in different ways. Paired with new product radicalness, new product information has an enhancing effect on CSB, paired with managerial new product orientation it has a buffering effect, and paired with long-term rewards it has a substitution effect. Many other examples may be found in the management literature on countervailing moderating effects. For instance, in the study of Mu *et al.* (2022) about the impact of hedonic and utilitarian message appeals in firm-generated content on daily sales revenue, message quality and consistency act as positive moderators, while message complexity acts as a negative moderator. Countervailing moderating effects may also change or stay similar over time. For instance, Ahearne *et al.* (2010) find that in case of an organizational change intervention, the average salesperson performance trajectory declines during the unfreezing stage, increases during the moving stage and levels off during the refreezing stage. A learning orientation of salespeople amplifies the performance drop in the unfreezing stage, accelerates the positive recovery slope during the moving stage, and increases the level at which performance restabilizes. A performance orientation shows the opposite effects in all these stages. These examples show that it is important for academic researchers to know what multiple moderators are at play and interact in practice, because including some and omitting others may give a biased representation of reality, certainly in case of countervailing moderators.

Moreover, moderators may not only change the strength and sign, but also the shape of the relationship between an independent and dependent variable of interest to the manager/decision maker (Haans *et al.*, 2016; Jancenelle, 2020). For instance, Uotila *et al.* (2009) analyze how a firm's relative share of exploration (within its overall exploitation and exploration activities) affects its (financial) performance. Practice indicates that managers balance exploitation and exploration activities, as they must deal with day-to-day operations that guarantee current firm performance on

one hand and experimentation/investment to ensure long term firm performance on the other hand. Environmental (e.g., technological) dynamism in an industry plays a moderating role. The authors find that the relative share of exploration has a U-shaped effect on firm performance when R&D intensity (reflecting technological dynamism) is low, but an inverted U-shaped effect when it is high. In this case, the moderator (R&D intensity) creates a shape-flip in the U-curved relationship. From a managerial point of view, it is important to know these kinds of crucial moderators, certainly when they may change the shape of the relationship between the independent (possible decision) and dependent (possible goal) variable.

This leads to the following question-based step:

**Step 5: Getting insight into moderator complexity in terms of possible effects and interrelationships (Descriptive relevance issue)**

- Does practice give an indication of moderator levels at which the significance or sign of the impact of the independent variable on the dependent variable are expected to change?
- In case of multiple moderators, are they expected to show an enhancing, buffering or substitution effect?
- Based on the previous sub-question, are the multiple moderating effects expected to be complementary or competing/countervailing in practice?
- Is the sign of a moderator expected to change or stay similar over time in practice?
- How are moderators expected to influence the shape of the relationship between the independent and dependent variable of interest to practitioners?

It also should be noted that moderating variables are only 'pure' moderators if they are not correlated with the independent and dependent variables. In many studies including moderating effects, this is not the case, meaning that they often deal with quasi-moderators. At least researchers should be clear on this (Söderlund, 2023). Moreover, as a moderator interferes with the independent (IV) and/or dependent variable (DV), variances of the IV and/or DV may be restricted for some levels of the moderator, affecting the relationship between the IV and DV. Compression by a moderator on the DV weakens its relationship with the independent variable (IV), while compression on the IV strengthens the relationship. Therefore, taking a restricted variance interaction perspective, may better explain the 'why' of observed moderation effects, making the insight also more relevant or at least clearer to the decision maker (Cortina *et al.*, 2019, 2023). For example, innovation has a positive impact on sales growth, but this relationship is weaker when environmental dynamism is low. This observed effect is mainly due to the low variance in sales growth, when environmental dynamism is low, implying a downward compression on the dependent variable (Cortina *et al.*, 2023). Correlation and variance restriction are issues that not only should be dealt with during the empirical analysis stage, but also when formulating research hypotheses. Talking with practitioners (as in a theory-in-use approach) may help in identifying whether these issues may characterize managerial problem and decision contexts. This leads to:

**Step 6: Getting insight into the relationship between moderators and the independent/dependent variables (Descriptive relevance issue)**

- Based on practice, is a moderator expected to correlate with the independent and/or dependent variable?
- Is a moderator expected to compress the variances of these variables at certain moderator levels in practice?

Based on the previous steps (1 to 6), the moderator related hypotheses, the research design, and the data collection methods, should be refined when necessary. This should be a process of balancing between theoretical insights (e.g., hypotheses that make sense from a theoretical point of view) and practical/managerial insights (driven by the questions in the previous steps). Also in the data analysis

stage, managerial relevance may be increased when analyzing moderating effects. Simple slope tests (pick-a-point method) can be used to evaluate whether the relationship (slope) between X and Y is significant at a particular value of Z (Dawson, 2014). For instance, analyzing the effects of hedonic and utilitarian message appeals in firm-generated content on product performance (daily sales revenue), Mu *et al.* (2022) find that that message quality and message goal consistency both positively moderate that relationship, but only if they surpass certain threshold levels. The positive effects are stronger for hedonic than for utilitarian appeals. It is important to illustrate how these threshold levels make sense for decision makers in practice, for instance by giving examples. It can even make more sense to re-plot an interaction by swapping the independent variable and moderator, if that is more in line with questions that may be raised in a managerial context (see step 2). By re-plotting the interaction and doing a slope test this can be easily answered as well, based on the researcher's model and available data. Moreover, all expected effects in steps 5 and 6 should be tested, based on the empirical data available, before coming up with managerial recommendations.

Especially for research that is intended to be problem-solving (actionable), more attention should be paid to the operational relevance of the insights and recommendations. Managerial recommendations will only make sense if clear 'first-then' and/or 'if-then' statements can be formulated, based on levels of the included moderators and independent variables that apply to a manager's problem and decision context. This means that recommendations should be clear about the decision architecture in terms of the best decision order, the best (optimal) decision levels, the role of a decision in the decision-making process and/or the interrelationship between decisions.

We will illustrate this with some of the exemplary articles that were already used in previous steps. For instance, in the practical implications section of their academic article about the impact of hedonic and utilitarian message appeals on daily sales, Mu *et al.* (2022) provide a list of questions that should be asked by practitioners. Some of the questions relate to the moderators included in their study. The authors make guidelines actionable, by coming up with specific recommendations on message styles (illustrated with company examples from practice). The extensive managerial guidelines in the Mu *et al.* (2022) were summarized in a contribution on the INSEAD knowledge platform (an expert opinion and management insights portal) as well (Borah, 2022). In their recommendations, the authors also highlight the importance of reaching minimum levels on these moderators to reach the intended results. Moreover, they emphasize that, as message quality and consistency act as positive moderators and message complexity acts as a negative moderator, consistent and high-quality messages may only have the intended effect on daily sales, if they are written clearly and concisely as well. In other words, when moderating variables show 'countervailing' effects, they cannot be entirely isolated from each other, when making decisions on them. In that case, guidelines should be written in an 'integrative (AND)' way instead of 'a one OR the other' way.

Moreover, formulating various scenarios can make managerial recommendations more relevant to practitioners. An example of a study that uses this approach is that of Borgh and Schepers (2018) who find that new product information moderates the impact of new product radicalness, product orientation and long-term rewards on conservative selling behavior (CSB) in various ways. In their managerial implications section, various scenarios are discussed, showing that, dependent on the CSB related goals of managers, specific decisions with respect to the independent variables (e.g., rewards) and moderating variable (new product information) must be made.

Lastly, it is important to identify whether threshold 'levels' of an independent or moderating variable make a big difference in terms of managerial recommendations. For instance, as a moderator creates for example a shape-flip in the U-shaped relationship between an independent and a dependent

variable (see earlier exemplary article of Uotila *et al.*, 2009), this may have far-reaching implications for a decision maker/manager. When the moderator passes through the point of a shape-flip, the same level for an independent (decision) variable may suddenly move from a very good to a very bad one in terms of its implications on the dependent (goal) variable (Haans *et al.*, 2016). This is something that should be explicitly part of the actionable recommendations.

This leads to the following question-based step:

**Step 7: Providing actionable recommendations for practitioners (Goal and operational relevance issue)**

- Can clear if-then or first-then recommendations be provided related to goal and decision variables of managers/practitioners?
- Should recommendations be perceived by a practitioner as separate or integrative guidelines? (OR versus AND guidelines)
- Can recommendations be written in a goal-scenario-based way?
- Do specific threshold 'levels' of an independent or moderating variable make a big difference in terms of managerial recommendations?

#### **4. Managerial relevance of mediating variables and effects**

Mediating variables or mediators explain 'why' or 'how' an independent (X) and dependent (Y) variable are indirectly related. A mediation analysis measures such an effect of independent on dependent variables through mediating variables or mediators. Zhao *et al.* (2010) distinguish between different types of mediation:

- Complementary mediation, where the mediated effect and direct causal effect both exist and point at the same direction.
- Competitive mediation, where the mediated effect and direct effect both exist and point in opposite directions.
- Indirect-only mediation, where the mediated effect exists, but not the direct effect.
- Direct-only nonmediation, where the direct effect exists, but not the indirect effect.
- No-effect nonmediation, where neither the direct effect nor the indirect effect exists.

There may even be an interplay between mediating effects and moderating effects, leading to so called moderated mediation or mediated moderation effects (Gatignon, 2014, p. 352). Coenen (2022) shows that from a statistical point of view, failing to control for mediating variables will lead to under- or overestimated coefficients. Inclusion of mediators may at least avoid overestimates of the direct effects of independent on dependent variables of interest to decision makers. For example, by including HR flexibility as a mediator, Beltrán-Martín *et al.* (2008) find that the "direct" effect of high-performance work systems (HPWS) on organizational performance becomes statistically insignificant, suggesting an indirect-only mediation between HPWS and performance. Despite the importance of including mediators in studies, Coenen (2022) also warns that as all variables correlate with each other to some extent, the so-called 'crud factor', biased estimates become almost inevitable in a mediation analysis. This means that mediation effects should be interpreted very critically from a theoretical point of view. But this may also be perceived as a plea for a theories-in-use approach, in which mediators are only included, if there are reasons to believe that they play a crucial role in practice.

Subsequently, various dimensions of the managerial relevance of mediating variables and their effects will be discussed. They relate to questions that academic researchers should ask themselves (see figure 2).

(Insert figure 2 here)

There are many managerial contexts, in which the ‘why behind’ in a causal relationship is important to know for the manager/practitioner. For instance, the effect of exploitation and exploration activities on firm performance may be better explained by looking at mediating variables (e.g., costs versus perceived benefits of exploitation and exploration) (Haans *et al.*, 2016). Mediators may also help practitioners in better understanding ‘how to’ reach an overarching end goal through intermediate goals. For example, rewards/appraisal within a performance system may make employees more willing to be flexible which in turn may improve organizational performance. Therefore, HR flexibility turns out to be a crucial intermediate goal in pursuing the end goal of higher organizational performance (Beltrán-Martín *et al.*, 2008). Knowing the antecedents that affect an independent variable, making this variable a mediating variable, may be relevant to a manager as well. For instance, supply chain integration affects organizational performance, but in turn highly depends on various dimensions of compatibility between supply chain partners (Rajaguru and Matanda, 2019). This leads to the first step:

**Step 1: Assessing the relevance of mediators (Descriptive and goal relevance issue)**

- Do mediators as proposed by theory (e.g., a literature review) make sense to practitioners, from a ‘why’ or ‘how to’ question perspective?
- Are there other mediators, mentioned by practitioners, which may affect the main relationship between the independent (X) and dependent variable (Y) under study?

A critical concern that has been raised in the academic literature, is that observed mediation effects may be the consequence of a reverse causal order, as the dependent variable influences the mediator (Kim *et al.*, 2018; MacKinnon *et al.*, 2012). Longitudinal studies (if possible) may help in tracing the exact causal order (Ghosh and Jacobson, 2016). Another suggestion is to compare alternative statistical models, in which the causal order of variables is changed. Lemmer and Gollwitzer (2017) argue however that this kind of testing often fails, especially when the mediator is measured less reliable than the dependent variable. This means that academic researchers often must rely upon theoretical plausibility and/or empirical evidence in making decisions on the causal order. This evidence may come from conversations with practitioners (as in a theory-in-use approach) or from known business cases (as reported for instance in business magazines). For instance, in their study, Stock *et al.* (2013) give the example of former CEO Lafley at P&G, who translated an innovation-oriented culture into specific actions (e.g., diffusing stories), that ultimately positively influenced the firm’s innovativeness. Based on this kind of empirical evidence, combined with theoretical insights from academic articles, the authors formulated various hypotheses. They found that effects of innovation-oriented values and norms on product program effectiveness are indeed fully mediated by cultural artifacts, such as stories of exemplary innovation behavior, areas for informal exchange and innovation events. In this exemplary article, previous empirical evidence on the order and role of mediating mechanisms, helped in formulating hypotheses at the beginning of the research process. This leads to:

**Step 2: Assessing the causal order and role of independent, mediating, and dependent variables (Goal and operational relevance issue)**

- What is the exact order and role of mediating mechanisms, based on insights from managerial practice and/or other empirical evidence?

Mediating constructs or variables will make more sense to practitioners, if they can measure them or at least some items of them, in case of multi-item constructs. Some mediators (or items) can be objectively measured, for instance by means of exact and quantitative data available to the company. Others may rely upon more subjective measures, as for instance in the study of Stock *et al.* (2013), in which all multi-item constructs relied upon opinions to be answered by practitioners. In this study, the authors emphasized the importance of performing a pre-qualitative study with a good choice of

appropriate informants for testing the measurability of their constructs used. They also recognized in their conclusions that their results may be affected by the fact that perceptions of some of the items questioned may vary across informants, dependent on the functional department that the informant belongs to (in their case marketing versus R&D managers). This leads to:

**Step 3: Assessing the measurability of mediators (Operational relevance issue)**

- To what extent can a mediator be measured by a practitioner? (partly or completely)
- Can a mediator be measured on an objective or more subjective basis?

A managerial problem and decision context becomes more complex when there are ‘multiple’ mediating variables, which may be either complementary (inducing indirect effects with the same sign) or competing (inducing indirect effects with the opposite sign) (Gatignon, 2014, p. 357). Zhao *et al.* (2010) also note that the direct (main) effect of an independent on a dependent variable and the mediating effects may have opposite signs as well. Especially in research domains in which psychological mechanisms play a crucial role (as in consumer or managerial behavior research) there may be multiple mediators (Schauerte *et al.*, 2023). Orsingher and Wirtz (2018) find for instance that the impact of referral reward programs on an individual’s likelihood of actual referral is mediated by two opposite mediators. The perceived attractiveness of the rewards by an individual acts as a positive mediator, while the metaperception (that is how the individual thinks he may be viewed by others when referring) acts as a negative mediator. For a practitioner, it is important to know these intermediary mechanisms, as it may broaden his/her view on all relevant effects to be considered. It may also help practitioners in better understanding why some managerial decisions do not have the desired outcome, for instance due to competing/countervailing mediating effects (Montani *et al.*, 2020). Competing/countervailing mediating effects may also induce a U-shaped or inverted U-shaped relationship between an independent and dependent variable of interest to practitioners. For example, the study of Althuisen (2021) indicates that an inverted U-shaped relationship exists between aesthetic product design complexity and liking by consumers due to two countervailing effects. Cognitive effort acts as a negative mediator (negative effect), while arousal/interest acts as a positive mediator (positive effect). Another illustrative study is that of Wies *et al.* (2023), showing that there is an inverted U-shaped relationship between influencers’ indegree (follower count) and follower’s engagement (with sponsored content), due to two countervailing effects. Engagement is expressed as the product of reach and engagement likelihood. Indegree has a positive effect on reach, but a negative on engagement likelihood (through perceived tie strength), as an influencer’s higher indegree may make followers believe that this influencer will devote less effort to nurturing all follower relations. For a practitioner, it is important to know that such underlying mediating mechanisms, may change the shape of the relationship between an independent and dependent variable (becoming U-shaped, or even inverted, as in the previous examples). This leads to:

**Step 4: Getting insight into mediator complexity in terms of possible effects and interrelationships (Descriptive relevance issue)**

- In case of multiple mediators, are they expected to be complementary or competing/countervailing in practice?
- How are these mediators expected to influence the shape of the relationship between the independent and dependent variable of interest to practitioners? (possibly in interaction with moderators)

Better insights on the exact shape of a relationship between an independent and a dependent variable, may allow managers to make better decisions as well. In the previous example of Wies *et al.* (2023), the authors suggest that influencers with ‘intermediate’ indegree may represent, what they call the engagement “sweet spot”. This is a consequence of the inverted u-shaped relationship that was observed between influencers’ indegree and followers’ engagement. This challenges for instance a popular view, that advertisers should be mainly interested in influencers with ‘most’ followers. But the authors also find that higher content customization and lower brand familiarity (as moderators)

flatten the inverted U-shape between indegree and engagement flattens. For lesser-known brands for instance, it does make sense to work with larger-indegree influencers. Another illustrative study in which there is an interplay between moderating and mediating effects is that of Schulz *et al.* (2022). The authors study the impact of pay inequality on trust in managers through perceived manager fairness. But the indirect relationship is 'moderated' by employee collective voice as well. The authors find that giving employees a voice can help to increase acceptance of pay differentiation but only up to a point/threshold level of inequality.

Moreover, insights on multiple mediating effects (possibly combined with moderation effects), may also allow managers to make better decisions, knowing for instance how to counter negative effects and enhance positive effects. For example, as inseparability lowers customers' price negotiation aspiration in a service context and heterogeneity increases the aspiration, decision makers/managers can try to manipulate both effects at the same time (Alavi *et al.*, 2020). To reduce perceived heterogeneity, they may for instance pursue more standardization in their service processes and guarantee service consistency through reference customers. They may also stress their services' inseparability/ the integration of customers in the service process, making customers more aware not to harm the relationship through tough negotiations. In this example, the recommendations are not about one 'or' the other, but about one 'and' the other, meaning that positive mediating effects should be enhanced, while negative effects should be countered.

Lastly, as a construct/variable turns out to be an important mediator in a relationship, it may be perceived as a decision at another level in the manager's decision process. For instance, the study of Rajaguru and Matanda (2019) indicates that dynamic capabilities such as supply chain capabilities mediate the link between supply chain process integration and organizational performance. Therefore, the authors claim that supply chain integration should be perceived as a strategic decision instead of an operational (excellence) decision only. Khalifa (2021) however states that the classification of a decision as strategic, tactical, or more operational, highly depends on the managerial decision context of a practitioner.

These insights lead to:

**Step 5: Providing actionable recommendations for practitioners (Operational relevance issue)**

- Can clear if-then or first-then recommendations be provided related to goal and decision variables of managers/practitioners?
- Based on the shape of a relationship, which results from the underlying mediating mechanisms, what is the optimal decision level for the independent variable? Does this level make sense to practitioners?
- In case of moderated mediation (or mediated moderation) effects, how is the optimal decision level affected by the level of additional (e.g. moderating) variables? Does this make sense to practitioners?
- Should recommendations be perceived by a practitioner as separate or integrative guidelines? (OR versus AND guidelines)
- Does the mediating effect change the order an/or role of a particular decision in a managerial decision process? (context or scenario specific)

## 5. Conclusions, limitations, and future directions of research

This study focused on the use of moderators and mediators in management (related) research. Finding the right balance between academic validity/rigor and managerial relevance in terms of including moderators and mediators remains the key challenge, but sometimes small changes may

already increase managerial relevance. The insights and step-by-step recommendations assist the academic researcher in making better choices when analyzing moderators and mediators, dependent on the intended type of research and level of managerial relevance. To make recommendations more actionable, researchers should have a clear insight into the decision architecture of managerial problem contexts. In case of multiple moderating and/or mediating variables, the decision architecture becomes more complex, especially when the effects are countervailing/opposite.

Moreover, managerial relevance of moderators and mediators is not only a concern in terms of research output, but also in terms of research input. In terms of input, academic research should not only rely upon theory (existing academic literature) when formulating hypotheses and analyzing moderators and/or mediators. Consulting decision makers/practitioners or integrating insights from business magazines and portals, etc. may help the researcher in detecting unanswered (managerially) relevant 'who', 'where' and 'when' questions related to moderating effects. The same holds for 'why' and 'how' questions with respect to mediating effects. Input from practitioners may also help in getting a better insight on moderating and/or mediating variables (in terms of controllability and/or measurability) and levels that make sense in practice. Lastly, it will also allow academic researchers to formulate recommendations more in line with typical managerial contexts at the end of the research process, in particular testing whether their first-then and if-then guidelines make sense in practice. They may also learn from various practitioners to what extent their guidelines (managerial implications) are useful (from a symbolic to a more instrumental use). After all, the proof of the pudding is in the eating.

But it also works in the other direction, meaning that this article is not a plea for pure practitioner-focused research only. There is nothing wrong to take a more theoretical perspective in the first place, as managers often rely upon their own mental models and don't necessarily have a monopoly on the truth. As more mediating and moderating variables are involved/incorporated in research (as theory develops in a certain domain), making optimal decisions becomes a 'balancing' act for managers/decision makers. It may even challenge their common beliefs (e.g., linear thinking). In this article, many studies were used to illustrate this.

The step-by-step guidelines in this article not only provide guidance to academic researchers, but also to editors and reviewers, evaluating articles that deal with moderating and/or mediating effects.

Some of the guidelines in this article may also help academics in writing for other outlets, in which managerial relevance/accessibility for professional readers prevails. Outlets may vary from general management journals/magazines with digital content (e.g., HBR and MIT SMR) or online expert opinion and business/management insights portals (e.g., INSEAD Knowledge and Knowledge at Wharton) to research-based news and analysis platforms (e.g., The Conversation).

From a theoretical point of view, this study relies upon 'known' theoretical principles about moderators and mediators, but adds a managerial perspective, whereby managerial practice/relevance complements and/or challenges theory and vice versa. As Colquitt and Zepata-Phelan (2007) argue, empirical articles make a theoretical contribution by building and/or testing theory. The authors introduced a taxonomy that reflects the theoretical contribution of empirical articles along these two dimensions. According to their taxonomy, articles that introduce new mediators or moderators are considered to represent a 'moderate' level of theory building, as they do supplement or clarify existing theory, but on the other hand often not change the 'core logic of a theory'. However as this article shows, adding moderators and mediators may challenge the 'core logic of managerial practice', both in thinking (e.g., nonlinear instead of linear) and decision making (e.g., in terms of decision order, role, optimal decision levels and interrelationship between



decisions). But it also works in the other direction, as practice may challenge or complement theory, by adding or reformulating mediators/moderators and their levels, based on existing managerial practice. For instance, Aguinis *et al.* (2017) emphasize that range restriction (on the possible scores of moderator levels) may lead to moderating effects that are undetected or when detected, are simply underestimated. It may be perceived as a plea for academics to have a clear insight into what range and what specific levels of moderators 'may' apply in practice. In this context, an abductive ('what may be') reasoning approach may help by having conversations and theorizing with managers (Brodie, 2017; Leeflang, 2017; Logman, 2011). It may complement the more widely used deductive and inductive approaches in testing and developing theories. The guidelines in this article may guide the researcher in following this abductive approach, adding a managerial relevance dimension to the theoretical/methodological steps, when analyzing moderators and/or mediators. In this respect, the guidelines may also be used for teaching purposes, complementing more theoretical articles that mainly focus on methodological/statistical issues of moderating/mediating variables and their effects.

An important limitation of this study is that it mainly focuses on practice-oriented research, in which the recommendations guide the researcher in pursuing descriptive, goal and operational relevance for practitioners at the same time. Other studies however focus more on descriptive relevance only, giving practitioners interesting 'insights' that only 'indirectly' may guide them in making decisions, as in big picture or explicating research with a focus on symbolic or conceptual use.

From this perspective, an interesting direction for future research, could be to analyze in more detail what are specific criteria of (managerial) descriptive relevance for research that mainly has the purpose to provide 'insights' rather than actionable recommendations for practitioners.

Another direction for future research is the analysis of a possible trade-off between the three dimensions of managerial relevance. For instance, including more intermediate goal variables (e.g., covered by mediators) and contextual variables (e.g., covered by moderators) may increase the goal and descriptive relevance for a manager. On the other hand, it may be at the expense of operational relevance, as it may become very difficult or impossible to define clear and unambiguous first-then or if-then recommendations as a researcher.

Lastly, it may be interesting to analyze how methodological adjustments used to increase academic rigor match with increasing managerial relevance. For instance, one of the solutions to the problem of omitted variables is the inclusion of a lagged dependent variable in the model (Janani *et al.*, 2022; Nagengast *et al.*, 2014; Wilkins, 2018). As decision makers mainly use the past as their reference and therefore often show incremental behavior in making decisions, the use of lagged variables in research may also increase managerial relevance (Wierenga, 2011).

For all these future direction purposes, a similar integrative/critical review perspective could be used as in this article, selecting studies based on their academic influence (in terms of the number of citations) and/or their critical view or uniqueness, adding extra perspectives/dimensions.

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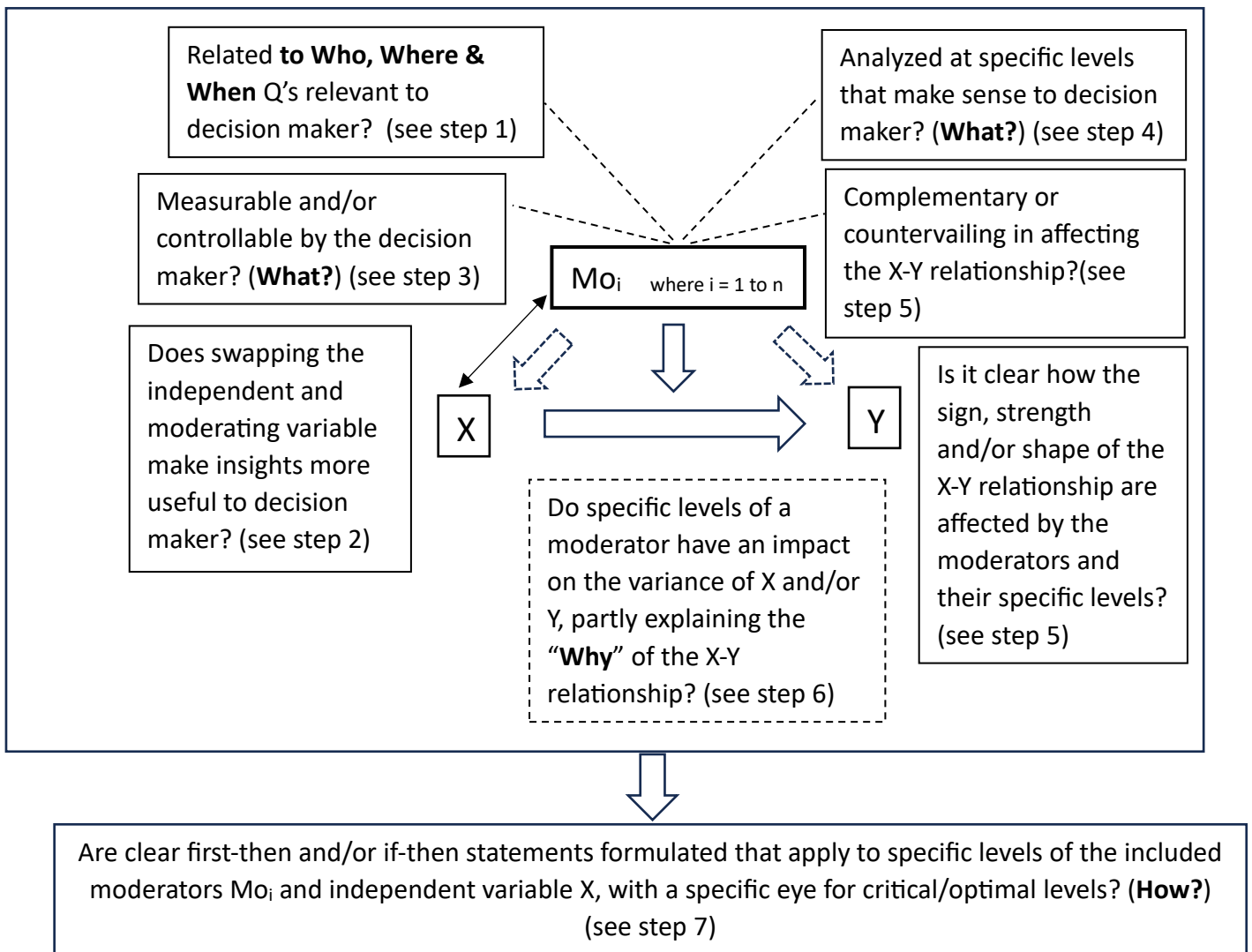
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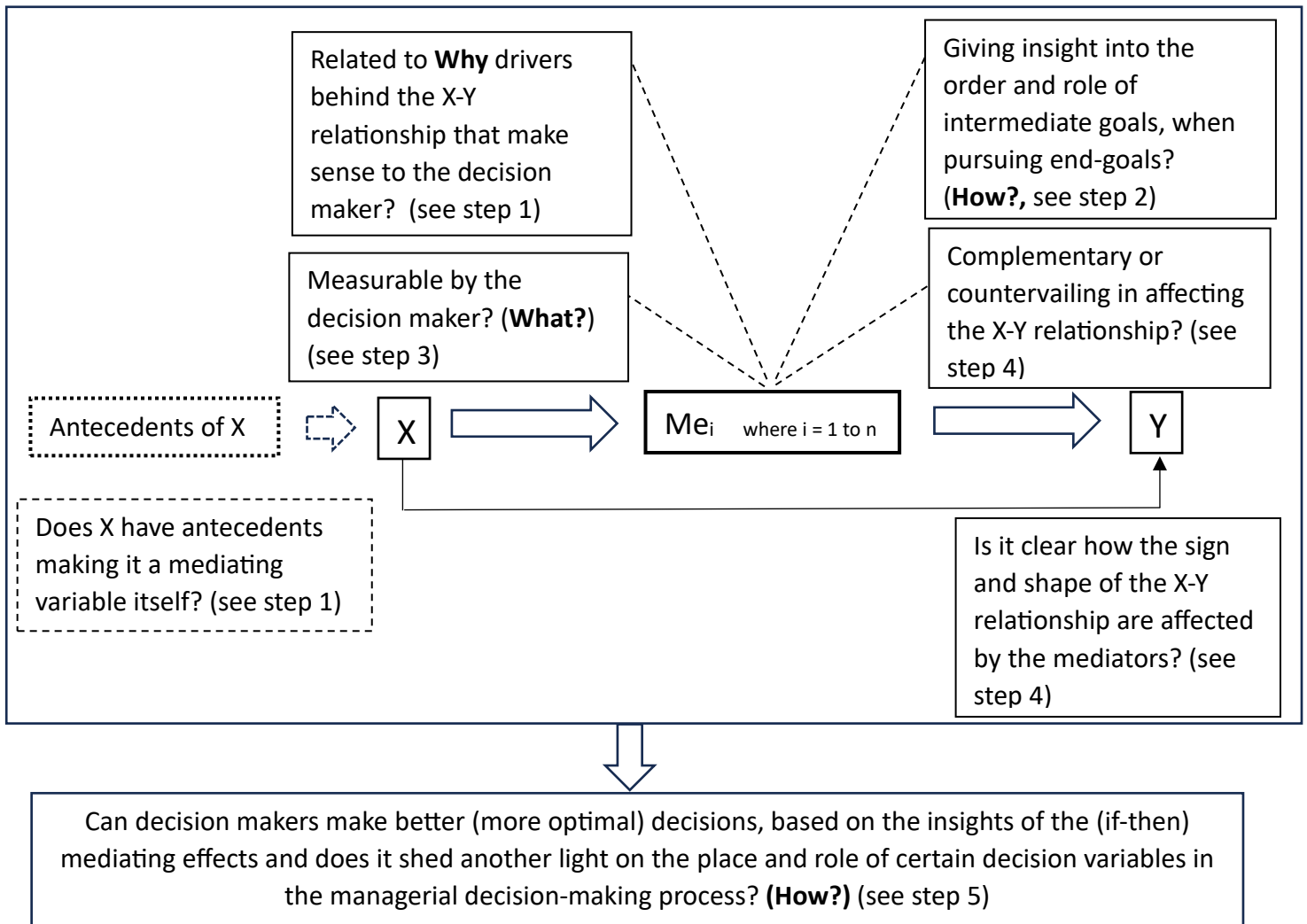
**Figure 1: What makes moderators relevant to decision makers in practice?**



Source: Created by author



**Figure 2: What makes mediators relevant to decision makers in practice?**



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