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# Optimal profitable applications for web development companies using a linear programming approach

Khalid K. A. Abdullah *, Saim Rasheed

*Department of Information Technology, Faculty of Computing and Information Technology, King Abdulaziz University, Jeddah, Saudi Arabia*

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ABSTRACT

The consumed resources in web development companies are different and greatly affect a company's profit or loss extent. We will utilize linear programming to measure that and maximize the company's profit. Furthermore, we will apply the simplex method algorithm within certain constraints placed on different components of the company's different products. This problem can be solved with a trial and error approach but this requires great effort and time, which is a challenging thing to do on each product. We can employ different computer tools that calculate and solve these problems. Microsoft Excel is one of these tools that solve linear programming equations and provides accurate outputs; there are plugins such as (Solver) that work in integration with Excel. This paper's main goal and purpose are to calculate and acquire the ideal products that maximize the company's profit under certain constraints. The best distribution and optimal use of resources to increase profit while maintaining quality and quantification of each project type with imposed restrictions and steps that the company must take to stop and reduce excess and unused resources. The simplex method algorithm is used because it is faster than other algorithms in solving linear programming problems, and it has high efficiency in reducing the needed resources for computer processing. On the other hand, the limitations of this algorithm manifested in its dependence on variables will increase the complexity of the problem, and this cannot be implemented accurately in all cases of linear programming problems.



## 1. Introduction

Web development companies are always affected by the diversity of their different products, which has effects on the incidence of profit within these companies. Different products require more senior developers, designers, and resources such as hosting storage, the amount of traffic, and bandwidth for each service and website. Each type of web application need a different number of front-end developer, back-end developer, and user interface designer that also has a different cost when they work on different products, and for these reasons, such companies need to know the products that they should work on it in a focused and better way. Working on the most used applications will help and affect reducing costs and maximize the company's profit by consuming less time on upgrades and smaller teams to develop such websites or applications and as a result, this will contribute to the company's subsistence and continuity of its work. This increase in the company's profitability levels should increase the development team's productivity and raise the quality of the most common and used products and reduce problems in those products and issue updates to them on a regular basis. However, the challenging problem lies in identifying and validating the best products and services provided by the company in terms of less cost application with the best profit margin. Moreover, for the company to determine this, we will use linear programming by applying the simplex algorithm to test all variables against constraints within a given time to get the feasible region of the optimal solution.

The rest of this paper is structured and organized as follows. Section 2 deals with the related works to linear programming and the Simplex method algorithm. The methodology and steps of calculation

* Corresponding Author.
Email Address: kabdullah0020@stu.kau.edu.sa (K. K. A. Abdullah)
https://doi.org/10.21833/ijaas.2022.08.008
Corresponding author's ORCID profile:
https://orcid.org/0000-0003-1331-604X

processes are presented in Section 3. Section 4 is devoted to the presentation of results and discussion of the analysis of computational results for randomly generated cases. Finally, in Section 5, we give some conclusions and perspectives for future works.

## 2. Related works

There are a lot of related works related to the applications of linear programming. Specifically, algorithms such as the Simplex method algorithm (Nelder and Mead, 1965), and their entirety revolves around some main objective goals such as maximizing the company's profit, maximizing the production line, maximizing the spread of a particular service, or vice versa. It focuses on minimizing costs for a specific product or minimizing the waste of a particular raw material. Thus, in this section, we will review four related works.

Egharevba et al. (2021) mentioned the problem of preparing cake and other products in Tehinnah Cakes and Craft, and how there was a problem in using raw materials for baking cake and the rest of the products. The waste and loss of raw materials were also an issue. There was also a third problem of the limited availability of these raw materials during a specific period of time and their unavailability with the same equal amount. Which affected the Tehinnah Cakes and Craft bakery's profit, and for this reason, they needed to reach the best mix of raw materials to maximize their profit. This was the main goal of their paper, and they used linear programming with the Simplex method algorithm to get the optimal mix of raw materials. Scones, Jam Roll, Masil Ball, and Spanish Tart were the four different decision variables used in the research work. Moreover, as a result, and outcome of the paper, the allocating process succeeded in reaching the appropriate mixture to provide the best profit, and one of the main recommendations was to produce some raw materials within the bakery instead of bringing them ready to increase profitability. Other raw materials like Jam rolls are wasted and not being used often so they recommend not putting them in the mixture. From this point on, this paper sets a successful example of using linear programming with the Simplex method algorithm.

Golden Guinea Breweries Plc has suffered from a lack of profit in its products so even the process of paying salaries and wages has become a big problem for them and they have become late in paying their staffs' salaries. For such reasons, Golden Guinea Breweries Plc sought to optimize and improve its brewed drinks products and tried to use many methods such as taking samples and data from the company database and analyzing it in a coherent form. They also developed a method called PHP simplex, which is an online tool for solving linear programming problems to access the profitability of the organization as mentioned by Ekwonwune and Edebatu (2016). The primary objective of their work was to maximize profit for the company using the Simplex Method algorithm, one of the linear programming techniques to create a mathematical model that will enhance and improve the profit of the Brewed drinks production for Golden Guinea Breweries Plc. Five products were tested and the total costs of six raw materials were determined. After analysis and validation of the experiments, the paper came out with multiple outputs. It succeeded in maximizing the profit and determining the optimal raw materials, as well as reducing the cost of production, which ultimately led to the stability of the company and secured its financial position in the market.

The Simplex method algorithm was also used in the technical aspect of an information technology field: one of such cases was to measure the power and performance of the CPU (Central processing unit) and GPU (Graphics processing unit) and next to measure the efficiency of each of them. Lalami et al. (2011) used the lex algorithm to test the speed maximization at 12.5 on the GTX 260 board. They propose a parallel implementation of the Simplex on a CPU-GPU system via CUDAThese tests were important for high-resolution 3D graphics applications where applications necked CPUs at some point of high-speed operations and calculations and needed to get the maximum performance of each CPU and GPU. high-performance computers also were another field that fired such tests to improve processor performance on the level of every single core without affecting the safe usage constraints. Such a big and fast computer need to reach the maximum power of CPU or GPU but without triggering the heat issue within such boards. Several steps were used to pass this test using the Simplex method algorithm, and the computational results were successful at 12.5 speed of core at 8000x8000 pixels size without exceeding the maximum capacity of the GPU. One of the future works that are planned is to test larger linear programming problems, hopefully on a multi-GPU system, with a more complex architecture, and without the use of embedded libraries such as CUBLASor LAPACK.

Naik et al. (2020) talked about the concept of the simplex algorithm and the feasibility of using it for linear programming processes in the management of bakeries and their raw materials. The main objective of this paper was to maximize the profit of the bakery depending on the amount of used raw materials and the products that were sold. The study included many product variables that can be measured, such as bread, cakes, macarons, and cookies. Problems like this always exist in cases of production for retail stores, especially in the field of foods, as the raw materials are subject to waste or rot. For these reasons, the necessary quantity of these raw materials must be measured to reduce costs and preserve food. Another problem was that the chef did not have much experience in the process of bringing in new customers and the secondary objective of the paper was to maximize the market share of the bakery. This test was built and assumed in a period of 6 months, and raw materials such as flour, butter, sugar, and chocolate were initially provided in this test, and this test was performed using the linear programming technique. A method was used to exclude some unnecessary raw materials called Fourier–Motzkin elimination. A sensitivity analysis has been done in this paper to find out how much amount we can change on the input data for the output of our linear programming model to remain almost unchanged. The paper has set some restrictions and constraints on the number of raw materials, such as 160 kilograms of flour, 250 kilograms of sugar, and so on. The research paper on the bakery project ended with results that determined the number of products that should be produced while maintaining the lowest cost of raw materials, thus achieving the goal and maximizing the profitability of the bakery. As for the sensitivity analysis, it was found that the price of butter was very high, and the bakery was directed to produce cakes and bread only because it was noticed that they were the best-selling products, and accordingly there was another suggestion to convert the bakery into a premium cake shop.

## 3. Methodology

In this section, we will present the way in which linear programming and the simplex algorithm will be implemented, through which we will optimize and maximize the profit and income of the company. Here we will review the initial steps sequentially until optimal results are reached. The optimal solution, which means a certain set of web applications, will appear in the results that will be the outcomes after the application of the linear programming, and the goal set for maximizing the company's profit is called (the objective function), and it can be written as follows:

$$Z = c_1x_1 + c_2x_2 + \cdots + c_nx_n$$

It can also be expressed in the following compact form:

$$Z = \sum_{j=1}^{n} c_j x_i$$

where, Z is the total sum of the profit out of all the products, sold or developed by the company. As for the symbols, $c_1, c_2, \cdots, c_n$ they express the profit earned on each unit of the company's different products, which are web applications in this paper. The variables in the form of $x_1, x_2, \cdots, x_n$ are the decision variables, which we figured out by solving the problem through linear programming with a Simplex method algorithm. The numbers that appear with $1, 2, \cdots, n$ represent the number of products the company has and in this case Ecommerce, Blogs, portfolios, and Business websites.

To solve problems of this kind, we must adhere to the constraints and restrictions set by the company or any related parties to find the optimal solution that achieves maximizing profit for the company. These common limitations must be met, fulfilled, and adhered to it. This solution can be achieved by choosing an appropriate set of quantities of products $x$ and calculating their value. The constraints of the problem can be written in the following form:

$$\begin{array}{l} a_{11}x_1 + a_{12}x_2 + \cdots\cdots\cdots + a_{1n}x_n (\leq, =, \geq) b_1 \\ a_{12}x_1 + a_{22}x_2 + \cdots\cdots\cdots + a_{2n}x_n (\leq, =, \geq) b_2 \\ \vdots \qquad\qquad \vdots \qquad\qquad \vdots \\ \vdots \qquad\qquad \vdots \qquad\qquad \vdots \\ a_{m1}x_1 + a_{m2}x_2 + \cdots\cdots\cdots + a_{mn}x_n (\leq, =, \geq) b_m \end{array}$$

As mentioned above we have several types of variables, there are also new variables here, which are $a_{11}, a_{12}x_2, a_{1n} \cdots a_{mn}$ and these represent the value of each type of constraint that exists in this case for each of the different types of products of the web development company. As for the variables $b_1, b_2, \cdots, b_m$ they mean the maximum limit or minimum limit for each constraint boundary that must be obeyed, and each constraint is related to some operator such as $(\leq, \geq)$ which determines whether the constraint will be less, greater, or equal to the constraint limit. To use the simplex method algorithm in solving problems, there is an important step that must be taken, which to transform the problem into a form is called Standard Form which has some characteristics and properties such as:

- Constraints must all be equations by adding slack or artificial variables.
- The right side of the constraint must be non-negative, and this can be reached by multiplying all sides of the constraint by -1.
- The objective function must be of the type of maximization.

### 3.1. Assumptions

In this paper, the goal is to maximize the profit of web development companies by choosing suitable products to sell or develop. Moreover, to implement the linear programming through the Simplex method algorithm, we will use a hypothetical example of a startup company in the field of web application development with some random constraints, restrictions, and limits for this web development company. These constraints and the types of those constraints are not dedicated by this method; the user can apply them in any scenario specified by the real company. To put these hypothetical constraints and formulate them in the correct way and connection with the problem of this paper. We will discuss the available resources in this web development company along with some of the current conditions and restrictions that the company considers. The inability to increase employees or the amount of bandwidth and traffic for hosted web applications and data storage size and servers available to them are some of these restrictions. We will divide the company's products, which are web applications for more than one type and category.

These categories differ among themselves in the number of developers, designers, and resources they need to run and implement the website. Websites of the type of electronic commerce shop require more back-end developers than a regular blogging website and also require more bandwidth because they will host more and rapid visitors as well as need more data space because each product displayed on the online shop will contain separate and detailed information and many images for the product. In addition, other types, such as portfolios and business websites, differ as well. Sites such as portfolio websites need several better UI/UX designers to show the work gallery consistently and portion with a responsive presentation on the mobile, and we need more front-end developers to implement such themes and styles. As for business websites, they are official and formal websites and do not need that number of developers, not even bandwidth. Being formal websites with static contents ally that does not change except for long periods makes it low data traffic needed websites. We will work on this paper on a hypothetical problem to solve within a closed period (6 months) and all the previously mentioned restrictions will be taken into account and tested to come up with the optimal solution.

### 3.2. Data presentation

Web applications can be divided into four main types:

- Electronic commerce shop
- Personal blogs website
- Portfolios website
- Business websites

As mentioned, the goal of this paper is to maximize the company's profit by choosing an appropriate set of web applications and determining how many projects should be implemented and developed while taking into account the restrictions and constraints, numbers and restrictions are shown in Table 1.

**Table 1:** Problem's variables, constraints and data

| Name | Web Application type | | | | Maximum in 6 months |
|---|---|---|---|---|---|
| | E-commerce | Personal Blogs | Portfolio | Business | |
| Front-end developers | 4 | 1 | 5 | 2 | 16 |
| Back-end developers | 8 | 2 | 4 | 2 | 28 |
| UI/UX designer | 3 | 1 | 4 | 2 | 18 |
| Bandwidth (in GB/M) | 850 | 100 | 600 | 250 | 6000 |
| Data disk size (in GB) | 150 | 25 | 250 | 80 | 700 |
| Fixed expenses ($) | 8000 | 1000 | 4500 | 2000 | 27000 |
| Profit ($) | 18000 | 2500 | 11500 | 9000 | - |

The restrictions and constraints for each type of web application are set as follows:

1) Number of front-end developers:

The maximum number of front-end developers is 16 developers.

- E-commerce shop requires 4 front-end developers.
- Blog website requires 1 front-end developer.
- Portfolios website requires 5 front-end developers.
- Business website requires 2 front-end developers.

2) Number of back-end developers:

The maximum number of back-end developers is 28 developers.

- E-commerce shop requires 8 back-end developers.
- Blog website requires 2 back-end developers.
- Portfolios website requires 4 back-end developers.
- Business website requires 2 back-end developers.

3) The number of UI/UX designers:

The maximum number of UI/UX designers is 18.

- E-commerce shop requires 3 UI/UX designers.
- Blog website requires 1 UI/UX designer.
- Portfolios website requires 4 UI/UX designers.
- Business website requires 2 UI/UX designers.

4) Bandwidth amount per month:

The maximum amount of bandwidth per month is 6000 GB.

- E-commerce shops consume 850 GB of bandwidth per month.
- Blog websites consume 100 GB of bandwidth per month.
- Portfolios website consumes 600 GB bandwidth per month.
- Business websites consume 250 GB of bandwidth per month.

5) Data disk size:

The total data disk size capacity is 700 GB.

- E-commerce shop needs 150 GB.
- Blog website needs 25 GB.
- Portfolios website needs 250 GB.
- Business website needs 80 GB.

6) Fixed expenses for each web application:

The maximum total fixed expenses are $27,000.

- E-commerce shop cost $18000 per project.
- Blog website cost $2500 per project.
- Portfolios website cost $11500 per project.
- Business website cost $9000 per project.

7) Additional limitations in some types of web applications:

- The maximum number of E-commerce shops that could be developed during 6 months is 2.
- The maximum number of the Business website that could be developed during 6 months is 3.

8) Profit generated from developing each web application:

- E-commerce shop gives $8000 profit per project.
- Blog website gives $1000 profit per project.
- Portfolios website gives $4500 profit per project.
- Business website gives $2000 profit per project.

### 3.3. Model formulation

- Let $x1$ be the number of E-commerce shops to develop.
- Let $x2$ be the number of Blog websites to develop.
- Let $x3$ be the number of Portfolios websites to develop.
- Let $x4$ be the number of Business websites to develop.

The LP model for the above resources is given by:

$Z$ (Max) = 18000\$ $x_1$ + 2500\$ $x_2$ + 11500\$ $x_3$ + 9000\$$x_4$

Subject to:

$$4\,x1 + x2 + 5\,x3 + 2\,x4 \leq 16$$
$$8\,x1 + 2\,x2 + 4\,x3 + 2\,x4 \leq 28$$
$$3\,x1 + x2 + 4\,x3 + 2\,x4 \leq 18$$
$$850\,x1 + 100\,x2 + 650\,x3 + 250\,x4 \leq 6000$$
$$150\,x1 + 25\,x2 + 250\,x3 + 80\,x4 \leq 700$$
$$8000\,x1 + 1000\,x2 + 4500\,x3 + 2000\,x4 \leq 27000$$
$$X1 \leq 2$$
$$X4 \leq 3$$
$$x1, x2, x3, x4 \geq 0$$

Then, this model will be converted to the standard form as follows:

$$Z(Max) = 18000\$\,x1 + 2500\$\,x2 + 11500\$\,x3 + 9000\$x4$$
$$+0\,s1 + 0\,s2 + 0\,s3 + 0\,s4 + 0\,s5 + 0\,s6 + 0\,s7 + 0s8$$

Subject to:

$$4\,x1 + x2 + 5\,x3 + 2\,x4 + s1 = 16$$
$$8\,x1 + 2\,x2 + 4\,x3 + 2\,x4 + s2 = 28$$
$$3\,x1 + x2 + 4\,x3 + 2\,x4 + s3 = 18$$
$$850\,x1 + 100\,x2 + 650\,x3 + 250\,x4 + s4 = 6000$$
$$150\,x1 + 25\,x2 + 250\,x3 + 80\,x4 + s5 = 700$$
$$8000\,x1 + 1000\,x2 + 4500\,x3 + 2000\,x4 + s6 = 27000$$
$$X1 + s7 = 2$$
$$X4 + s8 = 3$$
$$x1, x2, x3, x4, s1, s2, s3, s4, s5, s6, s7, s8 \geq 0$$

Using MS Excel solver tool, the above linear programming model was solved and gives the optimal solution of:

$x_1 = 1$, $x_2 = 8.33$, $x_3 = 0.33$, $x_4 = 1$, $Z = 19833\$$

Fig. 1 shows a screenshot illustrating the problem in Microsoft Excel using the Solver tool and the optimal products which maximize the profit.

| Variables | Ecommerce | Blogs | Portfolio | Business | |
|---|---|---|---|---|---|
| Solution | **1.00** | **8.33** | **0.33** | **1.00** | Total Profit |
| Profit Per Project | 18000 | 2500 | 11500 | 9000 | **19833** |

| Constraints | | | | | LHS | | RHS |
|---|---|---|---|---|---|---|---|
| Front-end developers | 4 | 1 | 5 | 2 | 16.00 | <= | 16 |
| Back-end developers | 8 | 2 | 4 | 2 | 28.00 | <= | 28 |
| UI/UX designer | 3 | 1 | 4 | 2 | 14.67 | <= | 18 |
| Bandwidth (in GB/M) | 850 | 100 | 600 | 250 | 2133.33 | <= | 6000 |
| Data disk size (in GB) | 150 | 25 | 250 | 80 | 521.67 | <= | 700 |
| Fixed expenses (cost) | 8000 | 1000 | 4500 | 2000 | 19833.33 | <= | 27000 |
| Max Ecommerce | 2 | 0 | 0 | 0 | 2.00 | <= | 2 |
| Max Business | 0 | 0 | 0 | 3 | 3.00 | <= | 3 |

**Fig. 1:** Problem's illustration on MS Excel and solver tool

## 4. Results and discussion

### 4.1. Findings

After applying the solution with MS-Excel using the solver tool taking into account the specified constraints, the linear-programming problem was solved and the following results appeared:

- The proposed number of E-commerce shops to develop should be 1 at the given time.
- The proposed number of Blog websites to develop should be roughly 8 or 9 at the given time because 8.33 is not an integer.
- The proposed number of Portfolios websites to develop should be roughly 0 or 1 at the given time because 0.33 is not an integer.

- The proposed number of Business websites to develop should be 1 at the given time.

We can see from the results that the number of developers employed to develop the selected set of web applications is equal to the maximum team of developers, which indicates that the company may maximize profit even more by removing these limits and enabling additional developers to participate. In terms of designers, the present number is adequate for the selected set of web applications, and the number of some products may be raised without expanding the number of designers because there are around three unoccupied designers. The results also demonstrate that there is a waste of available bandwidth since the amount of bandwidth used every month is only one-third of the total accessible capacity. This implies that the company may reduce the amount of bandwidth and deploy different needed additional resources without affecting the selected set of web applications, lowering costs and assisting the company's profit maximization.

### 4.2. Benchmarking with other papers

The nature of scientific papers is that some of them are similar in inputs and the technique used, but the outputs remain different, and therefore a benchmarkwas made for the performance of some different papers that were discussing the same field as this current paper.

Table 2 shows the objectives of 8 different papers in the same field as our paper and shows the technique used to solve the linear or other problem, as well as the results of each paper.

**Table 2:** Benchmarking for the performance of different papers

| Reference | Objective | Technique and method | Result |
|---|---|---|---|
| (Iwuji et al., 2016) | The goal is to obtain daily low-cost diet plans that meet the DASH Diet's nutritional Tolerable Upper and Lower Intake for various daily calorie levels. | Linear programming is used to find the least expensive meal combinations to satisfy precise nutritional requirements for a given group of people, whether for general health or disease-related reasons. | The DASH diet model, which minimizes the daily cost of the DASH eating plan, was developed using the mathematical model of the linear programming "diet problem" and was further illustrated using some selected sample foods from the DASH food chart to formulate a 2000-calorie a day mathematical model used in obtaining a low-cost eating plan. |
| (Al-Rawi and Mukherjee, 2019) | This paper focuses on a constructive strategy for resolving a labor scheduling problem experienced in a construction firm, recommending an expected labor cost over a week and the necessity of part-time laborers in each shift. | Due to the obvious fluctuating need for service, linear programming techniques are utilized to provide a rational manner to organize these jobs and generate a new schedule each week, while reducing labor expense and optimizing worker preferences. | An overview of the planning and staff scheduling problem in a construction company is shown in this paper, which shows the minimum requirement of manpower for the proper execution of a job in each shift, the temporary employees that need to be hired from outside to meet the shift demands, and the specific type of deficit employee that needs to be hired, as well as the extra amount of money paid on temporary hire. |
| (Mikitiuk and Trojanowski, 2020) | The purpose of our study is to create algorithms that will determine, for a given number of sensors and a given set of POIs, a sensor activity plan that will maximize network lifetime, commonly known as the Maximum Lifetime Coverage Problem (MLCP). | A suite of benchmark test cases for the experimental assessment of our algorithms, as well as the results of tests using heuristic algorithms and local search approaches, are presented. A heuristic-based on linear programming provides a set that is also covered. In addition, a greedy strategy for finding the set covers is proposed, and the two approaches are compared in simulations. | They suggested three methods for generating a sensor activity schedule: a random and fine-tuning approach (RFTA), a cellular automata-inspired approach (CAIA), and a hypergraph model approach (HMA). Then, a local search approach was used to improve the solutions acquired using RFTA, CAIA, and HMA. |
| (Hussien et al., 2018) | In this study, the simplex technique is utilized to find the best solution to optimize production profit for three distinct block types in the BRA BLOCK FACTORY for the manufacturing of heat-insulating light construction blocks. | The simplex approach and integer programming are used to get the highest profit for a plant that operates seven hours each day. | They discover that generating 33000 of type BB6H.10 and 3903 of type BB2H.20 yields the highest profit. It indicates that if the plant produces the specified number of kinds BB6H.10 and BB2H.20, it will profit $3690.30 every day. |
| (Chattopadhyay and Singh, 2012) | This study focuses mostly on optimizing such characteristics linked to the product's mass manufacturing. It has been demonstrated using a Simplex procedure that the voltage and current should be in the range of 30 - 42 V and 49 - 66 A based on the cost of the SWNT achieved by the arc approach. | The cost of the SWNT produced by the arc discharge technique is used in this Simplex procedure. | The outcome focuses on the practical and optimal range of parameters, based on the cost of the SWNT obtained as the product. Calculation clearly shows that if the voltage or current exceeds the ideal range, the power consumption increases, and therefore the input cost increases, resulting in the infeasibility of the manufacturing line. |
| (Patra et al., 2020) | The study article improves the short-term and long-term pricing strategies of cloud providers to maximize profit while preserving service quality. | To manage the cloud computing environment, a spot rental allocation mechanism is designed, which can ensure the QoS of each request while simultaneously reducing resource waste. However, the profit optimization method has been created and solved to obtain the best multi-server facilities that can provide the most profit. | The current study offered a Spot-Allocation-Quality-Guaranteed service rental strategy employed by cloud service providers. This method replaces the temporary short-term rented strategy with the long-term rented strategy, reducing resource waste. |
| (Anggoro et al., 2019) | This paper will present a production picture to enhance profitability in Bintang Bakery's home business. The goal of this study is to maximize the advantages of the Bintang Bakery home industry. Lindo tools were utilized to do profit optimization calculations. | The results of calculations applying the simplex approach and Lindo aids reveal that the Bintang Bakery home industry's production outcomes are ideal. | The best profit optimization model is created by making flavored bread (x1) in as many as 3740 packages, bread mattress (x2) in 1300 packs, and bread (x3) in as many as 520 packs based on calculations using the linear programming simplex approach and with the use of Lindo software. The profit acquired from each loaf of bread manufactured is Rp. 19,750,000, and the profit increase obtained is Rp. 250,000. |
| (Oluwaseyi et al., 2020) | The objective of this paper was to establish the amount of bread that the company should manufacture in a day to maximize profit while keeping production limits in mind. | The linear programming approach was used to address a decision-making problem at the University of Benin Bakery in Benin City, Edo State, Nigeria. | The bakery might earn a maximum profit of # 100,000 if they produced 667 loaves of extra-large bread and reduced or stopped production of medium and large bread since they do not contribute to the bakery's maximum profit in consideration of the limits they operate under. |

## 5. Conclusion

In this paper, we utilized linear programming with the simplex algorithm to address a hypothetical problem in web development companies to identify the optimum set of products and web applications that may be developed and implemented. Furthermore, this approach is validated throughout a certain period in order to increase the company's profit as much as possible while adhering to the restrictions, constraints, and available resources. This approach may be utilized more comprehensively to find the best solution to any problem in the same context with varied restrictions, inputs, and resources.

## Compliance with ethical standards

### Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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