ICT–Supported Gaming for Competitive Intelligence

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INTRODUCTION

Collecting and processing competitive intelligence for the purpose of strategy formulation are complex activities requiring deep insight in and models of the "organization in its environment." These insights and models need to be not only shared between CI (competitive intelligence) practitioners for the purpose of data direction, collection, analysis, and dissemination, but also between CI practitioners and strategy makers. Sharing these insights and models requires high-quality communication (both regarding content and process) between these parties. In this overview, we examine the potential of (ICT- [information communication technology] enabled) simulation games to improve the quality of communication between CI practitioners and strategy makers.

BACKGROUND

Organizations need to collect and process competitive intelligence about the environment to formulate their strategies. Moreover, the pressure to produce timely, accurate, actionable, and strategically relevant intelligence is growing because the complexity and dynamics of the environment is increasing rapidly (cf. Cook & Cook, 2000; Fuld, 1995; Kahaner, 1997).

CI processes produce this intelligence. Usually, these processes are broken up into four stages: direction, collection, analysis, and dissemination (Fuld & Company, 2002, Kahaner, 1997). In the direction stage, CI professionals establish what data are relevant for the purpose of strategic decision making. In the collection stage, relevant data sources are determined and data are collected from them. In the analysis stage, collected data are transformed into competitive intelligence that can be used by strategic decision makers. In the dissemination stage, the competitive intelligence resulting from analysis is disseminated over strategic decision makers so that they can incorporate it in the process of (re)formulating their strategies.

If CI is to deliver its contribution to the process of strategy formulation, a proactive mode of intelligence gathering seems most appropriate (Ellis, 1993; Hannon, 1997; Tessun, 1997). In this mode, intelligence practitioners try to anticipate environmental developments that may have a strategic impact and assess their consequences. Proactive intelligence requires, in our view, a deep insight into the organization in its environment. For instance, directing the search for information requires an insight into strategic problems the organization in focus has to cope with, and environmental factors having an impact on these problems. To direct the search for data, CI professionals need to construct models of these strategic problems and environmental factors. Analyzing collected information and transforming it into intelligence builds on these constructed models and requires an insight into possible effects of a multitude of states of affairs and events in the environment of the organization, on parties relevant to and the organization in focus itself.

Not only do CI practitioners need a model of the organization in its environment, it is also important that this model is shared among the different parties involved in the intelligence process. The model should be shared among CI professionals so that they have a common orientation toward performing their CI activities. Moreover, it should be shared among CI professionals and strategic decision makers for several reasons. Among these are (a) improving the understanding amongst CI professionals of strategic problems, (b) grounding the model in the strategic orientation of the organization, (c) facilitating the dissemination of the intelligence, (d) ensuring commitment of strategic decision makers to using the intelligence, and (e) improving the process of monitoring and maintaining the model itself.

Sharing the model among the relevant parties in the organization requires high-quality communication (both regarding content and process) between these parties. In this overview, we examine the potential of (ICT-enabled) simulation games to improve this communication process. As Geurts, Caluwé, and Stoppelenburg (2000) assert, simulation games may be a valuable tool contributing to improving the quality of the communication. Simulation games are organized procedures (involving all kinds of paraphernalia) allowing participants to improve communication about complex problems by providing a safe and controlled environment to experiment with different interventions under varying circumstances by means of models representing these complex problems. The element of simulation requires participants to interactively model the

organization in its environment, systematically analyzing relevant variables, parties, processes, and their relations. The element of gaming allows participants to interactively experiment with the model in a relatively safe environment. Together, the simulation and the gaming elements can improve both the content and the process of communication required for proactive competitive intelligence. Although the use of games in supporting intelligence activities has been reported (e.g., Allgaier & Powell, 1998; Clark, 1998; Fuld, 1998), the link between simulation games and CI has not been treated thoroughly. In this overview, we examine this link.

To deliver its contribution to the intelligence process, simulation games may be supported by ICT in various ways (e.g., by groupware of various Web-based

Table 1. CI stages and required knowledge

	Description	Required knowledge
Directing	Determine strategic information requirements	Model of organization in its environment; how to use the model to derive required information
Collecting	Identify sources and retrieve data from them	How to select sources; how to approach sources
Analysis	Transform data into intelligence	Model of organization in its environment; how to use the model to assess the impact of specific constellations of environmental variables
Dissemination	Forward intelligence to strategic decision makers	Selection of what users get: what intelligence in what format

Table 2. Contribution of gaming and simulation to improving the quality of communication

		Increasing awareness and motivation	Training skills	Increasing knowledge and insight	Improving communication and cooperation	Integration of learning experiences
Building the simulation game	Model building Transforming model into game Scenario definition	Model building may increase awareness of the importance of knowledge and communication. Motivating to deal with the problem	Training in structuring complex problems in terms of simulations Training in making understandable complex models and making them transferable to other people	Increasing knowledge about the problem under consideration (What is the problem? Why is it a problem?) Increasing knowledge about relevant variables, parameters, events, and relations related to the problem	If participative methods for model building, transformation, and scenario definition are used, chances are created to improve communication and cooperation between parties dealing with the simulated problem.	Participative building allows for pooling knowledge and creating a shared language, improving discussions between parties dealing with the simulated problem.
Using the simulation game	Preparation Introduction Playing the simulation game Analysis and feedback	Awareness of differences between points of departure, differences between events, differences between lines of interventions and their effects Motivation providing a sense of control and security needed to deal with problems Focus is on habitualisation and tacit knowledge	Quickly picking up relevant aspects of a complex problem situation Operationally dealing with complex problems in different circumstances Dealing with unexpected events and interventions	Knowledge and insight in (constellations of related) variables causing certain effects given certain starting conditions, events, and interventions Focus is on analysis and explicit knowledge	Teams of players playing against or with each other need to cooperate, communicate, and get feedback on communication and cooperation and the results. Improvements can be monitored by playing the game more than once.	Shared understanding and awareness of the dynamics of the complex problem given different conditions, events, and interactions

applications). The role of ICT to enable simulation games is also discussed in this overview.

Linking Simulation Games to the CI Process

To explore the possible contribution of simulation games to improve communication in the different stages of the CI –process, we first need to explain what these stages entail and what knowledge is required in these stages. Second, we need to explain in what ways simulation games can improve communication. Given the knowledge requirements in the CI process and the possible contributions of simulation games to improving communication, it becomes possible to examine how communication in the different stages of the CI process can benefit from simulation games.

Tables 1 to 3 provide an answer to these questions. Table 1 provides an overview of the CI stages and of the knowledge required in them. Table 2 provides an overview of possible contributions of simulation games to improving communication. It lists the different functions simulation games can serve. Table 3 links the first two tables. It specifies how simulation games can enhance communication in the different stages of the CI process.

The two left columns of Table 1 present the stages of the CI process. In the right column, the knowledge required in these stages is presented.

Table 2 presents five different functions of simulation games (top row; see Geurts et al., 2000) and links them to the phases of building and using the simulation game (two left columns). In the rest of the table, the contributions of simulation games to enhancing communication are presented.

Table 3 links the knowledge requirements in the stages of the CI process (Table 1) to the possible contributions of building and using simulation games to enhance com-

Table 3. Gaming and simulation contributing to the acquisition of knowledge for the CI stages

	Directing	Collecting	Analysis	Dissemination
Building the simulation game	Participants develop a model of the organization in focus in its relevant environment in terms of parties, variables, and variables relevant for strategic decision making. Making this model can contribute to discussing and getting an awareness of environmental and organizational knowledge needed for strategic purposes, and thus enhances communication about the identification of relevant knowledge domains and data classes needed for directing purposes.	Participants identify possible sources for collecting information about the environment that can be used in the game. Identifying sources forces participants to discuss and evaluate their relevance and accessibility. Knowledge about relevance and accessibility of sources constitutes the core of the collection stage.	Participants model relations between the organization and environment .for gaming purposes. Developing the model enhances communication about variables relevant for strategic decision making and the interpretation of intelligence in terms of these variables in the analysis phase of the CI process.	Participants develop roles in the strategic decision-making process and rules for dissemination of intelligence to persons playing these roles. Developing roles and dissemination rules may focus participants on the importance and structure of different settings for disseminating environmental intelligence and their implications for the strategic decision-making process
Using the simulation-game	Participants identify and vary knowledge domains and data classes for making particular strategic decisions in different scenarios. Identifying knowledge domains and data classes and using them in the game can provide knowledge about the usefulness of these domains and classes in the strategic decision-making process and in varying scenarios.	Participants experiment with different sources of environmental data in different scenarios. Experimenting with these sources may enhance awareness of the usefulness of particular sources for particular problems in the strategic decision-making scenarios.	Participants experiment in different scenarios with giving meaning to environmental and organizational intelligence using the model developed in the building phase as a basis. Experimenting with the model in different scenarios may provide knowledge about the adequacy of the model for analysis purposes. Moreover, participants learn to use the model for analytic purposes in different contexts.	Participants vary who (which persons playing what role) has access to what intelligence in different scenarios. Varying access to intelligence may provide knowledge about the effectiveness and efficiency of different settings for the dissemination of intelligence and its use in the strategic decision-making process (in different scenarios).

Table 4. Examples of ICT applications supporting simulation games to arrive at knowledge for CI (the table builds on the contributions given in Table 3)

	Directing	Collecting	Analysis	Dissemination
Building the simulation-game	To build a model of the environment of the organization, forms of groupware may be used. To identify relevant (values of) variables and parameters, Decision Support Sytem (DSS) or system dynamics software may be used. ICT can also provide a virtual setting for gaming.	To identify possible sources for collecting information about the environment and to find relevant parameters, variables, and their values, ICT applications for monitoring the environment may be used (Internet, online databases, etc.).	Providing a model for analyzing information about the environment. The model used in the direction stage can be used for analysis purposes as well– (for ICT use, see "Directing").	Different forms of ICT may be part of the different settings for distributing environmental information and its use in strategic decisions (e.g., e-mail, electronic conferencing, dedicated software). The adequacy of the different forms may be tested during the game
Using the simulation game	To identify knowledge domains and data classes for making particular strategic decisions in different scenarios, participants may use groupware to support their communication and cooperation. DSS or System Dynamics (SD) software may be used to determine the effect of values of variables in order to direct the search activities. ICT can be used to generate information about autonomous events to the participants.	During the game, the participants may use specific software to monitor the game environment. Also during the game, ICT can be used to store the results about the usefulness of specific sources in different scenarios	ICT should be used to store knowledge about the adequacy of the model for analysis purposes in different scenarios. Groupware can be used to support the communication and cooperation during strategic discussions and the meaning of environmental information. DSS or SD software may be used to determine the effect of values of variables in order to make strategic decisions. Through ICT, common analysis tools can be made available (e.g., an automated Strengths, Weaknesses, Opportunities, and Threats (SWOT).	To store the knowledge about the adequacy of different settings for the distribution of the intelligence and its use (in different scenarios), ICT can be used

munication (Table 2). Table 3 specifies how simulation games can improve knowledge in the CI process for the purpose of strategic decision making.

Linking Gaming and Simulation to ICT

From Table 3, it follows that building and using simulation games can contribute to improving the quality of the content and the process of communication in the different stages of the CI process. Table 4 specifies how ICT may be used to support communication in these stages.

FUTURE TRENDS

As the process of globalization unfolds, the importance of sharing insight in the relations between the organization and parties about its relevant environment by means of high-quality communication between CI practitioners and strategy makers will probably increase. As the complexity and the intensity of these relations (that often include complex feedback mechanisms) increase, demands for model-building techniques and tools will increase as well. Two of the trends allowing for dealing with these increased demands are

- using CI-supported system dynamics instead of econometric models for the purpose of building complex feedback models flexibly handling different simulations and scenarios (Rouwette, 2003), and
- using group model-building for improving the quality of, commitment to, and communication between CI practitioners and strategy makers about the system dynamic models underpinning complex games (Vennix, 1996).

CONCLUSION

The purpose of this overview is to outline the relevance of simulation games for competitive intelligence and to examine the role of ICT to support simulation games for competitive intelligence. Simulation games can be a valuable tool for arriving at knowledge required in intelligence

activities. Its main contribution is to build and test different scenarios regarding the impact of the environment on the organization. During building and testing these scenarios, awareness, knowledge, and insight may be gained about the underlying model of the organization in its environment and about the impact of different values of environmental parameters on relevant organizational variables.

Moreover, building and testing different scenarios may also enhance the communication and cooperation needed for intelligence activities. ICT can support delivering the contributions of simulation and games to competitive intelligence in various ways. In this overview, we discussed some possibilities to support the building and using stages, and to facilitate the dissemination and use of the knowledge resulting from the game to intelligence activities.

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KEY TERMS

Analysis: The stage of the intelligence cycle in which the strategic significance of environmental data is determined. In this stage, the intelligence is produced. During analysis, intelligence professionals may use different models and techniques to interpret and value environmental data (e.g., SWOT analysis, growth-share matrix, or scenario analysis).

Collection: Stage of the intelligence cycle. In this stage, sources regarding the required environmental data are located and accessed, and the data are retrieved from them.

Competitive Intelligence: In the literature, two definitions are used: a product definition and a process definition. In the product definition, competitive intelligence is defined as information about the environment, relevant for strategic purposes. The process definition highlights producing and processing this environmental information. Process definitions often refer to the intelligence cycle.

Direction: Stage of the intelligence cycle. In the direction stage, one determines the strategic (external) information requirements; that is, one determines what environmental data should be collected.

Dissemination: Stage of the intelligence cycle. In this stage, the intelligence produced in the analysis stage is presented and forwarded to strategic decision makers.

Game Building: Stage in gaming and simulation. During the building stage, game constructors make a model of the problem they want to incorporate in the game. Next, they transform the model into a specific game, and, finally, they define different scenarios that can be played during the game.

Game Using: Stage in gaming and simulation. During the using stage, game facilitators make preparations for playing the game, and participants actually play the game (given a certain scenario).

Gaming and Simulation: The process of building and using simulation games as a means to deal with complex problems (see also "Simulation game").

Simulation Game: An organized procedure involving particular building blocks allowing participants to improve communication about complex problems by providing a safe and controlled environment to experiment with different interventions under varying circumstances by means of models representing these complex problems.