

Grapes of Wrath: A Business Game to Teach IS Concepts

Trevor T. Moores
Department of IS & DS
ESSEC Business School
Cergy-Pontoise Cedex
France
Email: moores@essec.fr

Abstract

In order to teach students the importance of information technology (IT) and the potential for strategic advantages, a business game called the Grapes of Wrath is described. The game involves buying lots of wine at auction and then selling to customers. The goal of the game is to allow students to experience the flow of information through an organization and the role that IT can play in supporting business processes. Post-game discussions center on the cost effectiveness of IT, and whether technological innovations can deliver strategic advantages.

1. Introduction

Despite the numerous technological innovations that have helped organizations develop new business strategies, such as e- and m-commerce, cloud computing, and others, there is still the lingering belief held by some that IT doesn't matter. The basic argument put forward is that since IT is a ubiquitous component of all modern organizations, there can be no strategic advantage from IT because it would be impossible for one organization to differentiate itself from any other [3].

This argument raises a number of challenges to the teaching of IS concepts to undergraduate and graduate students, because if IT really didn't matter, then a course in IS/IT for managers would be entirely redundant or reduced to little more than teaching a litany of technical terms, such as PC, database, network, and e-commerce.

In this paper, we describe a business game that has been used to counter the IT doesn't matter viewpoint. Taking an experiential learning approach, the game

involves buying and then selling three types of wine: Red, white, and champagne. Students are divided into groups of 4 or 5 and initially play the game entirely paper based. The information overload that often results reinforces the basic importance of IT to collect, store, and manipulate business information. Students are then asked to review their experiences and propose how IT can support their business and gain strategic advantages. The overall learning goal of the game is to make apparent the old adage: It's not what you've got, it's what you do with IT that matters!

2. Background

According to Carr [3], a number of infrastructural technologies have been found to be extremely useful in developing business strategies, such as the development of the telegraph, railroad system and electrical power plants. For a brief period, forward-looking companies were able to gain a strategic advantage over their competitors by harnessing this new technology. Very quickly, however, their availability reaches saturation point and costs decline rapidly, resulting in the new technology becoming nothing more than a commodity, i.e., a standardized unit available from multiple suppliers. When that situation arises the technology loses all strategic value.

The key argument put forward by Carr [3] is that information technology has similarly matured as a business asset, becoming widely available at ever-decreasing cost, and as such, no longer has any strategic value. The greatest risk for organizations is to overspend on IT. The goal of managers should now turn to controlling, if not reducing IT costs, being a fast-follower rather than a leader in new technology, and focus on vulnerabilities such as outages and security breaches rather than opportunities. In a later article, Carr even ventures to suggest that IT will go

the way of the electric power grid, with organizations drawing IT resources from utility companies, like Microsoft, rather than maintaining their own IT departments [4].

The response, especially from IT trade magazines, was swift and raucous. Keefe [6] argues that taking such a defensive approach to IT by just focusing on maintenance, risk avoidance, and cost cutting is foolish, because new technologies are being developed all the time; IT leaders still need to keep an eye on the future and “dream of ways to further business goals via technological advances.” A similar view was expressed by the CIO of General Motors, who suggested that although there is an element of commoditization in PCs, payroll systems, and the like, the use of IT in significant business areas such as product R&D, customer understanding and cost-effective Internet services is still “at the fifth grade level” and has a great deal of maturation left to accomplish [5].

Others have pointed out that IT is not the focus, *per se*, but how IT is being used. In particular, many rebuttals of Carr’s article focus on the role that IT plays in continuous innovation, bringing incremental returns rather than “big bang” initiatives [2]. The inflammatory nature of Carr’s article, it has been pointed out, has the potential to create an “ice-age” in IT spending, as damaging to organizations as Hammer’s (1990) clarion call to ‘don’t automate, obliterate!’ which led to excessive downsizing in the late 1990s [8]. But unless the next wave of graduating managers can tell the difference between hype and reality, the game may already be lost for the IT industry.

3. The ‘Grapes of Wrath’ game

While teaching introductory classes in IS to second and third-year (sophomore and junior) business students it became clear to the author that students that had some (sometimes minimal) exposure to a real business environment readily appreciated the type of activities that constituted an information system within an organization. Students that had no working background viewed the material as purely theoretical concepts and did not grasp the issues inherent in collecting, storing, and utilizing information in order to make business decisions. The ‘Grapes of Wrath’ business game (GOW) was subsequently developed by the author as a means of illustrating to students in-class the business processes and information flows that are meant to be supported by the IS function, and the role that information technology (IT) can play in supporting those business processes.

The business game takes an experiential learning approach to the understanding of information flows within an organization. Experiential learning is based on the learning philosophies of Dewey and Piaget, and involves reflecting on one’s experience of some activity or phenomenon. In order for experiential learning to work, the participant must be willing to be involved in the experience, be able to reflect on it and draw conclusions or new ideas from the experience [7]. Activities, including business games, are key techniques in providing such learning experiences, and have been well used in educational settings [1, 9].

The game is typically played over a period of two weeks for a 3-credit course; that is, 6 class hours. The students are divided into groups of at least four, but no more than six. Each group is an instance of GOW and not in direct competition for resources (wine sold at auction) or customer orders. The company has a traditional hierarchical structure, with a CEO overseeing the company, and a Purchasing, Sales and Financial Manager playing their respective roles. Students assume one of the available roles. The instructor plays the role of a Referee, presenting the auction and customer order details at the appropriate time, and accepting or rejecting team bids or quotations.

The game progresses in a series of weeks (week 1, week 2, etc.) of between 10 and 20 minutes duration. Two practice weeks of 20 minutes duration are played at the beginning to allow the students to work out how to play the game and organize the information flow between managers. It is often a good idea to have a break after the practice weeks so groups can finalize their strategy. The week duration is then reduced to 15, 10, and then 5 minutes to apply further pressure on the students and as a test of how well they have organized themselves and determined their information needs. The rate at which the time duration is reduced depends on how well the groups are playing the game.

Each week has the same cycle of activities. First, there is an auction of approximately 5 minutes. For simplicity, there are only three types of wine, namely, Red, White, and Champagne. An auction would have, say, 15 cases of Red, 8 cases of White and 3 cases of Champagne. The Purchasing Manager must present a written bid for the type of wine they wish to buy. They must buy all the cases of a particular wine. So, for instance, a bid for Red would be for all 15 cases. For every auction the Referee has a secret minimum price for the lots. If the bid presented meets or exceeds that minimum bid, the Purchasing Manager is told they are successful. The Purchasing Manager is given three chances to secure the bid. There is a weekly storage

fee of \$25 per 10 cases (or part thereof), and an attrition rate (due to breakages in storage, etc., etc.) of 1 case per week for each type of wine.

After the auction the game progresses to the customer order stage that lasts for the remainder of the week. Again for simplicity, there are only two customers called Customer 1 and Customer 2. Customer orders are typically for odd numbers of cases, say, 3 Red, 17 White, etc., so as to impact on storage calculations. For each customer order the Referee has a secret maximum price per case, with delivery expected in no more than 2 weeks. The price per case is set so as to guarantee a healthy profit. The Sales Manager must present a customer quotation showing the price per case. If the quotation is equal to or less than the maximum price per case the Sales Manager is told they are successful, otherwise, they have two more chances to get the correct price.

At the end of the week the Financial Manager must produce a Financial Statement for the previous week. The Financial Statement must show the opening balance, total income, total expenditure, closing balance, and profit/loss for the week. Failure to submit a Financial Statement in time results in a \$500 fine. Having completed all these tasks, the next week begins. A minimum of 10-12 weeks is recommended in order for groups to get to grips with the game. Tweaking aspects of the game, such as the rate at which prices change, and having groups in direct competition with each other for auction lots and customer orders, allows each playing of the game to be a unique experience.

4. What normally happens

Variations of the game have been played in several countries, such as Hong Kong, Japan, Singapore, and the US, for over 10 years. Classes have ranged from 200-level introductory programming classes, 300-level introductory IS concepts, database, analysis and design, or advanced programming classes, to 700-level graduate IS/IT for managers classes. Class sizes typically allow for seven to eight groups. Groups begin with an opening balance of \$1000 and given some marketing information that provides a basis for their subsequent auction bids and customer quotes. Prices are set to guarantee a healthy profit. Typically, however, none of the groups play the game particularly well. After playing more than 10 weeks, several of the groups will begin to post an overall loss in their closing balance, with the greatest losses often exceeding \$3000. The best groups typically struggle to

post a balance in excess of their opening balance of \$1000.

After the game is concluded, each group is asked to present what they learned from the game. Presentations often have common themes. Most groups realized the importance of proper record keeping, with many developing standardized forms to aid in communication, as well as record keeping. In general, it takes about 3 to 4 weeks for groups to become familiarized with the rules of the game, with most groups beginning to think strategically after 5 to 6 weeks of play. Excess inventory and losing track of changing prices at the auction are usually cited as the main reasons for preventing groups from making a profit during the game. Sometimes, groups decide to change their business model during the middle of the game, such as selling off inventory to avoid storage costs, or focusing on the most profitable wine, Champagne. As the final financial statements often show, however, these strategies do not prove entirely successful.

The students are then asked to reflect on their experiences and, depending on the nature of the class itself, suggest solutions. For instance, in an introductory IS concepts class students are often asked to write a one-page summary of how they played the game, identifying the information that passed from one manager to another. These reports are then used as the basis of discussing how to analyze a business process, starting from physical data-flow diagrams (DFDs) where each manager is identified as a source or sink of information, to logical DFDs, where processes, rather than people are identified. Given that groups tend to play the game in a similar way, students can readily empathize with each other and appreciate the meaning of each circle and arrow on the DFD from an emotional rather than a simply theoretical viewpoint.

One aspect students are normally very good at is designing paper-based forms to present auction bids and customer quotes to the Referee, and spreadsheet-like tables tracking inventory. Students are asked to retain copies of these forms and this provides a wealth of material for a database or programming class. Each form can then be identified as a required screen on an information system, with the field names and data types providing the design of the underlying database. The advantage here is that students begin to understand that the technology (Access, SQL, Visual Basic, Java, etc., etc.) is being learned in order to solve a business problem, and is not simply a technology that needs to be understood for its own sake. Given that the forms being implemented are also their own design, students

often feel a sense of excitement in seeing their creations being digitized and implemented in code.

For advanced level programming courses the full process of analysis, design, implementation, and field testing is carried out. After playing the game the students must identify one area that will be supported by an information system. Each group must then document their design, get approval from the steering committee chair (instructor), and then implement the system with accompanying user documentation. A few weeks of the game are then replayed to field test the newly developed systems. Issues of usability and problems at the interface between the paper-based and computer-based systems almost always become evident. This allows the instructor to drive home the key point that a good information system is not just how well the system is programmed, but often depends on how easy the system is to use and how seamlessly it integrates with other systems.

When played at a graduate level, more emphasis must be placed on the managerial implications suggested by the game. In the one-page reflection paper that follows the game, graduate students are asked to write a response to Carr's assertion that IT doesn't matter. As groups, the students are then asked to determine what IT infrastructure might be needed to support the playing of the game, should GOW be a real organization. In all cases, students recognize the information problems inherent in being a manager in the game, which is exactly the result the game is intended to provide. The IT infrastructure that each group proposes, however, can be radically different. Some differ simply in the cost of the hardware and software proposed: The very trap that Carr [3] warns of in his article. When the cost-effectiveness of the cheaper solutions is pointed out most groups begin to understand that overspending on IT can hurt the bottom line.

On the other hand, without fail, at least one group will propose a radically different infrastructure, sometimes using different platforms, such as wireless networking, and sometimes using a different business model, such as focusing on one type of wine and investing heavily in e-markets and the web to establish a brand and differentiate themselves from other groups. A debate can then be initiated around the central question of whether the most sensible strategy would be to reduce costs and maintain a core IT architecture, and under what conditions would an organization try something new?

For instance, whatever IT infrastructure the groups propose, the advent of cloud computing can be introduced as a game-changing technology. Cloud

computing, in which data is accessed over the Internet often using remote data centers, could allow organizations to effectively "rent" computing power, with scalability provided by the channel provider, notably Microsoft, IBM, HP, Salesforce, and Google, rather than requiring further investment in expensive hardware. Although this would seem to address many of the issues raised by Carr with respect to commoditizing and outsourcing the IT infrastructure, customers have been wary of making the shift to the cloud, and channel providers are having problems bearing the cost of the hardware [10].

These problems provide an ideal talking point on what individual groups might do. No-one can claim to have the answer because history will determine in hindsight which was the best option. In this context, however, students are faced with exactly the same questions they will face as future business leaders when the next big "thing" appears on the technological horizon: To follow Carr's advice and wait-and-see, or take the initiative in the hope of gaining a strategic advantage over one's competitors.

5. Student feedback

The most recent use of the game was in September/October 2010 as part of a team-taught graduate course called IS/IT for Managers. This is a core course in the MSc in Management program, and is the only IS/IT course taken by the students. The main objective of the course is to allow students to critically analyze the importance of IS/IT in modern organizations, often through case studies. The game was introduced as an alternative means of demonstrating information flow and the value of IS/IT in supporting business processes. The game was played over two days (6 hours), with 60 minutes for the first two (practice) weeks, before the durations were quickly reduced to 10 and then 5 minutes. A total of 9 weeks/rounds were played.

At the end, a one-page survey was distributed which asked students to describe two things they liked and two things they didn't like about the game. A final question asked the students whether they thought the game would be useful for other students to understand the need for IT in an organization, with a Likert scale using the anchors 1-Strongly Disagree to 5-Strongly Agree. From a class of 32, 27 responses were received, with a mean score for the last question being 4.16 (Agree). Most importantly, none of the respondents disagreed with the use of the game.

The most common positive comments were that the game was simple enough to play, but created an

‘exciting and challenging’ environment in which groups had to work together to solve the information problems. One of the most positive comments suggested: “It was a really good way to make us implicitly understand the importance of IT in the organization of a group or firm ... [The game] was really amusing and exciting and at the same time it made us understand important things just by experiencing them. I think it had a more profound effect than what a common class could have had.”

The most common negative comments were that the game was too long and that it was difficult to understand the point of the game at the beginning. The students in this class were particularly good at playing the game and week durations were reduced to 10 minutes much faster than for a typical class. The point of the game is outlined before the game is played, but groups often complain that it takes some time for the team members to understand what they need to do and what strategy they will employ. The first two practice weeks and having a break before playing the rest of the game is meant to help with this particular problem.

Other negative comments included making the game even more challenging. Given the speed at which the groups could handle shorter weeks, it was clear this was a motivated and capable group of students, and this is the first time such comments had been received. Many of the other comments touched on deliberate aspects of the game that became useful for a discussion session that followed. In particular, some complained that it was too easy to cheat. As one student put it: “It’s a little disappointing that our results are not verified and checked. I think we were a little too much free to do what we wanted (even cheating).” This, of course, creates excellent background to discussing corporate ethics, and the role of IT to track and prove financial accounts. A prize (a bottle of Champagne) was on offer for the best performing group, but when profit and loss statements for the last three weeks were required to prove their victory they were unable to produce the necessary documentation.

6. Conclusions

Students approach the game with genuine enthusiasm and develop a good appreciation of the information problems inherent in a modern

organization. The experience allows for a common ground around which to tackle major issues facing the IT industry, such as, whether IT has any strategic benefit, or whether the best approach is simply to provide a cost-effective infrastructure and follow the lead of other organizations as new technology becomes available. It would be difficult to say how history will eventually answer some of these questions, but the game provides an opportunity to raise, and potentially provide a best guess, of what makes sense.

7. References

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