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THE GAME OF STORES: SIMULATING RETAIL SITE SELECTION AND PROFITABILITY

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ABSTRACT
Retailers are faced with the challenge of how many stores to operate in a potential or an existing market and where those stores should be located. Various factors influence this decision-making. For instance, the customer behavior and their demographic characteristics, customer travel times, presence of competitors, costs involved, location profitability, etc. Literature in retailing points out various gravity laws that assist retailers to make the location choice decision. 'Game of Stores" is a board game-based simulation designed for classroom teaching that incorporates the principles of Huffs Law to create a dynamic environment for participants. The gameplay is devised to mimic reality in a competitive setup and to provide participants with similar challenges faced by retailers in real-time. The simulation is intended to help participants comprehend, analyze, and apply the concepts related to retail store location decisions in a gamified environment and to test their analytical skills in optimizing retail location choice and profitability. The applied nature of the game makes it suitable for use in Retail Management courses for students specializing in Marketing.

Introduction

Researchers in the fields of educational psychology have pointed out many benefits of using games for learning. Bitrián, Buil, and Catalan (2020talk about improved general learning, motivation, and improved performance in game-oriented pedagogy. Schaller (2006) stated that game-based learning leads to the cultivation of higher-order thinking skills due to experimenting, synthesizing, and testing hypotheses in real time. Indeed, game-based learning has always been a popular pedagogical tool for teaching retail management; however, most of the retail games either addressed the demand and supply issues of retailing or were modified versions of the popular Beer Game (Senge, 1990; Sterman, 1989), addressing inventory management challenges, or focused on the entire supply chain (Dhumal, Sundararaghavan, & Nandkeolyar, 2008; Holweg & Bicheno, 2002; Sparling, 2002). "Game of Stores" is a board-game-based simulation developed by the authors that addresses a much more fundamental challenge faced by retailers in terms of retail site selection decision; a learning objective that extant games developed around retailing don't deliver.

Retailers are often considered the most powerful actors of the distribution channels with proximity to end consumers and the potential to create a market. Therefore, retail store site selection is considered a strategic decision, both in terms of customer satisfaction and profitability of the company to changing market conditions and intense competition. Retail site selection being a long-term investment decision is difficult and costly to change (Kiss & Schmuck, 2021; Pando-Garcia, Periañez-Cañadillas, & Charterina, 2016;). However, choosing viable retail sites in a new geography is not just a question of real estate economics but also an evaluation of the fit between the store product mix and the customers' demographic characteristics. The presence of competitive stores in the geographic vicinity also has a direct bearing on the location's profitability. Therefore, retail store site selection is a process that must be followed carefully to pass ahead of the competition. Retailers often rely on gravity models in delineating retail site locations and modeling spatial interaction (Huff, 1963; Reilly, 1931). The fundamental insight being, customers do not necessarily shop at the closest store but patronize locations in proportion to the attractiveness of the retail site and in inverse proportion to their distances (Drezner & Drezner, 2002; Huff & Jenks, 1968).

"Game of Stores" mimics the decision-making process faced by retailers related to the opening of stores in new geographic locations. Based of Huff's Law (Huff, (1963))the game attempts to build and test the participants' analytical capabilities while making decisions

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related to opening new retail stores. At the end of the game, the participant or the participating team who makes the most profits is declared the winner. This board-game-based simulation helps participants gain an experiential – gestalt understanding of the fact that spatial interactions between people and places and the shopping choices of the individual consumer can be a complex process depending on a variety of factors including age, lifestyle, quality expectations, store value proposition, or convenience. The game and its learning outcomes are designed for students in a Retail Management course for students specializing in Marketing within a business management program.

The rest of the paper has three broad sections. The first section delineates the theoretical foundations behind the design of a simulation as a pedagogical tool and the theories that are applied in the "Game of Stores." The second section is focused on describing the game itself. This section includes the resources required, the complete gameplay, the learning objectives from the game, suggestions on replicating the game in classrooms. The final section of the paper outlines a detailed quantitative and qualitative assessment of the learning outcomes of the game followed by the concluding remarks.

Theoretical Foundations

Role of Business Simulation Games in Driving Pedagogical Outcomes

A simulation can be described as a pedagogical method that attempts to reflect actual situations through utilizing games, scenarios, role-playing, socio drama, and decision-making experiences (Bitrián et al., 2020; Thürer, Cole, Hanna, & Protzman, 2020) In a bid to enhance student involvement and group cooperation, game-based simulations are used extensively as part of the curriculum across Universities (Franklin, Peat, & Lewis, 2003). Simulations closely mimic real-time environments thus prepare students more effectively for future job roles (Pratt & Hahn, 2016; Russell-Bennett, Rundle-Thiele, & Kuhn, 2010).

In this pedagogical approach, student-professor interactions are enriched since the latter now assumes the role of a mentor and facilitator, thus allowing the student to learn by themselves (Brazhkin & Zimmerman, 2019; Russell-Bennett et al., 2010). This learning approach provides the opportunity to learn relevant (Honebein, 1996; Lin, Yen, & Wang, 2018) skills and improve critical thinking (Fall, 1998).

Theories in the field of management and its allied disciplines are criticized for being overly rational, logical, and not considering the interactional perspective between social actors and social systems (Easton & Araujo, 1997; Hughes, O'Regan, & Wornham, 2008). One way this aberration can be addressed is by simulating an ecological system within the classroom environment that enables the students to participate as actors and experience such ramifications personally (Buil, Catalán, & Martínez, 2019; Goi, 2019). While case studies and other experiential learning tools do some justice in this regard to mimic an ecosystem; the effort is only partial because of the following reasons:

(1) Rarely do students get into the shoes of a decision-maker.

(2) In cases where the student is designated as a decision-maker, the student does not get to experience the full result of their decision for the business and the larger ecosystem surrounding the business which includes customers and competitors.

(3) In cases where response by the business environment because of the decision making is made known, further opportunity for the student to modify the original decision in the light of the past outcome and the anticipated consequence of the business environment is limited (Ben-Zvi, 2010).

In a business simulation, players mimic the business environment as the action taken by each player can impact the game strategy for other players (Hernández-Lara, Perera-Lluna, & Serradell-López, 2019; Mustata, Alexe, & Alexe, 2017) as most business games are designed to be zero-sum games. The player can revisit their decision in the next round based on the study of the result of the decision in the previous round and observe other participants' reactions to the decision. Considering that the game will be played in multiple rounds, a student can learn how to decide, how the competitors will evaluate his/ her decision, and how to revise the decision based on his/her learning while simultaneously observing the business theories come to play during the process of gameplay (Goi, 2019).

Role of Simulations in Enhancing Pedagogical Outcomes in the Discipline of Marketing

Baker et al. (2017) studied the effectiveness of marketing simulations as a pedagogical tool. Their study sample was undergraduate students participating in a marketing simulation that was conducted in iterations over six decision periods. Results of the study indicated that simulation as a pedagogical tool alone predicted more than fifty percent variance in learning effectiveness. The study results revealed that marketing simulations increased curiosity, enhanced participant behavioral control, and enriched the enjoyment in the learning process which together determined learning effectiveness. This study calls for the incorporation of marketing simulations as part of the curriculum since simulations enable inductive learning (learning by doing) and teach students how to adapt to a constantly changing environment. Brennan and Vos (2013) studied the effect of marketing simulations in improving mathematical (numeracy) and financial skills. Based on quasi-experimental research, the authors proved that simulation significantly improves mathematical and financial ability in its participants. The reason attributed to this improvement is the participants' performing of calculations and analyzing financial data in making decisions during the gameplay. Canhoto and Murphy (2016) illustrates the effectiveness of marketing simulations in giving instant feedback for the decisions taken. The authors also propose other pedagogical-oriented activities that can also be gamified in the lines of a simulation to improve engagement amongst learners. The authors underscore the utility of simulations in driving the concepts at the same time reducing cognitive load on the part of the students, as the learning experiences using simulations are fun-filled and pedagogically engaging at the same time. van Esch, Von der Heidt, Frethey-Bentham, and Northey (2020) investigated the effect of marketing simulations on student engagement and GPA (grade point average). Based on an experiment-based study involving the treatment group and control group, the authors proved that students in the treatment group who also undertook additional marketing simulation exercises apart from their regular classwork scored significantly better GPA compared to the students in the control group. This research suggests improved learner abilities for the students who participate in marketing simulation-based exercises

Simulation has always been a popular pedagogical tool for teaching retail management. Several simulations relate to managing demand and supply in retailing (Anderson & Morrice, 2000; Holweg & Bicheno, 2002) and there are a few that are modified versions of the popular Beer Game (Dhumal et al., 2008; Senge, 1990; Sparling, 2002; Sterman, 1989). And some are ICT (Internet and Communications Technology) enabled (Paravizo & Braatz, 2019; Repenning et al., 2015; Stubbs & Pal, 2003). However, "Game of Stores" addresses learning objectives that are much more fundamental to a retail management course in terms of retail site selection, which is often the first question retailers have to address. Extant games do not address this question.

The Theoretical Concept Used in "Game of Stores": Huff's Law

"Game of Stores" is primarily based on the theoretical concepts derived out of Huff's law. Huff's Law (Huff, 1963) in turn is derived from Reilly's law of retail gravitation (Reilly, 1931). According to Huff's law (Huff, (1963)), the probability (P_{ij}) that a consumer located at "i" will choose to shop at store j is given by,

$$P_{ij} = \frac{A_j^{\alpha} D_{ij}^{-\beta}}{\sum_{k=1}^{n} A_k^{\alpha} D_{ik}^{-\beta}}$$

Where A_j is the measurement of the attractiveness of the store (in this exercise, the area of the store is taken as a proxy of attractiveness), D_{ij} is the distance between the location i and store j, α is the attractiveness elasticity parameter to be obtained from empirical observation and β is the distance decay parameter to be obtained from empirical observation (both α and β are assumed as 1 for this exercise). Accordingly, within this game context, P_{ij} can be simplified as:

$$P_{ij} = \frac{A_j / D_{ij}}{\sum_{k=1}^{n} A_k / D_{ik}}$$

The equation suggests that the customer's selection of shopping sites is directly proportional to site attractiveness (location size) and inversely proportional to the distance from the site.

Using minimal mathematics, Huff's law parsimoniously explains the shopping probability of customers. Despite its development decades ago, it is still widely used in commercial network planning (Pan, Li, & Dang, 2013), designing hospital servicescapes (Jia, Wang, & Xierali, 2017), and analyzing market competition (Marić & Šiljeg, 2017). In addition to factoring in Huff's law, the retailer needs to consider the fit of the retail site value proposition with the customer segments in the targeted geographies, the retail site maintenance costs, and the presence of competitive stores in assessing the profitability for the selected location. The game embeds these elements as a part of the gameplay and is vital to decision-making.

The Simulation: Game of Stores

The General Format of the Game

In "Game of Stores" a set of 6 players in teams move around the game-board based on the roll of dices. The game board is akin to a Monopoly game board, but it has fictitious cities instead. On landing in a city, the playing team must decide whether they should open a retail store in that location or not. If a store is already established by them in any previous rounds in that city, they can decide whether they would expand their presence by opening one more store in the city but on a different site. After every round (when all six players' choices have been entered in the accompanying excel sheet by the game moderator) profits are populated by an excel based moderator sheet. This excel sheet is available with the game instructor to key in team decisions. Profits are automatically calculated at the end of every round. The algorithms to calculate profits are based on the following parameters: 1. fit between the store value proposition and the customer demographics in the city, 2. average customer travel times to the store, 3. the size of the store, 4. presence of competing stores of the same value proposition, and 5. set up/maintenance costs incurred. After each round, the game moderator shares the profits and related information with each team. While the game can be played perpetually, at

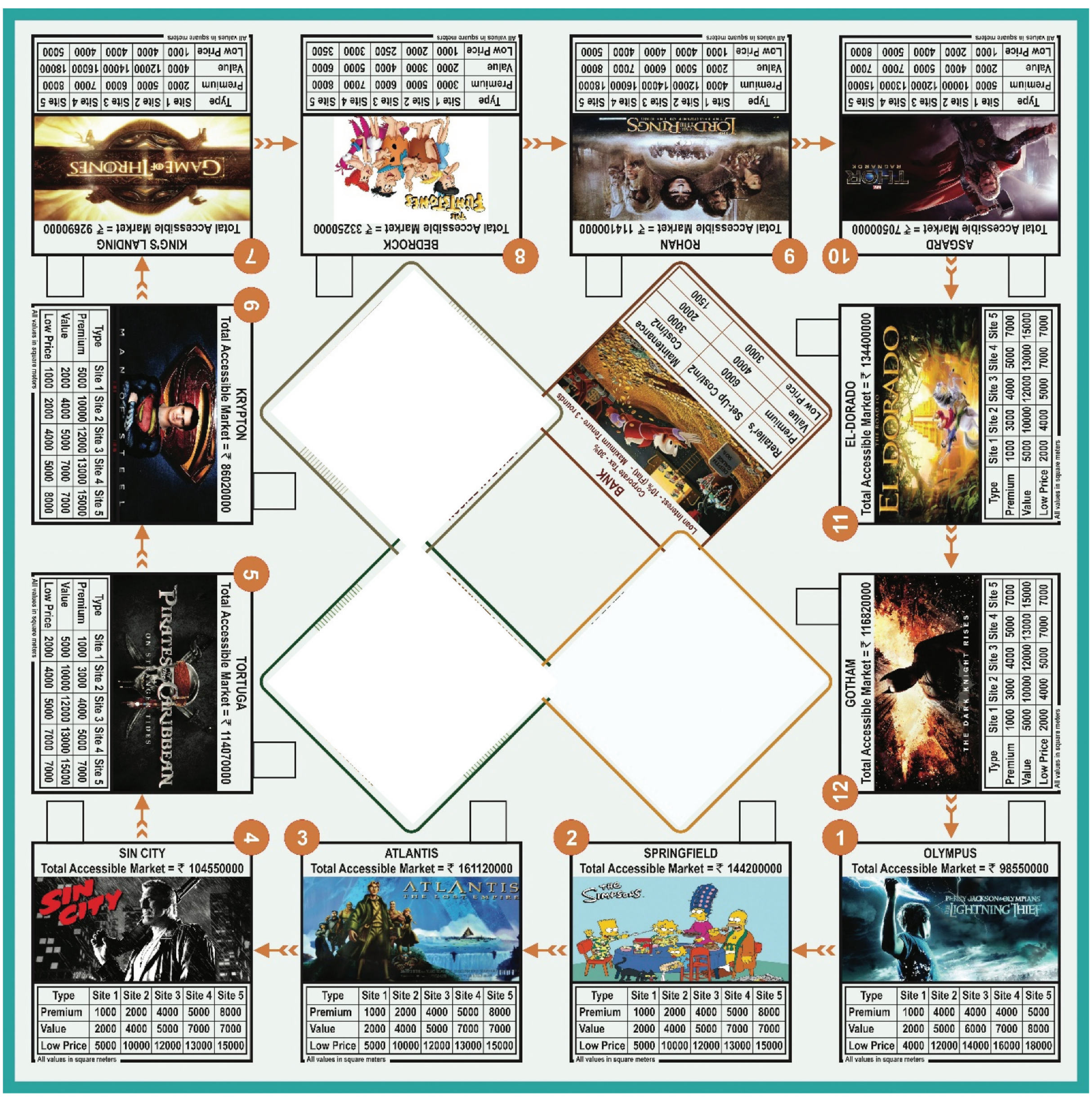


Figure 1. The game board.

the end of the designated number of rounds (preferably between 10– 20 rounds), the player reporting the highest profits can be declared a winner.

Materials Required

(1) Game Board: Please refer to Figure 1. A printout of the gameboard (preferably on flex). The size may vary depending on the number of players and the classroom size.

(2) Moderator Sheet: Please refer to the attachment along with the paper. The moderator sheet is a macro-enabled excel sheet where the game decisions must be tabulated by the moderator. Outcomes such as "profit" and "market share" are automatically reported within the excel sheet at the end of every round as soon as all the players' decisions are keyed in by the moderator. A laptop/desktop with Microsoft Office installed to access the excel moderator sheet is a must.

(3) Market Research Cards: Please refer to Figure 2. Printouts of the 12 cards can be taken on an A4 sheet and then cut out as per size.

(4) Dice: 2 in number.

(5) Pegs: 6 in number. To identify participating teams (any plastic material such as small toys, bottle caps, etc. can be used in proportion to the gameboard's printed size.)

(6) Counters: To identify store locations purchased by the participating teams on the gameboard, a set of multi-colored rummy counters or board pins of six different colors can be used (player pegs, dice, counters can easily be obtained by purchasing a standard monopoly game)

Modus Operandi

The game board consists of 12 fictional cities from popular Hollywood movies and popular TV Series. Fictional cities are used for nomenclature instead of real ones to ensure that participants' decisions in the gameplay are not offset by any pre-conceived notion of the city in concern. Each city has a total accessible market and provides 15 different retail site locations to choose from. The game is to be played with 6 players. A player could be an individual or a team of students based on class size.

Player Designation

Players 1,4 are predesignated as premium retailers (premium retailers stock exclusive products and brands, the customer target segment for these retailers are mostly the upper strata of the society in terms of disposable income) players 2,5 are predesignated as value retailers (value retailers balance price and quality in terms of their product assortments, provide seasonal discounts and target the middle-income group of customers), and players 3, 6 are predesignated as low-price retailers (low price retailers are perpetual discount stores). A player with a designated value proposition can select only those sites marked with the same value proposition (Ex: premium players can only select premium sites on the game board). Colored pegs are used to represent the different players while similarly colored rummy counters are used to identify the players' established retail stores on the game board during the gameplay.

City Designation

Each city has a dominant segment of customers [premium/ value/ low price]. This information, however, is not made explicit to the players. Sites marked premium, value, low price is available for every city. It means that while a city could have predominantly premium customers, low price and value segment sites are still made available for purchase in the game.

While the player is aware of their value proposition before the beginning of the game, the value proposition desired by the city's dominant target segment is not known to them (Refer to Figure 1. for the Game Board). The player can either take a wild guess or take help of the market research (MR) reports made available to the player at the game moderator's consent. These MR reports come for a fee (Refer to Figure 3 for a sample MR report).

Market Research Reports

The market research card for each of these fictional cities provides the customer demographics information in terms of age and occupation, a set of customer testimonials, and the average customer travel times to different retail site locations within the city. Besides, players also get to know the estimated population of the city. However, the value proposition of the city's dominant customer segment is not explicitly mentioned in the market research report. It can be intuitively inferred based on the demographic information and the customer testimonials available in the report. The profit formula is framed in such a manner that if a player opens stores in cities that correspond to the same designation, the profits will be higher than any other combination.

To illustrate: if a player is "value" oriented,

(1) He can only choose value sites offered across all cities.

Figure 2. Market research cards.

Figure 3. Sample market research report card.

(2) In case he opts to open a store in a city that predominantly has "value" customers, he will earn more profits than opening a store in any other city.

Corpus

All players start with an initial corpus of INR 500 million (1 US $ = INR 75 approx. resulting in an initial corpus of US$ 6.6 million equivalent to € 5.7 million. The game can also be played without any country-specific currency, by just considering 500 million as the game currency).

Post rolling of the die, an individual player can take one or more of the following decisions:

(1) Avail the market research report to find out whether the city's value proposition matches with the player's value proposition.

(2) Select a site [between site 2 and site 5] and build a store, which will result in a one-time fixed cost and recurring maintenance cost every round.

(3) In the event of a store already built-in any previous rounds, an option exists to build one more store in a different site, barring site 1 and the site already occupied.

(4) And of course, not do anything for that round if deemed fit.

Note: Site no 1 (alias AI in the moderator sheet) for all value propositions is not accessible for store establishment across all cities. All site 1 on the game board corresponds to preexisting unorganized local competition in that geography. They are not to be made accessible to players for retail store construction.

Learning Objectives

This game is designed to improve learner's ability in making correct store selection decisions, simultaneously considering multiple factors that could affect store profitability in long run. These factors include:

(A) Average distance to the store for prospective customers
(B) Presence of target segment in the city where the store is situated
(C) Costs and opportunities associated with building large store or small store
(D) Presence of competitive stores in the city
(E) The value proposition of competitive stores in the city

Accordingly, the learning objectives of the simulation are twofold:

(1) To correctly judge factors A to E for a city before deciding on whether a store should be built in that city

(2) To comprehend the interplay of factors A to E in determining store long-run profitability once the store is built in the city

During the gameplay, the player's decision, the decision of competitive players, outcomes for the player, and outcomes for the competitive players are made transparent to all the teams. The game algorithm is designed in such a way that the team that analyses this information from the learning objectives perspective and makes informed choices during the gameplay has a higher probability of achieving greater profits.

Replicating the Game in Classrooms

For easy replication of the game in classrooms, the moderator needs to ensure that all the materials required are procured and available during the gameplay. Refer to Figure 4 for a complete game setup picture.

The Moderator Sheet: The Moderator Sheet is an excel workbook that can be downloaded along with the paper. The excel workbook provided is macros enabled. Therefore, macros need to be allowed while running the file. The workbook contains the following sheets: Player 1 to Player 6 (or Player A to F) worksheets to record round-wise team decisions. On the top left corner of each player sheet, the instructor gets to set the value proposition for each team. For the sake of simplicity Team A and D are pre-set to "Premium," Team B and E are pre-set to "Value" and Team C and F are pre-set to "Low Price."

The instructor is expected to fill the columns for each player on the player sheets for every round. Only the columns "City," "Research," and "Site" for each player [marked in bold] need to be filled with the help of dropdown lists provided. The rest of the columns should be left untouched. "City" corresponds to the city the player has landed in that round. "Research" corresponds to the collection of the Market Research by the participant. The "Site" indicates the name of the site that the player has purchased. In case the player does not purchase any site, the column must be left blank.

For instance, from Figure 5, it can be observed that player A has landed on Atlantis in round 1, opted for the Market Research, and purchased Site2. Once Site2 is input, the rest of the columns populate on their own. In the sheet "Profit History," the "counter" is set to 0 by default. Once all the player decisions for a round are input in the corresponding player sheets, the "Recorder" button in the "Profit History" sheet is to be clicked for populating the profit for the round (refer to Figure 6).

Figure 4. The complete game set-up.

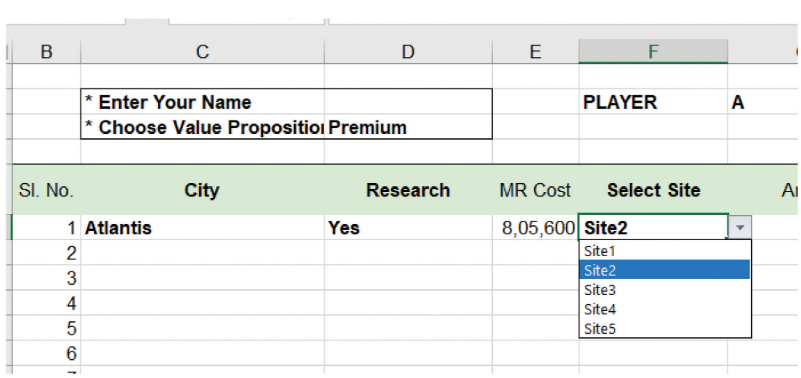
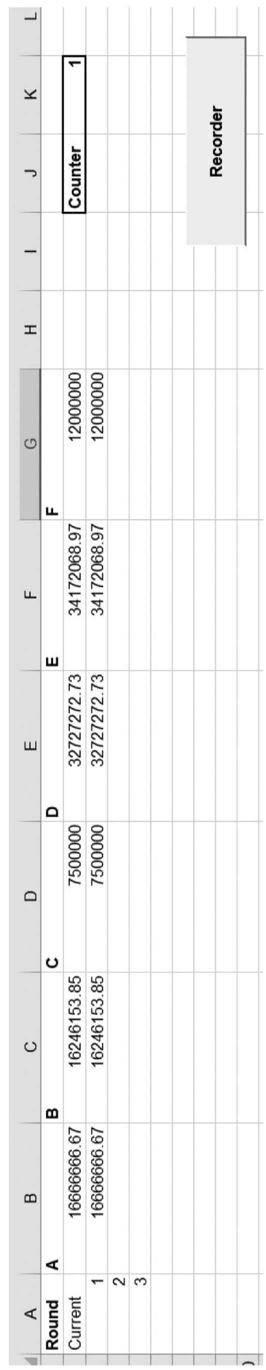


Figure 5. The dropdown lists.



	A	B	C	D	E	F	G	H	I	J	K
1	Round	A	B	C	D	E	F			Counter	1
2	Current	16666666.67	16246153.85	7500000	32727272.73	34172068.97	12000000				
3	1	16666666.67	16246153.85	7500000	32727272.73	34172068.97	12000000				
4	2										
5	3										

Figure 6. The recorder button.

This process is repetitive. The "counter" helps the instructor to keep a track of the number of rounds being played.

The worksheet "Dynamic," provides the city-specific pie charts of market shares and is also auto-updated. The game instructor might like to project these charts on a big screen during the gameplay to create a sense of excitement among the teams and let them infer city-specific consumer insights. To reuse the moderator sheet for a different class, the instructor is required to delete the column contents for "City," "Research" and "Site" for all the player sheets as well as the column contents in the "Profit history" sheet and set the counter to '0'. For the sake of simplicity and improved readability, the back-end algorithms used in the moderator sheet are provided in Appendix A.

Assessment of Learning Outcomes

This game can be played immediately after discussing the theoretical concepts related to retail site selection decisions. The game runs for 20 rounds that take almost 2 hours with a break in between followed by a debriefing. The winning team is announced and asked to share their strategies with the class. The rest of the teams are also asked to analyze their performance and share their experiences. In the process of experience sharing the moderator helps students understand the dynamics of retail site selection that includes the essential factors affecting the demand for a retail site, site attractiveness, various saturation indices, and the gravity laws of retailing that govern the subtleties of store selection. Additionally, real-life examples from popular retail brands are discussed to complement and strengthen students' learning.

A novice student can play this game even without the knowledge of the underlying theoretical concepts related to retail site selection. However, a student who is well versed with the theories of retail store site selection can judge and make rational choices, thereby maximizing his /her likelihood of winning the game (Burch et al., 2019). As this game is oriented toward practical decision-making skills related to retail site selection, we have constructed a unidimensional three-item scale of decision making related to retail site selection based upon Marzano and Kendall (1998) treatise on standards-based education. The scale items are rated on a 5-point Likert Scale with ends as Strongly Disagree (1) and Strongly Agree (5). The items are worded as follows:

(1) I can confidently identify important and suitable criteria for assessing whether a particular location is appropriate for opening a retail store when information about the store's nature of business is made available to me.

(2) When the information about the nature of the business and information related to possible retail site locations are made available, I can confidently identify the extent to which each alternative possesses appropriate conditions.

(3) When the information about the nature of the business and information related to possible retail site locations are made available, and I am asked to choose one location for store construction from multiple options, I can confidently identify the best alternative upon decision criteria.

The rating scale-based questionnaire was administered in a well-reputed AACSB accredited University in South India which had students from all over the country. The sample was drawn from both undergraduate (N = 245, male = 163, female = 82) and graduate (N = 177, male = 106, female = 71) students in Business Administration who were majoring in Marketing and opted for a Retail Management course.

The rating scale was administered soon after completing the concepts related to the retail site selection decision (pretest). The same scale was administered also after the completion of the game (posttest). Considering that the pretest – posttest experimental design setup is used, each student was uniquely identified during both the study waves. There was no attrition in posttest responses considering the less than two-week time gap between both the tests. This test's null hypothesis stated that there exists no difference in the mean decision-making score before and after the game is played. The paired t-test results based on the mean score before the test (M = 3.41 and SD = .76) and mean score after the test (M = 4.02, SD = .71) refuted null hypothesis [t(420) = 10.9, p <.001] at one percent significance. The test results imply that students perceived a significant improvement in their decision-making skills concerning retail store site selection once the game is played.

During the posttest, a positive significant correlation was also observed between the team's mean rating score based on three questions and the team's profits reported at the end of the game (correlation: .74, p <.05). This correlation suggests that the team that reported a higher perception of learning outcomes also reported higher profits in the gameplay, indicating that the teams who were able to learn the game's concepts demonstrated better performance during the gameplay.

As a final check to measure the game's ability in driving the intended learning outcomes objectively, a multiple-choice test was designed. The test had 30 questions surrounding the game's theoretical concepts each question carrying one mark (Refer to Appendix B for a set of sample questions along with the answers in bold). This test was administered to the master's in business administration first-year students after their class on retail site selection models (sample size 50) [mean = 10.14, standard deviation = 3.149]. After the game was played, the test was re-administered to the same students [mean = 26.32, standard deviation = 2.289]. A paired sample t-test was performed to check for a significant difference between mean scores. The test results (t value = 28.5, df = 49, $p < .05$) proved that students scored significantly higher marks after the game is played. This test objectively ratifies the usability of the game in a classroom environment to drive learning outcomes.

Discussion

Game of Stores is a retail simulation game that can be played both in small classrooms as well as large classrooms. It teaches the participants to think like a retailer and make a decision about the opening of a retail store taking multiple geographical, demographic, and financial factors into account. The ramifications of the decisions made by the participants in the game environment are plenty. For instance, if the store is opened in an inappropriate location, the retailer not only loses the cost of establishment, recurring losses will emerge if the sales generated from the store are not able to compensate for the cost of running the store. This game illustrates the importance of making judicious decisions when the opportunity to open a store arises in a city. Assurance of learning tests affirms that participants who played the game became more confident about store location decisions. Participants who also compared their choice with others and altered their gameplay strategy reported more confidence on Marzano and Kendall (1998) scale and also scored higher in the game. This finding is coherent with previous literature (Baker et al., 2017) which states that participation in simulation games improves learning effectiveness. Posttest scores on the retail location-related exam had a higher mean compared to pretest scores. This finding also reiterates that participation in simulation games improves performance in tests (van Esch et al., 2020). Because of the game's applied and dynamic nature, student participants experience heightened motivation and interest as compared to standard classroom lectures in line with Canhoto and Murphy (2016) findings of simulations' ability to give instant feedback and enabling improved decision-making amongst its participants. Because of the game's applied and dynamic nature, student participants experience heightened motivation and interest as compared to standard classroom lectures. In the words of Vinny Malhotra (Final year MBA student specializing in Marketing) who formed a part of the winning team:

> Who doesn't enjoy playing games? However, I was amazed to realize how specific instructional and learning objectives were infused logically in designing the 'Game of Stores'. It took us a while to grasp the gameplay but after few rounds, we gradually built an understanding of the simulated system. Indeed, simulation is a powerful tool for delivering important concepts. Am sure am never going to forget the learning for the rest of my life.

Conclusion

"Game of Stores" align with the existing literature on the use of simulation as a pedagogical tool for driving learning outcomes. In addition, the game addresses a gap in the current pool of available instructor resources to drive a retailing course by providing an easy-to-replicate game board-based simulation that can be used in a classroom to deliver the concepts around gravity laws in retailing and retail store site selection. "Game of Stores" is designed around the gravity laws of retailing. However, it is to be noted that the gravity models are a simplification of the real world. Spatial interactions between people and places can be a complex process depending on a variety of factors including but not limited to customer demographics, product and service quality, price, the proximity of competitors, accessibility and visibility of the site, the topography of the region, crime rates, and socioeconomic factors. Thus, it is essential to account for market structure and the types of products or services for proper use of gravity models. The gameplay of "Game of Stores" builts in only a set of factors that are useful for a retail site location decision which is not exhaustive. Additionally, the board game-based nature of "Game of Stores" limits the usage of the simulation only to physical classroom setups. However, as a future research direction, the game has the potential to be translated completely online wherein student participants can log in with their respective user ids and passwords and play the game in real-time across the globe. From a pedagogical research perspective, it would also be interesting to compare the efficiency of the online and offline versions of the game in driving learning outcomes. However, in its current form, being a simulation exercise, "Game of Stores" attracts and holds students' attention and has the potential to improve the retention of learned skills and knowledge over time. Designing the game is even easier and requires no sophisticated software or costly materials. Thereby it can be replicated in marketing and management classrooms all over the world.

Disclosure Statement

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Appendix A: Backend Calculations

This section outlines the assumptions and the algorithm used in the Moderator Sheet for calculating profits and the total accessible market for every round.

Target customer segment description

For the sake of simplicity, the demographics of the cities are categorized on two parameters, namely age and occupation. The percentage of the breakup is represented as notations in Table 1. A segment is defined based upon the intersection between age and occupation type. The three segments considered in the game are outlined in Table 2.

City wise actual data is presented in Table 3. This information serves as input to the game. Please note, this information is made available to the instructor alone. As observed from Table 3, each city has only one dominant customer segment (whose percent is greater than the other two segments). The dominant customer segment for each city is represented in bold. It may also be observed that each dominant customer segment is equally represented in the game (exactly 4 cities carry each dominant customer segment).

Total Accessible Market (TAM) Calculation

Assuming the retail sales per turn for the low price, value, and premium customers to be R_{LP},R_V, and R_P respectively (the algorithm uses INR 5 Million, INR 6.6 Million, and INR 10 Million equivalent to US $ 67,000, US $ 89,000, and US $ 134,000 respectively), the total accessible market (TAM) for the city per round can be calculated as follows:

$$\begin{aligned} TAM &= R_{LP}P\ (p_1 + p_4 + p_7) + R_V P\ (p_2 + p_3 + p_8) \\ &\quad + R_P P\ (p_5 + p_6 + p_9) \\ &= TAM_{LP} + TAM_V + TAM_P \end{aligned}$$

Here TAM_{LP},TAM_V, and TAM_P denote the individual accessible markets for retailers with low price, value, and premium value propositions respectively. For easy reference, TAM and market research card costs for each of the cities are provided in Table 4 (TAM and MR cost values are in Indian Rupees, INR). The market research cost is assumed as 5% of the TAM. The segment-wise bifurcation of TAM values for each of the cities is provided in Table 5.

Revenue Calculation

As mentioned previously, the game begins with the assumption that Site no 1 for all locations (premium, value, low price) for all cities are already occupied by local retailers and are not available for purchase in the game. The market shares for the firms are calculated using Huff's Law of shopper attraction. The areas of the possible sites and the average travel times for the customers to reach the respective sites are provided in the market research report for the player and Table 6 for the moderator.

Let us assume that a player has been assigned "Premium" as the team value proposition and there are 5 possible sites for a premium retailer in any city. The areas of these sites are

Table 1. Demographic description of a sample city.

Segments	Students	Salaried	Self Employed
Aged 16–25	p_1	p_2	p_3
Aged 26–35	p_4	p_5	p_6
Aged > 35	p_7	p_8	p_9

Table 2. Customer orientation in a sample city.

Segments	Students	Salaried	Self Employed
Aged 16–25	*Low Price*	*Value*	*Value*
Aged 26–35	*Low Price*	*Premium*	*Premium*
Aged > 35	*Low Price*	*Value*	*Premium*

respectively denoted as A_2,A_3,A_4, and $A5$; and the corresponding average travel times are denoted as d_2,d_3,d_4, and d_5 (The distance and area matrix for the cities and the corresponding sites are provided in Table 6). Assuming site number 5 for premium retailers is already occupied by any other player and the current player opts to open a store at the third site meant for the premium segment; then the player's revenue from the site (Rev) will be calculated as:

$$Rev = TAM_p\left(\frac{\frac{A_4}{d_4}}{\frac{A_1}{d_1}+\frac{A_4}{d_4}+\frac{A_5}{d_5}}\right)$$

The player's market share from the city (MktSh) is calculated as:

$$MktSh = Rev/TAM$$

Cost Calculations

There are three types of direct costs incurred by the players during the game: market research cost, establishment cost, and maintenance cost. Market research cost is incurred when the player seeks the market research report (MR). This cost is specific to each of the cities and is proportional to the TAM of the respective cities (the algorithm sets it to 0.5% of TAM). Refer to Table 4 for the MR costs per city.

Establishment cost is incurred when a player opts to open a store in a specific site within a city. This cost is proportional to the area of the site. However, the constant of

Table 4. Market information for each location.

Locations	TAM (INR)	MR Cost (INR)
Asgard	70,500,000	352,500
Atlantis	161,120,000	805,600
Bedrock	33,250,000	166,250
El Dorado	134,400,000	672,000
Gotham	116,820,000	584,100
Kings Landing	92,690,000	463,450
Krypton	86,020,000	430,100
Olympus	98,550,000	492,750
Rohan	114,100,000	570,500
Sin City	104,550,000	522,750
Springfield	144,200,000	721,000
Tortuga	114,070,000	570,350

Table 3. Percentage population distribution for each location.

Locations	Segments	Students	Salaried	Self Employed	Category	Percentage
Asgard	Aged 16–25	14	20	15	Low Price	25
	Aged 26–35	9	11	9	Value	50
	Aged > 35	2	15	5	Premium	25
Atlantis	Aged 16–26	7	16	2	Low Price	10
	Aged 26–36	2	33	10	Value	30
	Aged > 36	1	12	17	Premium	60
Bedrock	Aged 16–27	35	8	2	Low Price	50
	Aged 26–37	14	10	9	Value	25
	Aged > 37	1	15	6	Premium	25
El Dorado	Aged 16–28	10	14	1	Low Price	15
	Aged 26–38	4	36	13	Value	25
	Aged > 38	1	10	11	Premium	60
Gotham	Aged 16–29	37	3	1	Low Price	60
	Aged 26–39	19	16	6	Value	15
	Aged > 39	4	11	3	Premium	25
King's Landing	Aged 16–30	14	24	9	Low Price	20
	Aged 26–40	5	13	8	Value	55
	Aged > 40	1	22	4	Premium	25
Krypton	Aged 16–31	23	9	2	Low Price	30
	Aged 26–41	6	32	7	Value	20
	Aged > 41	1	9	11	Premium	50
Olympus	Aged 16–32	40	3	2	Low Price	55
	Aged 26–42	11	18	5	Value	20
	Aged > 42	4	15	2	Premium	25
Rohan	Aged 16–33	15	14	1	Low Price	20
	Aged 26–43	4	36	10	Value	25
	Aged > 43	1	10	9	Premium	55
Sin City	Aged 16–34	33	8	2	Low Price	60
	Aged 26–44	20	7	5	Value	25
	Aged > 44	7	15	3	Premium	15
Springfield	Aged 16–35	10	26	14	Low Price	15
	Aged 26–45	3	7	9	Value	60
	Aged > 45	2	20	9	Premium	25
Tortuga	Aged 16–36	18	28	17	Low Price	25
	Aged 26–46	6	9	4	Value	60
	Aged > 46	1	15	2	Premium	15

Table 5. Segment-wise TAM values for each location.

Locations	Segments	Segment-wise TAM (INR)
Asgard	Premium	25,000,000
	Value	33,000,000
	Low Price	12,500,000
Atlantis	Premium	114,000,000
	Value	37,620,000
	Low Price	9,500,000
Bedrock	Premium	12,500,000
	Value	8,250,000
	Low Price	12,500,000
El Dorado	Premium	96,000,000
	Value	26,400,000
	Low Price	12,000,000
Gotham	Premium	45,000,000
	Value	17,820,000
	Low Price	54,000,000
King's Landing	Premium	32,500,000
	Value	47,190,000
	Low Price	13,000,000
Krypton	Premium	55,000,000
	Value	14,520,000
	Low Price	16,500,000
Olympus	Premium	37,500,000
	Value	19,800,000
	Low Price	41,250,000
Rohan	Premium	77,000,000
	Value	23,100,000
	Low Price	14,000,000
Sin City	Premium	25,500,000
	Value	28,050,000
	Low Price	51,000,000
Springfield	Premium	50,000,000
	Value	79,200,000
	Low Price	15,000,000
Tortuga	Premium	25,500,000
	Value	67,320,000
	Low Price	21,250,000

proportionality varies across different value propositions (INR 6000 or US $ 81, INR 4000 or US $ 54, and INR 3000 or US $ 40 per square meter for "Premium," "Value" and "Low Price" retailers respectively). This is a one-time cost. On the contrary, maintenance cost is incurred to maintain a store for a complete turn. This cost is again proportional to the area of the site with a varying constant of proportionality (INR 3000 or US $ 40, INR 2000 or US $ 27 and, INR 1500 or US $ 20 per square meter for "Premium," "Value" and "Low Price" retailers respectively). However, the maintenance cost is recurring in nature and once a player opens a store in a particular site, the maintenance cost for that site is incurred for every subsequent round till the game ends. Also, if a player opens more than one store in a city then there is a reduction in the maintenance cost due to economies of scale (10% for 2 stores, 15% for 3 stores, and so on). Refer to Table 7 for details related to costs.

A Calculation Example

Let us assume that, in the first round both the premium players, namely A and B, land on Asgard, both opt for market research, and then decide to open a store. Let us assume that player A opts for Site 2 and player B opts for Site 3. The revenue generated by each player can be computed using the corresponding values from Table 4, Table 6, and the Huff's Law equation. It is to be noted that TAM values are calculated using the demographic distributions in Table 2, value proposition information in Table 1, and the price ratio values in Table 7. The revenue generated by Player A in INR will therefore be:

$$25,000,000 \times \frac{\frac{10,000}{10}}{\frac{10,000}{10} + \frac{12,000}{15}}$$

The value 25,000,000 is obtained from Table 6, corresponding to the location "Asgard" and the value proposition "Premium." Similarly, the revenue generated by Player B in INR will be:

Table 6. Distance and area information for each site in each location.

	Distance in mins	10	10	15	20	25
Locations	Segments	Site 1	Site 2	Site 3	Site 4	Site 5
Asgard	Premium	5000	10,000	12,000	13,000	15,000
	Value	2000	4000	5000	7000	7000
	Low Price	1000	2000	4000	5000	8000
Atlantis	Premium	1000	2000	4000	5000	8000
	Value	2000	4000	5000	7000	7000
	Low Price	5000	10,000	12,000	13,000	15,000
Bedrock	Premium	3000	5000	6000	7000	8000
	Value	2000	3000	4000	5000	6000
	Low Price	1000	2000	2500	3000	3500
El Dorado	Premium	1000	3000	4000	5000	7000
	Value	5000	10,000	12,000	13,000	15,000
	Low Price	2000	4000	5000	7000	7000
Gotham	Premium	1000	3000	4000	5000	7000
	Value	5000	10,000	12,000	13,000	15,000
	Low Price	2000	4000	5000	7000	7000
King's Landing	Premium	2000	5000	6000	7000	8000
	Value	4000	12,000	14,000	16,000	18,000
	Low Price	1000	4000	4000	4000	5000
Krypton	Premium	5000	10,000	12,000	13,000	15,000
	Value	2000	4000	5000	7000	7000
	Low Price	1000	2000	4000	5000	8000
Olympus	Premium	1000	4000	4000	4000	5000
	Value	2000	5000	6000	7000	8000
	Low Price	4000	12,000	14,000	16,000	18,000
Rohan	Premium	4000	12,000	14,000	16,000	18,000
	Value	2000	5000	6000	7000	8000
	Low Price	1000	4000	4000	4000	5000
Sin City	Premium	1000	2000	4000	5000	8000
	Value	2000	4000	5000	7000	7000
	Low Price	5000	10,000	12,000	13,000	15,000
Springfield	Premium	1000	2000	4000	5000	8000
	Value	2000	4000	5000	7000	7000
	Low Price	5000	10,000	12,000	13,000	15,000
Tortuga	Premium	1000	3000	4000	5000	7000
	Value	5000	10,000	12,000	13,000	15,000
	Low Price	2000	4000	5000	7000	7000

Table 7. Cost information and price ratios for each value proposition.

Proposition	Establishment Cost/Unit Area (INR)	Maintenance Cost/Unit Area (INR)	Price Ratio
Premium	6000	3000	10
Value	4000	2000	6.6
Low Price	3000	1500	5

$$25,000,000 \times \frac{\frac{12,000}{15}}{\frac{10,000}{10} + \frac{12,000}{15}}$$

The costs incurred by Player A include the market research cost, establishment cost, and maintenance cost. It is to be noted that the maintenance cost is recurring in nature, therefore maintenance for each of the already established facilities would appear in all subsequent rounds. Since we are assuming that this is the first round for the player and the only facility Player A has is Site 2 in Asgard. Therefore, the total cost incurred by Player A in INR is,

$$352,500 + 6,000 \times 10,000 + 3,000 \times 10,000$$

For Player B the costs would be computed similarly.

Appendix B: Sample test questions

1. What statement about the retail location is correct?

(A) **There is typically little flexibility in location planning once a location has been chosen.**
(B) A good location guarantees success for a retailer.
(C) While store location has a strong impact on a retailer's long-run and short-run planning, it does not influence the specific elements of its retail strategy mix.
(D) The selection of a store location requires low investment.

2. Which factor does not contribute to Huff's law of shopper attraction?

(A) Product assortment carried at various locations
(B) Travel times from the consumer's home to different retail locations
(C) **The population of the city in which a store is located**
(D) The sensitivity of the kind of shopping to travel time

3. Retailers with large capital expenditures in land, buildings, and equipment often specify ______________ as a goal.

(A) return on sales
(B) return on costs
(C) return on income
(D) **return on investment**

4. The first step in retail strategy development is __________.

(A) **situation analysis**
(B) financial review
(C) goal articulation
(D) store positioning

5. A retailer's ______________ is the key to its ability to attract customers.

(A) pricing system
(B) promotion system
(C) Store personnel
(D) **Location**