



NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF ENGINEERING

DEPARTMENT OF CHEMICAL ENGINEERING

**Entrepreneurship and Innovation
TCE 6104**

January 2025

This examination paper consists of **eight (8)** pages

Total Marks: 100

INSTRUCTIONS

1. Answer **ALL** questions in section A and **ANY THREE** in section B
2. Candidates are reminded of the necessity for good English and orderly presentation in their answers

MARK ALLOCATION

QUESTION	MARKS
1	40
2	20
3	20
4	20
5	20
TOTAL ATTAINABLE MARK	100

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SECTION A

Instruction

Answer all the questions in question 1 section A.

Question 1.

Challenges of women in the food industry

Women entrepreneurs are jostling for market share. This jostling occurs within the context of complex industries. The industry has high customer expectations and demands. A negative aspect of the enormous and continuously rising popularity of the fast-food market is the changing habits of eating.

Eating habits and health issues in the fast-food industry

Some health experts suggest that changing eating habits leads to an unhealthy lifestyle (Dumlao, Maniquiz, Catubag, Adrian, and Fronda, 2020). The fast-food market has observed a shift in the choice of this consumer base towards healthier and organic varieties of fast-food (Singh, Farooquee, & Pattanaik, 2017; Food & Beverages, 2014). The same source notes that smart fast-food chains are becoming aware of customer needs. Such fast-food chains have already started offering healthier options. These meals are typically low in cost but high in calories. Many global fast-food providers seek healthier options (Gaille, 2017).

These consumers seem more concerned about the ingredients used in their fast-foods. The demand for organic vegetables, hormone-free meat, unprocessed cheese, and an overall environment of transparency in operations at the food manufacturing chains is on the rise. Women entrepreneurs have to contend with a whole host of complex fast-food dynamics. Women entrepreneurs have the difficult task of meeting environmental and food product health regulations. Diseases affecting meat products are an issue. Primarily, swine fever, chicken flu (Ralf Rivas, 2019), and recently COVID-19 (UN Women and UNDP, 2020) are health challenges.

Competition from fast-food franchises

Table 2.12: Fast-food brand estimated brand value (source: Lock, 2021)

Brand	value U.S. dollars
McDonald's	129.3 billion
Starbucks	47 75347 753
KFC	16 58416 584
Subway	13 76813 768
Domino's Pizza	10 74310 743
Pizza Hut	7 3417 341
Chipotle	6 6036 603
Burger King	6 3686 368
Taco Bell	5 9285 928
Tim Hortons	5 3535 353

Companies in this industry operate restaurants (Veitch, 2017) in which customers order and pay at a counter (Lock, 2021). The statistic shows the brand value of the 10 most valuable quick-service restaurant brands worldwide in 2020. These global fast-food franchises have greater resources to outcompete the women entrepreneurs in the industry. Despite an influx of women entering the field of entrepreneurship in developing countries (Gichuki et al., 2014), very few women entrepreneurs have the capacity to out-muscle the international fast-food operators fighting for market share and huge profits in the industry. Women entrepreneurs in the developing world face complex barriers to entry and scaling up their (fast-food) enterprises (Sullivan & Meek, 2012). Women entrepreneurs suffer unequal access to resources and networks (Nadee, 2018; Goyal & Yadav, 2014) and suffer from a lack of financial resources to upgrade operations (Baluku, Kikooma, & Kibanja, 2016). The economic and financial value within the fast-food industry goes to global franchises. The fast-food industry is male-dominated (Milazzo & Goldstein, 2019). Women working in male-dominated industries face a variety of challenges, including those illustrated in Table 2.13:

Male dominance and adversities in the fast-food industry

Table 2.13: Challenges faced by women in male-dominated jobs

<ul style="list-style-type: none"> ● Societal expectations and beliefs about women’s leadership abilities (Campuzano, 2019)
<ul style="list-style-type: none"> ● Pervasive stereotypes, such as that of the “caring mother” (Sarathchandra, Haltinner, Lichtenberg, & Tracy, 2018) or office housekeeper (Berdahl, Cooper, Livingston, & Williams, 2018),
<ul style="list-style-type: none"> ● Higher stress and anxiety compared to women working in other fields (Qian & Fan, 2019)
<ul style="list-style-type: none"> ● Lack of mentoring and career development opportunities (Campuzano, 2019)
<ul style="list-style-type: none"> ● Sexual harassment (Dale, Travis, & Shaffer, 2018)
<ul style="list-style-type: none"> ● Women use various mechanisms to cope with working in male-dominated work environments (Sarathchandra, Haltinner, Lichtenberg, & Tracy, 2018):
<ul style="list-style-type: none"> ● Distancing themselves from colleagues, especially other women
<ul style="list-style-type: none"> ● Accepting masculine cultural norms and acting like “one of the boys,” which exacerbates the problem by contributing to the normalisation of this culture (Swail & Marlow, 2018),
<ul style="list-style-type: none"> ● Leaving the industry

The fast-food industry management gender gap is reflected in the figure 2.4 :

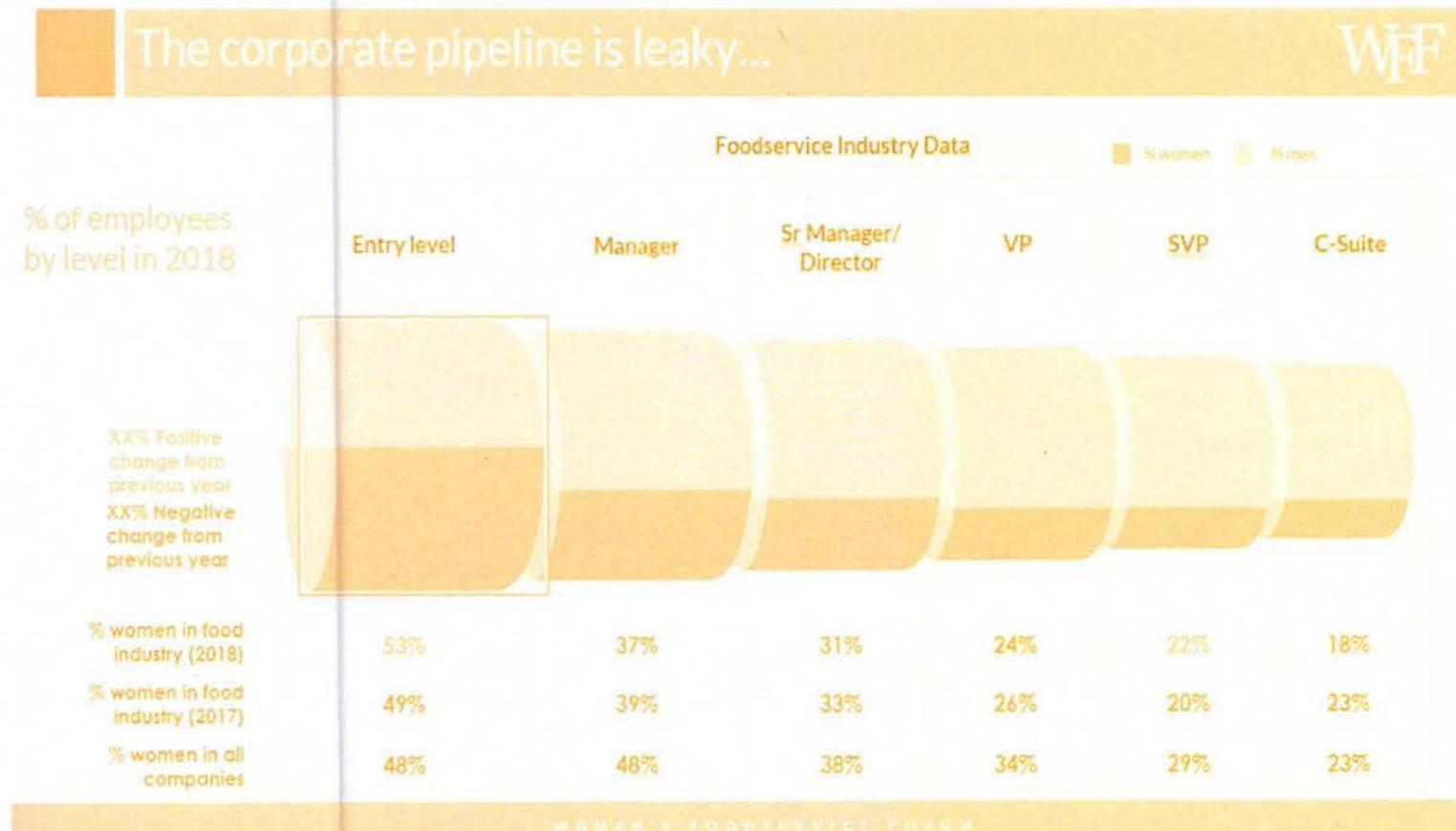


Figure 2.4: Gender gap in fast-food industry within management and/or leadership

The fast-food industry is going backwards in its top areas of focus, including the C-suite. For example, women represented 18 percent of the food industry's C-suite executives in 2018, down from 23 percent in 2017. Across all companies surveyed, only about one in five senior leaders is a woman, and one in 25 is a woman of colour. Across all companies, the first promotions are the most inequitable. Women are 21% less likely than men to be promoted to manager (Luna, 2019). Charlebois (2018) argues that in Canada, where more than 70% of front-of-house employees are women, the kitchen, where managerial decisions are made, is often dominated by men. Brush et al. (2014) note that 97% of venture-funded businesses have male CEOs. For instance, Charlebois (2018) notes that while in Canada women have managerial degrees and food service qualifications, women still have been unable to make inroads into managerial positions and boards within the fast-food industry. The fast-food industry is presented as a male domain (Luna, 2019).

Question 1

Define the following concepts and give examples within chemical engineering field

- | | |
|-----------------------------|-----------|
| a) Innovation | [2 marks] |
| b) Entrepreneur | [2 marks] |
| c) Entrepreneur mindset | [2 marks] |
| d) Just in time | [2 marks] |
| e) Organisational structure | [2 marks] |
| F) Intellectual property | [2 marks] |

Total [12 marks]

Question 1B

Explain how the following concepts can foster sustainable entrepreneurship

among chemical engineers:

- | | |
|---|------------|
| a) Using SWOT analysis, discuss the challenges faced by women entrepreneurs in the fast food industry as explained in the article above | [10 marks] |
| b) Entrepreneurial idea generation concept | [2 marks] |

c) Identify and explain five ways of idea generation to improve the situations of women entrepreneurs in the fast food industry [10marks]

d) State and explain any three benefits of idea generation [6 marks]

Total [28 marks]

Total marks section A [40 marks]

SECTION B

Instruction: answer any three (3) question from section B.

Question 2

Chemical engineering entrepreneurs need to do more to justify their inclusion in companies to foster growth and profitability. In a quest to grow products and companies, there is need to do feasibility studies. As a newly employed chemical engineering and in view of the aforementioned statement, answer the following questions:

a) Define a feasibility study concept with the aid of three examples within the chemical engineering field [6 marks]

b) With reference to any model of your choice, explain growth strategies of a chemical engineering company in the agricultural sector to foster resilience of the company [6 marks]

c) Identify any organizational structure to support the developing chemical engineering enterprise in [b] above to resilience of the enterprise [2 marks]

d) State any two limitations and two advantages of your chosen organizational structure that you have chosen above when implemented growth strategy of the company within the chemical engineering field. [6 marks]

Total [20 marks]

Question 3

- a) Identify any three distribution strategies within the context of entrepreneurs in the chemical engineering company **[6 marks]**
- b) Discuss merits and demerits of Just- in Time production and distribution system when implemented by corporate entrepreneurs in the chemical engineering field in company of your choice **[6 marks]**
- c) Having had developed a unique product concept, you want to protect your invention and knowledge. Identify and explain four (4) ways of protecting your intellectual property as a chemical engineer **[4 marks]**
- d) Identify any two risks and benefits of intellectual property protection as a chemical engineer **[4 marks]**
- Total [20 marks]**

Question 4

- a) Bank lending is a challenge for most women entrepreneurs. What financial sources can women entrepreneurs within the chemical engineering field utilise within a business enterprise to keep going within the industries they operate in? **[6 marks]**
- b) Identify any three marketing philosophies and explain how they suit the chemical engineering product so as to maximise sales **[6 marks]**
- c) With the aid of examples, explain how entrepreneurs can implement the 3Ps (product, place, price, people) in marketing chemical engineering products of their choice **[8 marks]**
- Total [20 marks]**

Question 5

- a) Define technology commercialization and its importance to chemical engineering entrepreneurs across industries **[5 marks]**
- b) Identify and explain with aid of examples any two (2) strategic partnerships and alliances as common strategies to setting up business and entry into market. **[5 marks]**
- c) Using a pricing strategy matrix, explain how a chemical engineering enterprise can maximise sales **[5 marks]**
- d) Explain the application of the BCG matrix within a chemical engineering enterprise **[5 marks]**
- Total [20 marks]**

Total [100]

END OF EXAMINATION