Using *i** to Analyze Trust-Building Strategies for Organizations under Coopetition

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Abstract. Trust is a prerequisite for simultaneous cooperation and competition because trust must exist for rivals to partner. It is a multilevel and evolutionary phenomenon that is comprised of three main phases: calculation, mutual understanding, and bonding. Trust influences conduct of actors under coopetition by regulating their competitive and cooperative behaviors. For example, in coopetitive relationships, trust can be the basis for choosing among opportunistic or altruistic actions. This paper outlines research into the strategic modeling of trust in coopetitive relationships using *i**. We propose an approach for developing a Trust Matrix from an *i** Strategic Rationale (SR) diagram. A Trust Matrix can be used to assess the perceived trustworthiness of each actor from the perspective of other actors in a coopetitive relationship. It can also be used in conjunction with its corresponding *i** SR diagram to generate new trust-building strategies. An illustrative example of a case study from the literature is used to explain this approach.

Keywords: Coopetition. Trust. Design. Modeling.

1 Introduction

Coopetition refers to simultaneous cooperation and competition among actors [1] whereby actors "cooperate to grow the pie and compete to split it up" [2]. It is "an integral part of many companies' daily agenda" [3] and has become "increasingly popular in recent years" [4]. It characterizes the "the current trend of economic activities" [5] and functions as "an important domain for industrial practice" [6]. Trust plays a vital role in coopetitive relationships because trust is a prerequisite for competitors to cooperate [7]. Moreover, trust regulates the degree of competition and cooperation in a coopetitive relationship [8]. Increase in trust leads to more cooperation and less competition while decrease in trust leads to more competition and less cooperation [9, 10]. Trust can be regarded as the primary control knob for balancing cooperation and competition in a coopetitive relationship [11]. Actors can implement various trust-building strategies to improve the stability and sustainability of their coopetitive relationships. In this paper, we propose an *i**-based approach for discriminating and generating trust-building strategies in a systematic and structured manner.

2 Trust in Interorganizational Cooperation

Child [12] defines trust as, “the willingness of one person or group to relate to another in the belief that the other’s actions will be beneficial rather than detrimental, even though this cannot be guaranteed.” Barney and Hansen [13] note that, “while trust is an attribute of a relationship between exchange partners, trustworthiness is an attribute of individual exchange partners.” Child et al. [14] proposed a widely cited framework of trust within cooperative strategy. They divide trust into three degrees of significance that correspond with three sequential phases of partnership development [14]. We adopt these notions of trust and trustworthiness in this paper.

During the first phase (i.e., formation) of a cooperative relationship, the type of trust that exists between partners is calculative trust (CT). Calculative trust entails estimating the costs and benefits of cooperating as well as predicting the risks of opportunism and threat of exploitation from partners. During the second phase (i.e., implementation) of a cooperative relationship, the type of trust that exists between partners is knowledge/understanding-based trust (KT). Knowledge or understanding-based trust arises after partners learn to mutually comprehend the decision-making and conflict resolution mechanisms of each other. During the third phase (i.e., evolution) of a cooperative relationship, the type of trust that exists between partners is bonding/values-bases trust (BT). Bonding or values-bases trust emerges only when partners respect each other as individuals and form inter-personal ties with each other.

3 Modeling Trust-Building Strategies for Organizations under Coopetition

Our research is motivated by the research of Gans et al. [15, 16] as well as Yu and Liu [17, 18]. Gans et al. [15, 16] extend the *i** modeling language to add support for planning and language action perspectives. Their TCD (Trust, Confidence, Distrust) approach [15, 16] aligns with the essence of Barney and Hansen’s [13] notion of trustworthiness as individual trust and system trust as confidence. They [15, 16] also note the importance of treating distrust as a conceptual entity by itself rather than regarding it merely as the absence of trust. Yu and Liu [17, 18] proposed an approach for considering contributions to trustworthiness using a qualitative reasoning approach. They note the importance of expressing "varieties of trust" [17] within conceptual models and reflecting "various theories and techniques currently being developed for specifically addressing trust" [18].

Figure 1 presents an *i** Strategic Rationale (SR) diagram of coopetition in the tourism industry. This model depicts an interpretive adaptation of a case study documented in [19] and [20]. This case study pertains to coopetitive relationship among three kinds of actors within the tourism industry in Poland [19, 20]. Mature Tourism Businesses (MB) and New Tourism Ventures (NV) compete with each other to win business from tourists that visit their region. They also collaborate via a Regional Tourism Organization (RO). The RO advertises their region in distant markets to attract tourists from those locations to visit their region. Following [15-18] we depict trustworthiness (i.e., individual trust) as *softgoals* of each actor.

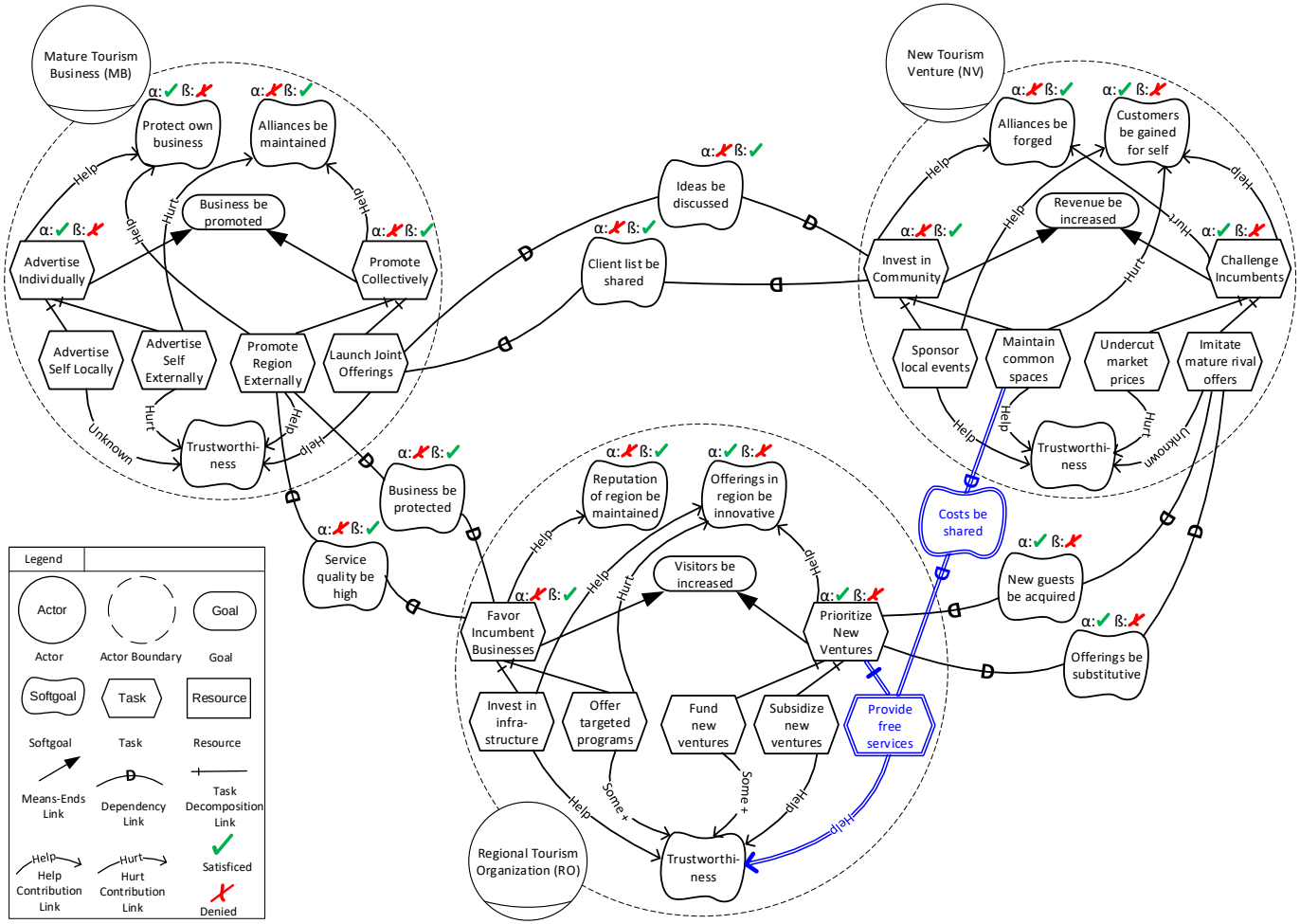

Figure 1. *i** Strategic Rationale (SR) diagram showing coopeting actors in a tourism network (Source: interpretive adaptation from [19, 20])

Figure 2 depicts a Trust Matrix showing scenarios α and ß from figure 1. In scenario α, actors MB and NV behave competitively towards each other while in scenario ß, they behave cooperatively with each. Moreover, in scenario α, RO prioritizes NV while in scenario ß, RO favors MB. A Trust Matrix depicts the perceived trustworthiness of each actor, based on its actions, from the perspectives of other actors. It is a visualization tool that renders tasks solely for evaluating their perceived impacts on individual and system trust. A Trust Matrix can be developed manually, or it can be generated automatically using a software tool such as jUCMNav (i.e., by assessing trust-specific attributes related to tasks in GRL).

A Trust Matrix is a square matrix in which each actor is placed on a row and a column. A column represents an actor that is perceiving the trustworthiness of another actor. A row represents an actor whose trustworthiness is being perceived. Border line of a *task* denotes the degree of trustworthiness (i.e., CT, KT, BT) that is impacted by that *task.* The color of a *task* and check/cross symbol above a *task* denote its satisficing/denial. This is used to indicate an increase/decrease in perceived trustworthiness.

For example, if MB *launches joint offerings* with NV then NV's perceived trustworthiness of MB increases. However, if MB does not *launch joint offerings* with NV then NV's perceived trustworthiness of MB decreases. Similarly, if RO *funds new ventures* then NV's perceived trustworthiness of RO increases but if RO does not *fund new ventures* then NV's perceived trustworthiness of RO decreases. Listing tasks in a tabular format allows comparison of scenarios to discriminate those with more trust-building tasks (e.g., ß) from those with more trust-destroying tasks (e.g., α).

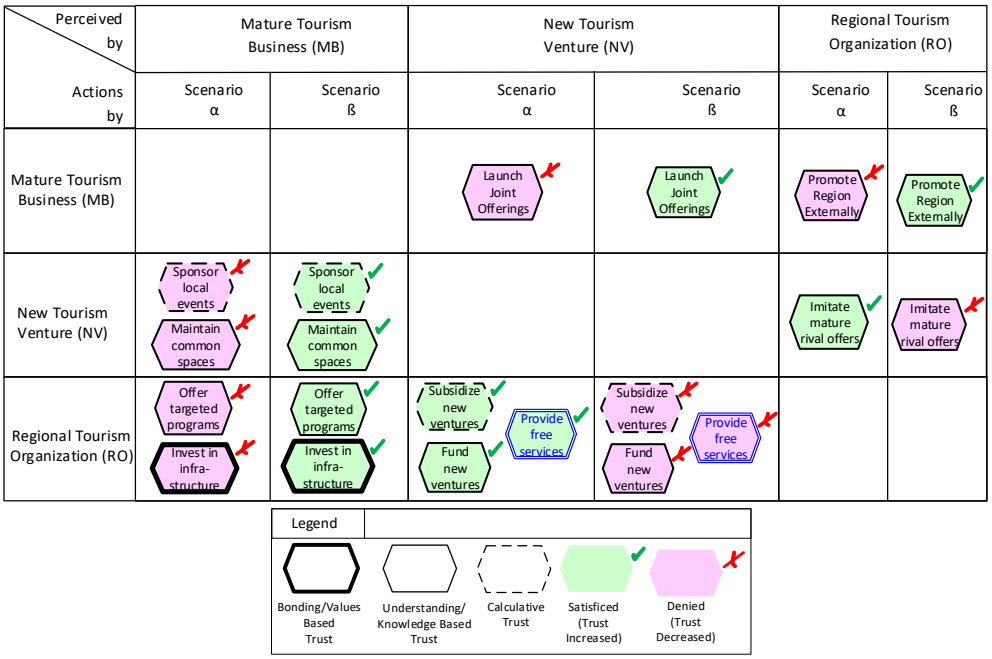

Figure 2. Trust Matrix based on scenarios α and ß from Figure 1

The reason that NV's perceived trustworthiness of MB increases if MB *launches joint offerings* with NV can be ascertained from figure 1. NV depends on MB to *share client list* with NV for NV to complete one of its tasks (i.e., *invest in community*). Therefore, MB's task *launch joint offerings* with NV has a *Help* contribution link to MB's softgoal *trustworthiness*. This task is only related to NV via a dependum (i.e., *share client list*) and therefore by performing this task the trustworthiness of MB is increased from the perspective of NV. Conversely, if MB does not *launch joint offerings* with NV then the dependum *share client list* is denied which prohibits NV from performing its task of *invest in community*. This has an adverse impact on the satisfaction of one of NV's softgoals (i.e., *alliances be forged*) decreases NV's perceived trustworthiness of MB.

A Trust Matrix can also be used for exploratory/generative purposes. *Tasks* denoted by a double outline of blue color are used to show a new alternative. For example, in figure 2, the RO has two alternatives for increasing its trustworthiness from NV's perspective. These tasks are *subsidize new venture* (increases CT) and *fund new ventures* (increases KT). Similarly, RO also has two alternatives for increasing its trustworthiness from the perspective of MB. These tasks are *offer targeted programs* (increases KT) and *invest in infrastructure* (increases BT). This shows that there is an asymmetry in the availability of trust-building activities (i.e., in terms of degree of significance) that are available to RO with respect to NV and MB.

To correct this asymmetry, RO can generate one or more new alternatives by exploring figure 1. For example, if the RO introduces a new task *provide free services* (i.e., denoted by double outline of blue color in figures 1 and 2) then it will be advantageous for NV when NV performs its task of *maintain common spaces*. NV depends on RO for *costs be shared* as a result of this new option *provide free services* that is generated by RO. Without this option NV *maintained common spaces* without assistance from RO, however, with this option NV can achieve its softgoal *alliances be forged* with the support of RO and this increases the perceived trustworthiness of RO from the perspective of NV. This shows that a Trust Matrix can be used to support the search for new options in an *i** SR diagram.

4 Conclusion and Future Work

In this paper, we proposed Trust Matrices as modeling artefacts to support and supplement the creative thinking and deep domain knowledge of SMEs. We used a case of coopetition from the tourism industry to explain the process for developing a Trust Matrix. We also discussed the application of Trust Matrices to evaluate existing options and generate new alternatives on their source *i** SR diagrams. Trust Matrices refer to well-established notions of trust from the Strategic Management literature. With further development, Trust Matrices can serve as useful tools for expressing and evaluating trust and trustworthiness in coopetitive relationships.

This research stream is in the early phases of development and many areas of inquiry remain open. These include developing a systematic basis for: (1) mapping *tasks* to degrees of trust and trustworthiness, as well as, (2) totaling individual and systemic increases and decreases of trust and trustworthiness. Additionally topics for research include: (3) alternate notions of interorganizational trust, such as those surveyed in [21], ought to be considered for reasoning about trust and trustworthiness in coopetitive relationships; (4) we treat system trust as the cumulative trustworthiness of actors that comprise the system however this overlooks the effects of synergy and complementarity within the system; (5) the exploratory/generative application of Trust Matrices also merits additional focus. Structural configurations and model contents may enable or constrain particular new alternatives; (6) moreover, path dependent factors such as reputation and prior dealings may impel or inhibit specific new options.

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