Chapter 12
The Business Context

Abstract There is a distinction between using rules in the business context and in the political context. Furthermore, in the political context, another distinction is between using rules to select people and using rules to follow procedures. Usually an analyst chooses a Voting Procedure (VP), based on his/her knowledge with regard to the technical issues to do with the application. We argue that instead, DMs themselves should make the choices and that a DM's preferences should be considered in the context of the decision problem.

12.1 Introduction

Although one might think that rules have been designed for political elections rather than for business decisions, it can be observed that they are used quite often in business organizations in a group decision context. Voting procedures are very well-suited to tackling a specific range of business decision problems. For instance, decisions made by the Board of Directors in many organizations are reached by using VPs.

On the other hand, although rules can be applied in both contexts, choosing a rule for the business context needs to consider matters that are very different from those of elections for a political context.

Moreover, it is well known that there are differences of another kind when rules are used, namely, when the choice concerns choosing a person, on the one hand or a policy, on the other hand. Both kinds of choices may be found in the business context. However, choosing a policy happens more often. Furthermore, this kind of decision may be associated with choosing procedures or other similar decisions, such as an alternative course of action to be implemented in the business of the organization. For instance, choosing suppliers is a decision problem that occurs frequently. Another example is to choose projects from a list with several proposals.

Choosing people in business organizations is normally related to recruiting staff and to assigning people to new tasks with new functions, which is rather different from choosing the representatives of political parties or the candidates of other groups of people standing for elected positions.

A. T. de Almeida et al., *Systems, Procedures and Voting Rules in Context*,
Advances in Group Decision and Negotiation 9,
https://doi.org/10.1007/978-3-030-30955-8_12

In the Business context, the issue of choosing a rule may take place in two situations: using a rule for either a specific decision problem or for every decision by a group of DMs. The latter usually happens at the highest level of the organization; for instance, at Board meetings of any business organization, for which norms of the organization (e.g.: explicit in bylaws) have to state which voting procedure should be applied. The specific decision problem is to do with each ordinary decision being made in conjunction with due regard to the several processes of the organization. For this situation, each kind of problem has its specific characteristics and may require different criteria to evaluate rules.

12.2 The Decision Process in the Business Context

Simon (1960) presents the three basic stages of a decision process. Several subsequent studies have added other stages. Most of these contributions come from information and decision systems (Bidgoli 1989; Sprague and Watson 1989; Davis and Olson 1985; Polmerol and Barba-Romero 2000).

The two additional stages come after the first three, making a total of five stages. According to Simon (1960), the initial stages are: Intelligence, Design and Choice. Stages 4 and 5 are Revising and Implementing the decision process.

In the intelligence stage, an organization and its environment are monitored in order to identify decision situations. This is not usual for most procedures of operational research and decision methods, although it is related to identifying a decision situation using the Value Focusing Thinking (VFT) approach as proposed by Keeney (1992). The vision for strategic management also incorporates this kind of approach, during which an organization and its environment are continuously monitored in order to obtain a diagnosis and to act proactively with a view to anticipating decision situations (de Almeida et al. 2015).

In most operational research techniques, it is assumed that a decision problem already exists, and the process starts with the second stage of Design by defining this problem (Ackoff and Sasieni 1968). In this stage the decision model is built, during which several ingredients of the decision model are dealt with, such as creating the set of alternatives, which are also evaluated in this stage. The MCDM/A method is chosen during this stage. In order to have the problem clearly defined, Problem Structuring Methods (PSM) may be applied (Eden 1988; Rosenhead and Mingers 2004; Eden and Ackermann 2004). Building the model includes establishing or estimating all the parameters of the mathematical model. With regard to the preference modeling to be done in this stage, the DM has a particular role in providing information.

The Choice stage is applied in order to evaluate the alternatives and produce a final recommendation. However, before presenting this recommendation to the DM, the fourth stage of Revising is conducted, in order to check for possible inconsistencies and to validate the model. This stage may incorporate a learning process being undertaken within the organization (Davis and Olson 1985). The recommendation is applied in the Implementation stage. There are several practical concerns to be

considered in these two last stages (de Almeida et al. 2015), the most important of which are discussed below.

Throughout these stages, different actors play some kind of role in the process. There are a few possible issues to be considered regarding these actors and their role. Amongst them, we have already considered the decision maker (DM), who can be influenced by other actors, such as stakeholders. Stakeholders are affected by the implementation of an action chosen by the DM and for that reason they try to exert some influence on the DMs. An Analyst has the role of supporting the DM in all stages of the process, and does so by methodologically structuring the problem and building the model (Roy 1996; Belton and Stewart 2002; Figueira et al. 2005; Polmerol and Barba-Romero 2000).

12.3 Types of Aggregation of DMs' Preferences

The aggregation of DMs' preferences consists of reducing the set of each individual DM's preferences to a collective preference system for the whole group of DMs. With a group of DMs, the preference aggregation process is closely related to a few factors, such as the way in which the DMs interact, including their power relation system, the time they have available to spend on this process, whether they are available to interact simultaneously and the role of other actors in this process.

Regarding the power relation system amongst the DMs, one of them may be a supra-DM, who usually has a hierarchical position in the organization's structure that is higher than that of the other DMs. The supra-DM is in charge of making the decision on main issues, such as the decision process itself, global evaluations and evaluating the other DMs' choices. The supra-DM is called a 'benevolent dictator' by Keeney (1976), and acts in accordance with one of the two types of Group Decision process. The other type is called the 'participatory group problem', in which the group acts jointly in the process and each DM has the same power and hierarchical position. Regarding other actors, instead of an analyst, in some situations a role is played by a facilitator or a mediator. With a facilitator, the interaction between DMs may be a more detailed process, assuming that the DMs are available for this. These issues play a conclusive role in the kind of group decision (GD) process, when classifying the types of GD aggregation.

Regarding the way in which the preferences are combined in order to obtaining a collective preference, whether or not a supra-DM is present, the decision process can be implemented in two ways as shown in Fig. 12.1 (Nurmi 1981; Kim and Ahn 1999; Leyva-López and Fernández-González 2003; Dias and Clímaco 2005; de Almeida et al. 2015):

- Procedure 1—Aggregate DMs' initial preferences Pi.
- Procedure 2—Aggregate DMs' individual choices Ri.

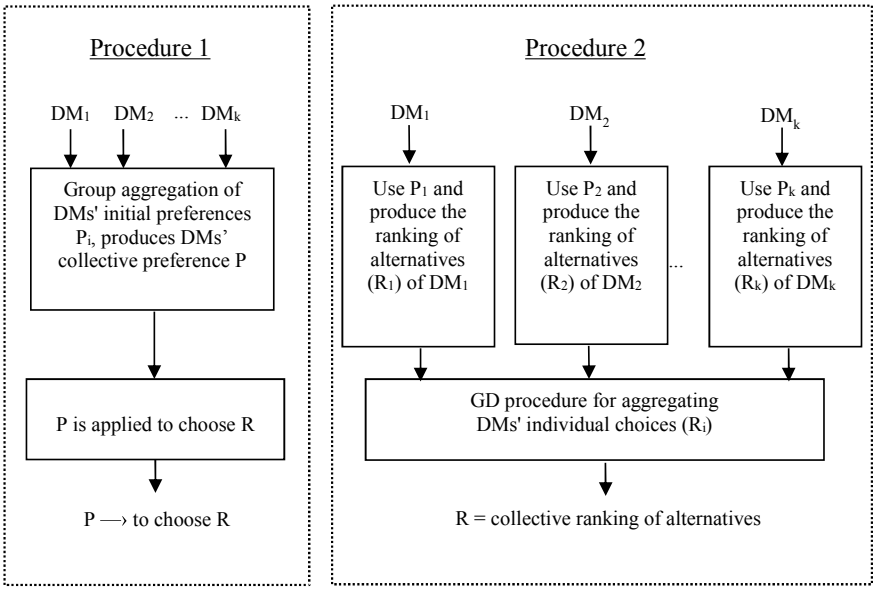

Fig. 12.1 Group decision aggregation processes

A distinction needs to be made between preferences and choices. Let us assume that each DM_i ($i = 1, 2, \ldots, k$), has an initial preference system (P_i) over the consequences (or outcomes) and could apply an MCDM/A method in order to obtain a separate ranking R_i of the alternatives (individual choices of DM_i), such as illustrated for procedure 2 in Fig. 12.1.

According to Nurmi (1981), with regard to preferences, given that there are individual preferences, aggregate these into collective preferences and then make the choice from this collective preference relation. As to choices, aggregate the individual preferences directly into collective choices (without the intermediary collective preference relation).

Therefore, in procedure 1 there is an integration of P_i, in order to produce a collective preference P, whereas in procedure 2, the process is completely separate for each DM.

In procedure 1, the group of DMs provides P_i in an integrated process, such that the aggregation of those preferences is intrinsically considered from the start. Then, a collective preference P is produced. To finalize, P is applied in order to make the final choices for the set of alternatives. These choices may be presented either with ordinal ranking only, or may include a cardinal score for each alternative. This depends on the method, which is jointly applied to all DMs. In this case, it is assumed that all DMs have the same criteria, although after applying these, they may have different evaluations for the intra-criterion and inter-criteria information. Usually the evaluation of intra-criteria is the same, and the differences in P_i concern the weights of the criteria.

For procedure 2, each DM_i provides R_i (ranking of alternatives for DM_i), which are the individual DMs' choices. The GD process consists of producing the final ranking of alternatives R. R_i may be obtained by completely different methods for each DM_i, and even if a different set of criteria is used, i.e. each DM may have a specific set of objectives. The only information that matters to the group decision aggregation is R_i. So, a voting procedure may be applied over R_i.

The latter is the focus of this text, since a VP is a natural method to be applied in order to combine R_i into R. Another step needs to be followed in this process: choosing the most suitable VP.

Typically, choosing a VP is a decision the analyst him/herself likes to make. In general, this choice is based on technical issues rather than the DMs' preference regarding how to tackle solving the final problem. Characteristics and properties of the VPs are considered. In other words, this part of the process appears simply as one of the technical issues to be considered during the process, since this step is not directly related to the final decision faced by DMs.

We argue that the DMs' preference regarding the final objective in this process should be taken into account. Therefore, they should be provided with methodological and technical support (de Almeida and Nurmi 2014, 2015).

12.4 Business Decision Process and Rule Choice

Often in business context, in the decision process DMs make their own ranking of alternatives, before a group aggregation procedure can be considered. Thus, the Business Decision Process can be divided into two specific decision processes:

- DPVP (decision process for choosing a voting procedure);
- DPBO (decision process for the business organization).

The DPVP is a first modeling step in the whole decision process, in which an MCDM method is applied. The DPBO is the subsequent step in the decision process. It focuses on the main concern of the business organization, in which the chosen VP is applied. Regarding the kind of support for these two processes, it should be noted that the DPVP is implemented using an MCDM model and the DPBO is conducted by means of a VP.

The DPVP is the main focus of this text and should use the framework that is presented in a later chapter. On the other hand, the main focus of the DPVP is the DPBO. For this reason a discussion on who should make the decision in the DPVP is worthwhile.

Usually an analyst chooses a VP and it is usually assumed that the DMs have agreed with the analyst´s choice of VP. We argue that this decision should be made not by the analyst but by the DMs themselves.

In such a case the DPVP is not strictly applied and the choice of a VP is made by taking some convenience for the modeling process into account. Although the analyst may consider many technical concerns regarding Social Choice Theory, typically, a

structured process is not applied in order to make this choice. In other words, the choice of VP is dealt with as an additional technical issue in the whole decision process.

We argue it is important the DMs should act in the DPVP, since applying different VPs to the same set of alternatives ranked by individual DMs might lead to different results. An important issue is that the analyst's preferences (or technical predisposition) should prevail over the DMs' preference in the DPVP.

12.5 The Sequence in the Decision Process

Although the DMs supply their preference for the DPVP, such a process includes receiving the support of an analyst or facilitator, whose role is to support all DMs in the group decision process.

In the DPVP, the analyst supplies the DMs with the necessary information about the VPs. This includes listing the main VPs available and explaining their main characteristics, which would include their main properties and behavior regarding paradoxes.

There are two possible sequences for the decision process:

- DMs choose the VP before they rank the alternatives (of the DPBO);
- DMs choose the VP after ranking the alternatives (of the DPBO).

If the DMs have no knowledge about how other DMs have ranked the alternatives regarding the DPBO, then, the latter sequence would be fine. On the other hand, the former sequence could make some kind of manipulation possible i.e. the DMs might be tempted to adopt strategic choices for the ranking of alternatives in the DPBO. In the latter sequence, the DPBO is divided into two parts. The alternatives are ranked before the DPVP, as a preliminary part of the DPBO, which is finalized afterwards. However, in the first sequence, the DPBO is concluded at once, only after the DPVP has been conducted.

A bias in choosing a VP may happen if the VP is evaluated only after the data are known (the ranking of the alternatives). A DM may feel attracted to favor a VP that is not the one that is best suited to the DPBO, since this VP might suggest the alternative that the DM would like to choose. The analyst needs to be aware of these possibilities and be ready to deal with them, since this tendency may be present.

12.6 Topics for Further Reflection

As already mentioned an MCDM method is applied in the DPVP. Now, one could raise another relevant question:

How should the DMs interact in order to choose the VP in the DPVP? Or,

What is the DPVP group decision process like?

Also, one could imagine that another model should be built to aggregate the DMs' individual preferences with regard to the criteria for evaluating the VPs; alternatively a more complex negotiation process could be conducted with the DMs. This issue is discussed in the chapter related to the framework for the DPVP.

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