

A Study on the Financial Impact of COVID-19 on ITC Limited

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Abstract

The COVID-19 pandemic caused disruptions in the supply chain and workforce availability, as well as in consumers' demand across Indian industry. This study presents the impacts of the pandemic on the business operations and financial performance of a diversified Indian conglomerate, ITC Limited, with operations in FMCG, hotels, paperboards and packaging, agri-business and information technology. The respondents were asked to complete a structured questionnaire with a five-point Likert scale, which was then analysed using descriptive statistics, Cronbach's alpha, one-way analysis of variance, simple and multiple linear regression and a Baron–Kenny mediation analysis with the Sobel test. The respondents' mean score responses were positive for COVID-19 disrupting operations (mean score = 3.87), ITC's operational management being important (mean score = 3.81), and COVID-19 having an impact on financial performance (mean score = 3.79). Results of the regression indicate that the disruption of COVID-19 significantly affects business operations ($\beta = 0.530$, $p < .001$); business operations significantly affect financial performance ($\beta = 0.643$, $p < .001$); and the disruption of COVID-19 significantly affects financial performance ($\beta = 0.589$, $p < .001$). The COVID-19–financial performance relationship was partially mediated by business operations (indirect effect = 0.245; Sobel $z = 4.10$, $p < .001$; and 41.6% of the total effect). Gender, age, occupation and education were not significant factors for Chi-square and ANOVA tests. There are four different alternative hypotheses (H1-H4) all supported.

Keywords: COVID-19; ITC Limited; financial performance; business operations; mediation analysis; Likert scale; regression; India

Introduction

The first wave of COVID-19 in early 2020, and the nationwide lockdowns that followed, marked one of the worst crises to business activity in recent Indian history. Manufacturing was paralyzed or curtailed, inter-state travel was limited, retail sales were depressed and consumer spending was reallocated as a result. Cultivating a broad range of products, diversifying through multiple distribution channels, exposed firms to these shocks in various ways simultaneously.

ITC Limited is one of the largest diversified companies of India with operations in fast-moving consumer goods (FMCG), hotels, paperboards and packaging, agri-business and information technology. The mix of essential-goods businesses (foods and staples) and discretionary businesses (hospitality) makes the group an interesting case study for examining the transition from operational disruption to financial impact from a pandemic.

The reported numbers are the focus of most discussions about the impact of a pandemic. Less attention has been paid to the operational channel: supply-chain management, workforce availability, adaptation of processes and recovery of operations. Therefore, the direct relationship between COVID-19 and financial performance, as well as the indirect relationship through the business operations is examined in this study with the respondent's perceptions having knowledge of ITC Limited and the perception of economic effect of COVID-19.

Conceptual Framework

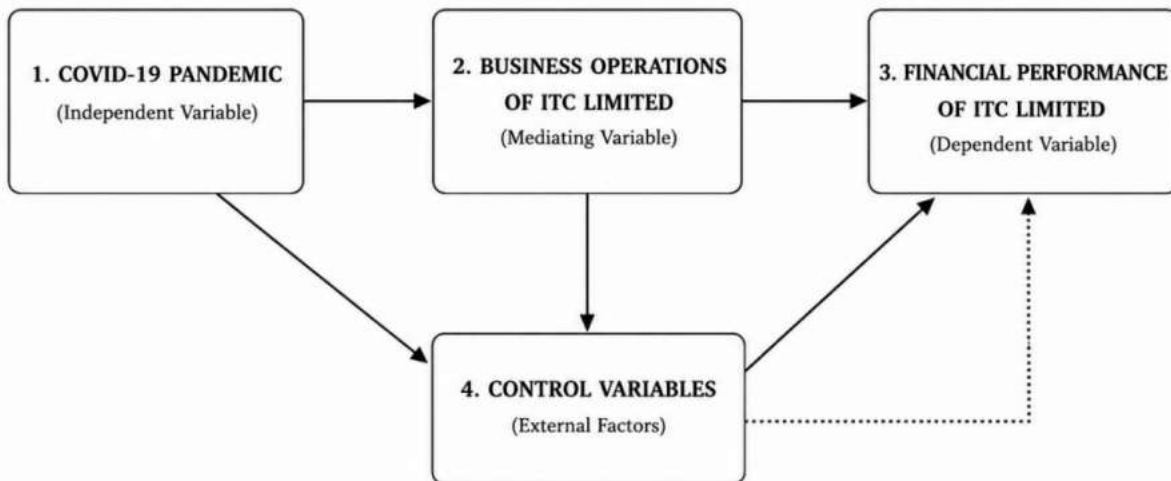
The study treats COVID-19 as the independent variable, business operations as mediating variable and financial performance of ITC Limited as the dependent variable. The framework suggests that the impact of COVID-19 on business operations (path a) and business operations on financial performance (path b) are both direct and indirect, with the latter being part of the direct impact of COVID-19 on financial performance (indirect effect $a \times b$), while the former

is also directly influencing financial performance (direct effect a). Other influences (e.g. regulation, the broader economy, consumer spending and market conditions) are measured separately and used as a control in a further model.

CONCEPTUAL FRAMEWORK

A Study on the Financial Impact of COVID-19 on ITC Limited

————→ Direct Relationship
→ Indirect Relationship



Note: *** $p < .001$. Coefficients are unstandardised OLS estimates from the regression models in Excel (Section 7.5 – 7.6).

Review of Literature

Baker et al. (2020)

In their paper The Unprecedented Stock Market Reaction to COVID-19, Baker et al. (2020), compare large daily stock market moves going back to 1900 and market volatility since 1985 using text-based methods. The study identified that COVID-19 was the most severe infectious disease shock to hit the stock market up to date, even though the Spanish Flu was earlier than it. The authors argued that the primary reason were restrictions by the government on business activity and voluntary social distancing imposed in a service-oriented economy.

Craighead, Ketchen and Darby (2020)

Craighead, Ketchen and Darby (2020) considered the question of why pandemics are different from other supply chain disturbances in their paper titled “Pandemics and Supply Chain Management Research: Toward a Theoretical Toolbox”. It cited the wide range of disruptions, the spillover effects, and the unprecedented demand and supply disruptions.

Donthu and Gustafsson (2020)

Donthu and Gustafsson (2020) presented an editorial titled “ Effects of COVID-19 on Business and Research” which states that pandemics are rare catastrophes and will occur again, so society should prepare itself to mitigate the impacts. The study added that the outbreak had heavy economic effects on the world and is impacting the way businesses and consumers act.

Fernandes (2020)

In the report “Economic Effects of Coronavirus Outbreak (COVID-19) on the World Economy,” Fernandes (2020) analyzed the effect of the crisis on the world economy by industry and by country, and provided estimates of the costs in 30 countries for various scenarios. The impact was being underestimated as they were over-reliant on SARS or the 2008/09 financial crisis, the report found. It projected a median GDP decline of 2.8% for the countries covered for 2020, and observed spillover effects via value chains.

Guan et al. (2020)

To study the impacts of various lockdown scenarios on supply-chain, Guan et al. (2020) employed a global trade modelling framework. The study showed that the numbers of countries with restrictions impact losses, and the length of a lockdown has a greater impact on losses than the severity of the restrictions. The authors decided that the complexity of global supply chains exacerbates the losses due to COVID-19.

ITC Limited (2020)

However, in its announcement “Financial Results for the Quarter and Year ended 31st March, 2020,” ITC Limited stated that it has been performing well in the first nine months of 2020. The outbreak then had a significant impact on the company, causing problems for the supply chain in the fourth quarter and a heavy blow to the hotels business. ITC also set up a COVID-19 Contingency Fund of Rs. 215 crore.

Ivanov (2020)

The paper by Ivanov (2020), “Predicting the impacts of epidemic outbreaks on global supply chains: A simulation-based analysis on the coronavirus outbreak (COVID-19/SARS-CoV-2) case”, investigates how an epidemic would affect the performance of supply chains in both the short and long term through simulation. Epidemics (or epidemics risk) were studied as a unique supply chain risk because of its extended duration, its spread through the chain and the high uncertainty. It recommended that companies make supply chain plans for a pandemic.

Ivanov and Dolgui (2020)

In their study “Viability of intertwined supply networks: extending the supply chain resilience angles towards survivability” (Ivanov and Dolgui, 2020), Ivanov and Dolgui investigated supply chain resilience at the scale of intertwined supply networks, that is, interconnected supply chains which keep the society supplied with goods and services. COVID-19 outbreak was the motivating factor in the study. It added a fresh perspective on how to assess the viability of a supply chain when facing unprecedented events and recommended areas for future research.

Ramelli and Wagner (2020)

In their study “Feverish Stock Price Reactions to COVID-19” (2020), Ramelli and Wagner (2020) looked at how stock prices of various companies responded to the pandemic’s emergence. The research revealed that international companies, particularly those that had more exposure to trade with China, initially did not do well. Subsequently, the effects of the crisis on firm values took the form of corporate debt and cash-holding, demonstrating the financial channel amplification of real effects of the crisis.

Shen et al. (2020)

Shen et al. (2020), in their study “The Impact of the COVID-19 Pandemic on Firm Performance,” analysed the financial data of listed Chinese companies. This research revealed that the outbreak of COVID-19 was detrimental to the performance of the firms. The impact was greater on smaller businesses and in areas and sectors hardest hit.

Objectives of the study.

- To compare the financial performance before, during and after the Covid-19 Era in ITC Limited.

To examine the correlation between the effect of the COVID-19 pandemic on the financial performance of ITC Limited.

- To examine how the COVID-19 has affected the functioning of ITC Limited's businesses.

- To analyse the relationship between the business operations and the financial performance of ITC Limited.

To examine the mediation effect of business operations in between the relationship of COVID-19 and financial performance of ITC Limited.

Research Hypotheses

- H1: COVID-19 has a significant impact on the business operations of ITC Limited.
- H2: Business operations have a significant impact on the financial performance of ITC Limited.
- H3: COVID-19 has a significant impact on the financial performance of ITC Limited.
- H4: Business operations significantly mediate the relationship between COVID-19 and the financial impact on ITC Limited.

Corresponding null hypotheses

- H01: COVID-19 has no significant impact on the business operations of ITC Limited.
- H02: Business operations have no significant impact on the financial performance of ITC Limited.
- H03: COVID-19 has no significant impact on the financial performance of ITC Limited.
- H04: Business operations do not significantly mediate the relationship between COVID-19 and the financial impact on ITC Limited.

Supplementary tests were conducted to determine if there were differences in perceptions by gender, age group, occupation and education. For each demographic variable the null hypothesis was that the variable is independent of (chi-square) or has no effect on the mean of (ANOVA) the perception measures.

Research Methodology**Research design and data**

This study is descriptive and causal-explanatory design with primary data, obtained by filling out structured online questionnaires (Google Forms). There are 120 responses in the data set. Demographic information (age, gender, occupation, education) and two screening questions for awareness (Q5–Q6) to be answered by section A of the questionnaire. There are 26 five point Likert statements (Q7–Q32) and one closed question on the major challenge facing companies such as ITC (Q33) in Section B.

Data note: The workbook provided with this draft contains 120 rows of simulated responses for practice with the analysis, rather than actual respondents. The following results are all based on that file. Substitute with the true Google Forms export (same column format) and rerun the Excel workbook prior to submission, changing the numbers in Sections 7–9 and removing this note.

Measurement

The answers were rated on a scale of 1-5 where 1=Strongly Disagree and 5=Strongly Agree. Five construct scores were calculated as the average of five items: COVID-19 disruption of operations (X: Q7-Q11), management and recovery of business operations (M: Q12-Q16), financial impact of COVID-19 (Y: Q17-Q21), mediation perception (Q22-Q26), and external factors (Q27-Q31). There is only one overall impact item for Q32. The construct scores are used as the operational measures of the three model variables: COVID-19 (X), business operations (M) and financial performance (Y).

Analytical tools

All the analysis was performed using worksheet formulas in Microsoft Excel, which were implemented to replicate the Data Analysis ToolPak: AVERAGE, STDEV and CORREL for descriptive statistics and correlations; CHIDIST/CHITEST for Chi-Square tests of independence; DEVSQ and FDIST for one-way ANOVA; NORMSDIST for the Sobel test; and LINEST with TDIST and FDIST for simple and multiple regression. Throughout the significance level is 5%.

•Chi-square: tests association between demographic groups and (a) agreement with the overall-impact statement Q32 and (b) a high (mean ≥ 4.0) versus lower financial-impact score. For ease of analysis, categories with expected counts less than five were combined.

One-way ANOVA: to determine if there are differences in mean X, M and Y scores among gender, age, occupation and education groups.

•Regression: Model 1 (M on X) tests H1; Model 2 (Y on M) tests H2; Model 3 (Y on X) tests H3.

Mediation (H4): Baron and Kenny's (1986) approach through Models 1, 3 and 4 (Y on X and M), with the Sobel (1982) test for the indirect effect.

Data Analysis and Interpretation

Profile of respondents

Table 1: Demographic profile of respondents (N = 120)

Variable	Category	Count	Percent
Age (raw)	Below 18	1	0.8%
	18–25	88	73.3%
	26–35	15	12.5%
	36–45	12	10.0%
	Above 45	4	3.3%
Gender	Male	70	58.3%
	Female	47	39.2%
	Prefer not to say	3	2.5%
Occupation	Student	58	48.3%

	Salaried Employee	26	21.7%
	Business / Self-employed	17	14.2%
	Professional	13	10.8%
	Other	6	5.0%
Education	School	1	0.8%
	Undergraduate	69	57.5%
	Postgraduate	35	29.2%
	Other	15	12.5%
Aware of ITC Limited?	Yes	116	96.7%
	No	4	3.3%
Aware of COVID-19 business impact?	Yes	116	96.7%
	No	4	3.3%

Most respondents were aged 18–25 (73.3%), male (58.3%), students (48.3%) and undergraduates (57.5%). The awareness was high as 116 of the 120 respondents (96.7%) knew ITC Limited and the same number knew about the impact of COVID-19 on business of Indian companies. This sample is therefore young and student-based, and makes generalisation difficult.

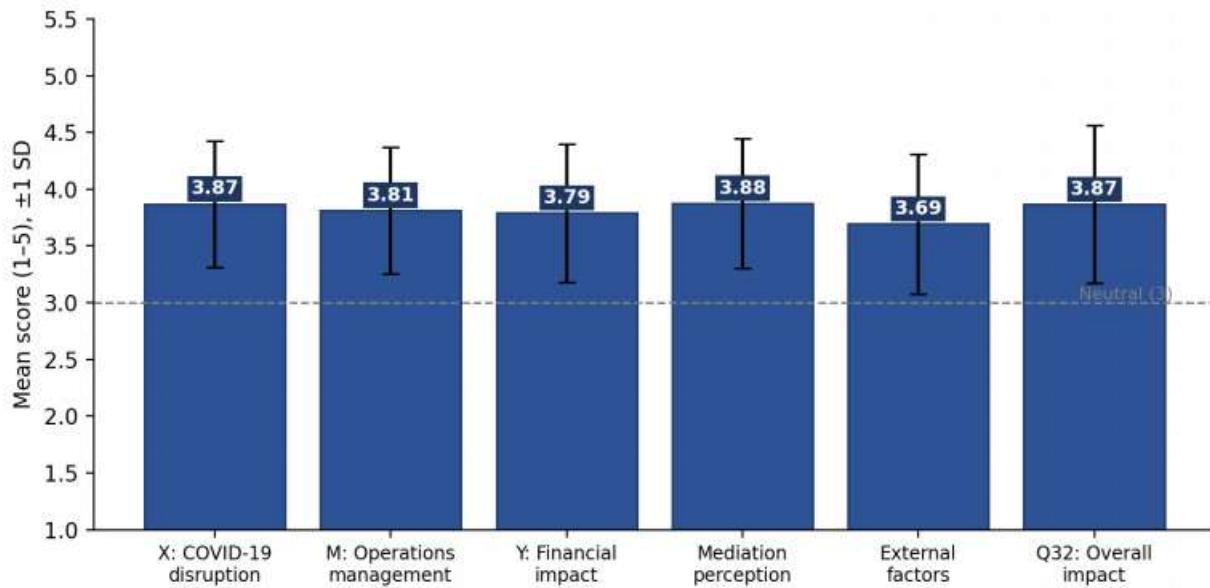
Descriptive statistics and reliability

Table 2: Construct means, standard deviations and reliability

Construct	Items	Mean	SD	Cronbach α	Reliability
X: COVID-19 disruption of operations	Q7–Q11	3.87	0.56	0.742	Acceptable
M: Business-operations management	Q12–Q16	3.81	0.56	0.768	Acceptable
Y: Financial impact of COVID-19	Q17–Q21	3.79	0.61	0.801	Good
Mediation perception	Q22–Q26	3.88	0.57	0.758	Acceptable
External factors	Q27–Q31	3.69	0.62	0.801	Good
Overall impact (Q32)	Q32	3.87	0.70	single item	n/a

Scale: 1 = Strongly Disagree, 5 = Strongly Agree. α values of 0.70 or above are conventionally treated as acceptable (Cronbach, 1951; Nunnally, 1978).

Figure 2: Mean construct scores



The mean scores of all constructs are above the 3.00 (neutral) indicating general agreement. The mediation perception scale (3.88) and COVID-19 disruption of operations (3.87) have the highest means while external factors have the lowest mean (3.69). Every alpha is between 0.742 and 0.801, which means that all scales are at least acceptable in terms of reliability.

Table 3: Item-level statistics (Q7–Q32)

Item	Mean	SD	% Agree / SA
Q7. COVID-19 disrupted the normal business operations of ITC.	3.90	0.74	72.5%
Q8. COVID-19 created difficulties for ITC in managing its supply chain and distribution activities.	3.88	0.85	69.2%
Q9. Changes in consumer demand during COVID-19 affected the business operations of ITC.	3.88	0.79	69.2%
Q10. COVID-19 affected the availability of employees and workforce required for ITC's operations.	3.82	0.83	65.0%
Q11. ITC had to make changes to its business operations to respond to the challenges created by COVID-19.	3.88	0.76	70.8%
Q12. Efficient management of business operations helped ITC maintain its financial performance during difficult economic conditions.	3.80	0.74	67.5%
Q13. Changes in ITC's business operations affected its revenue generation.	3.88	0.79	70.8%
Q14. The ability of ITC to maintain its supply and distribution activities influenced its financial performance.	3.77	0.78	62.5%
Q15. Effective management of business operations helped ITC reduce the negative financial effects of COVID-19.	3.86	0.77	69.2%

Q16. The recovery of ITC's business operations contributed to the improvement of its financial performance after COVID-19.	3.75	0.80	62.5%
Q17. COVID-19 had a noticeable effect on the financial performance of ITC.	3.74	0.86	60.0%
Q18. The changes in consumer demand during COVID-19 affected ITC's financial results.	3.75	0.83	65.0%
Q19. COVID-19-related disruptions affected the revenue-generating ability of ITC.	3.85	0.76	67.5%
Q20. The financial performance of ITC was affected during the COVID-19 period compared with the pre-COVID period.	3.80	0.82	61.7%
Q21. ITC showed improvement in its financial performance as business conditions recovered after COVID-19.	3.81	0.79	70.0%
Q22. COVID-19 affected ITC's financial performance partly through its effect on the company's business operations.	3.83	0.84	65.0%
Q23. The way ITC managed its business operations influenced the extent to which COVID-19 affected its financial performance.	3.95	0.77	73.3%
Q24. ITC's ability to adapt its business operations helped reduce the financial impact of COVID-19.	3.79	0.81	65.0%
Q25. Disruptions in ITC's business operations during COVID-19 contributed to changes in its financial performance.	3.91	0.79	74.2%
Q26. The recovery of ITC's business operations helped the company recover financially after the COVID-19 period.	3.91	0.81	70.8%
Q27. Changes in government regulations during COVID-19 affected ITC's business activities.	3.75	0.88	63.3%
Q28. Changes in the overall Indian economy influenced ITC's financial performance during COVID-19.	3.69	0.85	62.5%
Q29. Changes in consumer spending patterns affected ITC's business performance during the pandemic.	3.76	0.76	65.0%
Q30. Supply chain disruptions in the wider economy affected ITC's business activities.	3.63	0.84	59.2%
Q31. Changes in market conditions after COVID-19 influenced ITC's financial recovery.	3.63	0.81	56.7%
Q32. Overall, COVID-19 had a significant impact on ITC's business operations and financial performance.	3.87	0.70	71.7%

Item means range from 3.63 to 3.95. The highest-rated statement is Q23 (mean 3.95, 73.3% agreement) and the lowest-rated is Q31 (mean 3.63).

Chi-square tests of independence

The table below shows eight chi-square tests of independence (Table 4). Every demographic variable was correlated with (a) the agreement with the question "COVID-19 had a significant impact on ITC's business operations and financial

performance": Agree or Strongly Agree (86 respondents) and Neutral or Disagree (34 respondents) and (b) with the financial-impact score (high = 55 respondents, lower = 65 respondents).

Table 4: Chi-square tests of independence

Test	χ^2	df	p	Cramér's V	Min. expected	Decision
Gender × Overall impact (Q32)	0.616	1	.433	0.073	12.85	Fail to reject H0
Age group × Overall impact (Q32)	0.131	1	.717	0.033	8.78	Fail to reject H0
Occupation × Overall impact (Q32)	2.507	3	.474	0.145	4.82	Fail to reject H0
Education × Overall impact (Q32)	0.875	2	.646	0.085	4.53	Fail to reject H0
Gender × Financial-impact level	0.762	1	.383	0.081	21.69	Fail to reject H0
Age group × Financial-impact level	0.110	1	.740	0.030	14.21	Fail to reject H0
Occupation × Financial-impact level	1.551	3	.670	0.114	7.79	Fail to reject H0
Education × Financial-impact level	1.874	2	.392	0.125	7.33	Fail to reject H0

The 3 respondents who did not wish to identify (N = 117) are not included in the Gender tests. Age is compared as 25 & below (n = 89) vs 26 & above (n = 31). Occupational Groups: Student, Salaried Employee, Business/Self-employed, Professional/Other. Education groups: degree, graduate, other/School.

At a 5% level none of the eight tests is significant. P-values are between .383 and .740 and Cramér's V is not above 0.145; that is, the associations are very weak. Thus, the perception of the impact of the pandemic on ITC is statistically independent of gender, age groups, occupation and education in this sample. Only two tests (occupation × Q32 and education × Q32) have one cell with an expected count of less than 5 cells: 4.82 and 4.53, respectively, which are within the usual tolerance of no more than 20% of cells with expected count less than 5, but there should be some caution in interpreting those values.

One-way ANOVA

Table 5: Mean scores by demographic group

Grouping	Group	n	Mean X	Mean M	Mean Y
Gender	Male	70	3.87	3.75	3.76
	Female	47	3.90	3.94	3.84
	Prefer not to say	3	3.47	3.33	3.73
	Overall	120	3.87	3.81	3.79

Age group	25 & below	89	3.90	3.81	3.76
	26–35	15	3.71	3.79	3.92
	36 & above	16	3.85	3.84	3.81
	Overall	120	3.87	3.81	3.79
Occupation	Student	58	3.80	3.80	3.76
	Salaried Employee	26	3.91	3.83	3.92
	Business / Self-employed	17	3.92	3.68	3.74
	Professional / Other	19	3.98	3.94	3.74
	Overall	120	3.87	3.81	3.79
Education	Undergraduate	69	3.89	3.80	3.83
	Postgraduate	35	3.85	3.82	3.71
	Other / School	16	3.84	3.86	3.77
	Overall	120	3.87	3.81	3.79

X = COVID-19 disruption of operations; M = business-operations management; Y = financial impact.

Table 6: One-way ANOVA results

Grouping → outcome	SSB	SSW	df (B, W)	F	p	Decision
Gender → X: COVID disruption	0.525	36.407	2, 117	0.843	.433	Fail to reject H0
Gender → M: Ops management	1.744	35.595	2, 117	2.866	.061	Fail to reject H0
Gender → Y: Financial impact	0.215	43.693	2, 117	0.288	.750	Fail to reject H0
Age group → X: COVID disruption	0.493	36.439	2, 117	0.791	.456	Fail to reject H0
Age group → M: Ops management	0.020	37.319	2, 117	0.031	.969	Fail to reject H0
Age group → Y: Financial impact	0.322	43.586	2, 117	0.432	.651	Fail to reject H0
Occupation → X: COVID disruption	0.558	36.374	3, 116	0.593	.621	Fail to reject H0
Occupation → M: Ops management	0.595	36.744	3, 116	0.626	.599	Fail to reject H0
Occupation → Y: Financial impact	0.600	43.308	3, 116	0.536	.659	Fail to reject H0

Education → X: COVID disruption	0.065	36.867	2, 117	0.103	.902	Fail to reject H0
Education → M: Ops management	0.060	37.279	2, 117	0.094	.910	Fail to reject H0
Education → Y: Financial impact	0.325	43.583	2, 117	0.437	.647	Fail to reject H0

There is no significant ANOVA at the 5% level (F critical value = 3.07 for two factors (gender, age group and education) and 2.68 for the other factor (occupation)). The lowest p-value is .061 for gender on the operations-management score, with "Prefer not to say" respondents (n = 3) scoring lower, but not significantly so and on a very small number of respondents. A comparison of mean scores then is similar across the demographic groups and agrees with the chi-square results. The F-test is reasonably robust with 5-point composite scores and group sizes of at least 15 (except the n = 3 gender group) even though the variance was not tested for equality of group variances, and the residuals were not tested to see if they were approximately normal.

Linear regression: testing H1, H2 and H3

Table 7: Model 1 (H1) – Dependent variable: business operations (M)

Term	B	Std. error	t	p
Intercept	1.7629	0.3076	5.732	< .001
X (COVID-19 disruption)	0.5298	0.0787	6.735	< .001

$R^2 = 0.278$, adjusted $R^2 = 0.272$, $F(1, 118) = 45.36$, $p < .001$.

Table 8: Model 2 (H2) – Dependent variable: financial impact (Y)

Term	B	Std. error	t	p
Intercept	1.3373	0.3097	4.317	< .001
M (operations management)	0.6432	0.0804	8.003	< .001

$R^2 = 0.352$, adjusted $R^2 = 0.346$, $F(1, 118) = 64.04$, $p < .001$.

Table 9: Model 3 (H3) – Dependent variable: financial impact (Y)

Term	B	Std. error	t	p
Intercept	1.5094	0.3302	4.572	< .001
X (COVID-19 disruption)	0.5893	0.0845	6.978	< .001

$R^2 = 0.292$, adjusted $R^2 = 0.286$, $F(1, 118) = 48.69$, $p < .001$.

•H1 was proved to be true. Disruption due to COVID-19 has a significant effect on the condition of business operations (B = 0.530, t = 6.74, p < .001). One point change in the value of X results in 0.53 point change in Y, explaining 27.8% of the variance.

•H2 is supported. Business operations have a significant effect on financial impact ($B = 0.643$, $t = 8.00$, $p < .001$) and explain 35.2% of the variance. H02 is rejected.

•H3 is supported. The impact of COVID-19 disruption has a significant effect on financial impact ($c = 0.589$, $t = 6.98$, $p < .001$) and explains 29.2% of the variance. H03 is rejected.

These represent perceptions-based relationships among the scores obtained in the survey. This means that the surveyees who perceive a high impact of the disruption also perceive a higher effect on operations and finances.

Mediation analysis: testing H4

Table 10: Model 4 – Dependent variable: financial impact (Y), with X and M entered together

Term	B	Std. error	t	p
Intercept	0.6934	0.3383	2.050	.043
X (COVID-19 disruption)	0.3440	0.0900	3.821	< .001
M (operations management)	0.4629	0.0895	5.169	< .001

$R^2 = 0.424$, adjusted $R^2 = 0.414$, $F(2, 117) = 43.01$, $p < .001$.

Table 11: Baron–Kenny steps and Sobel test

Step / effect	Estimate	SE	p	Result
Step 1: $X \rightarrow Y$ (total effect c)	0.589	0.084	< .001	Significant
Step 2: $X \rightarrow M$ (path a)	0.530	0.079	< .001	Significant
Step 3: $M \rightarrow Y$ controlling X (path b)	0.463	0.090	< .001	Significant
Step 4: $X \rightarrow Y$ controlling M (direct effect c')	0.344	0.090	< .001	Significant, reduced from c
Indirect effect ($a \times b$)	0.245	0.060	< .001	Sobel $z = 4.10$
95% CI of indirect effect (normal approx.)	0.128 to 0.362			Excludes 0
Proportion mediated ($a \times b / c$)	41.6%			Partial mediation

All criteria for causal-step conditions are met. Adding business operations to the model decreases the coefficient of COVID-19 from 0.589 to 0.344, which is still significant, whereas the coefficient of business operations is 0.463 ($p < .001$). The indirect effect is 0.245 (Sobel $z = 4.10$, $p < .001$) and explains 41.6% of the total effect. Business operations are thus a partial mediator of the link between COVID-19 and the financial impact, and H04 is falsified. Given that the Sobel test requires the product $a \times b$ to be normally distributed, the results were cross-checked using a bootstrap analysis (5,000 resamples, outside Excel) yielding a 95% percentile interval of 0.146 to 0.371 for the indirect effect.

Supplementary models

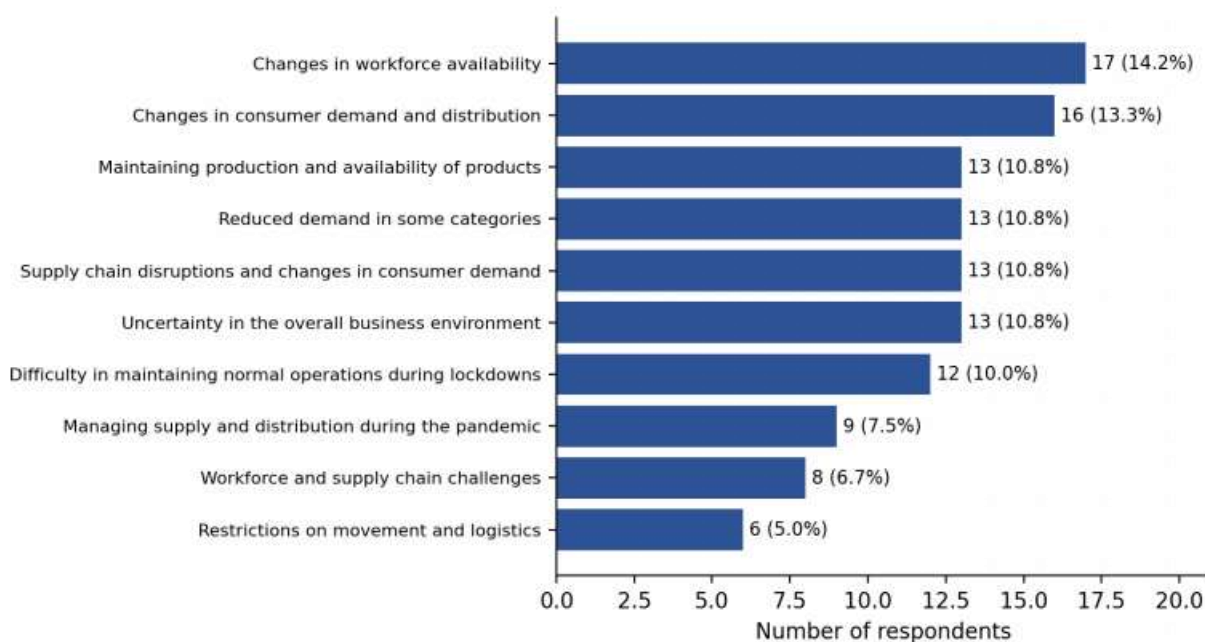
Model 5 performed a regression analysis of Q32, which represents the overall-impact variable, on X and M: both variables were significant (X: $B = 0.310$, $p = .008$; M: $B = 0.454$, $p < .001$; $R^2 = 0.289$). Model 6 included external factors (Q27–Q31) as a control variable in the financial-impact model. X ($B = 0.347$, $p < .001$) and M ($B = 0.464$, $p < .001$)

.001) were still significant, whereas external factors were not ($B = -0.079$, $p = .252$); the R^2 increased slightly to 0.430 from 0.424. Thus, the results of mediation are not sensitive to the presence of external factors, which are basically uncorrelated with other variables (r between -0.05 and 0.10).

Differences across pre-COVID, COVID and post-COVID periods (Objective 1)

There are no period-wise statistics on the financial performance in the questionnaire, and Objective 1 can be achieved through perception. Q20 assesses whether financial performance was impacted during COVID-19 compared with the pre-COVID period (mean 3.80), and Q21 assesses whether the performance improved during recovery afterwards (mean 3.81). Both means suggest agreement, meaning that there is perceived financial decline during the pandemic and recovery thereafter. A paired t-test reveals no difference in agreement level between the two items (mean difference = -0.008 , $t(119) = -0.112$, $p = .911$). To get a comprehensive answer to Objective 1, a comparison of ITC's audited revenue and profit in the pre-COVID, COVID and post-COVID periods should be carried out using data from ITC's annual reports.

Figure 3: Respondents' view of the major challenge faced by companies like ITC (Q33)



The replies received for question 33 fall under ten different categories. The most common challenges cited by people were changes in availability of labor (17; 14.2%) and consumer demands and distribution (16; 13.3%).

Summary of hypothesis tests

Table 12: Hypothesis decisions

Hypothesis	Test	Key statistic	Decision
H1: COVID-19 → business operations	Simple regression	$B = 0.530$, $p < .001$, $R^2 = 0.278$	H01 rejected; H1 supported
H2: Business operations → financial performance	Simple regression	$B = 0.643$, $p < .001$, $R^2 = 0.352$	H02 rejected; H2 supported
H3: COVID-19 → financial performance	Simple regression	$B = 0.589$, $p < .001$, $R^2 = 0.292$	H03 rejected; H3 supported

H4: Mediation by business operations	Baron–Kenny + Sobel	$a \times b = 0.245$, $z = 4.10$, $p < .001$	H04 rejected; H4 supported (partial mediation)
Demographic differences	Chi-square tests) (8	All $p \geq .383$	No significant association
Demographic differences	ANOVA tests) (12	All $p \geq .061$	No significant difference

Findings

Respondents generally conclude that COVID-19 impacted ITC's operations (mean 3.87), that business management had an impact (mean 3.81), and that financial performance was impacted (mean 3.79).

The business-operations scores are all significantly and positively associated with the COVID-19 disruption ($B = 0.530$; $R^2 = 0.278$).

Financial-impact scores are significantly predicted by the business operations ($B = 0.643$; $R^2 = 0.352$).

Financial-impact scores are significantly predicted by the interruption caused by COVID-19 ($c = 0.589$; $R^2 = 0.292$).

The indirect effect of COVID-19 on financial performance is 0.245 (41.6% of the total effect) and the direct effect is still significant 0.344.

•Perceptions do not differ significantly by gender, age, occupation or education (0 of 8 chi-square tests and 0 of 12 ANOVA tests significant).

The effect of the pandemic (Q20) and the recovery from COVID (Q21) are rated almost equally on the level of agreement.

Perceived external influencing factors (regulation, economy, spending, market conditions) provide no added explanatory power with operations within the model.

Discussion

The findings align with the hypothesis that a shock like COVID-19 can only affect financial outcomes through operational capability. The largest one association is between operations and financial impact ($R^2 = 0.352$) and adding operations to the model increases the amount of variance explained in financial impact from 29.2% to 42.4%. The continued strong direct impact indicates that COVID-19 also had an impact on financial performance outside the scope of the operations items, such as a change in demand for discretionary products like hospitality. The absence of demographic differences suggests that there is a common story about the pandemic across these groups, a plausible scenario for a well-known company, and perhaps due to the sample being relatively homogenous and made up of young, college students.

Suggestions and Implications

Operational resilience is a key driver of the financial impact of the pandemic and diversified companies must focus on flexible supply-chain and distribution arrangements.

Workforce continuity planning (remote and staggered work, multi-skilling, contingency staffing) should be prioritised as workforce availability was cited as the most frequent challenge.

Demand-sensing and distribution agility need to be improved and be able to respond to consumer demand changes rapidly across product categories.

Do highlight recovery of operations as a way to communicate with investors and stakeholders, as they connect recovery with financial recovery.

The limitations and possible scope for further research is discussed in the next section.

Limitations and Scope for Further Research

The data are perception based Likert, not audited financial figures – Objective 1 in particular requires a pre/during/post comparison of ITC's reported revenue and profit.

The sample is small (120) and predominantly young (73.3% aged 18-25; 48.3% students) and the data supplied is marked as simulated (data note in Section 6.1).

The mediators and manipulated variables are measured at the same time and the same respondents are used in both cases, therefore common-method bias may be an issue and the mediation result is an association and not a causal conclusion. Construct scores are five item means of ordinal data analyzed using parametric methods with acceptable alpha values, not high (0.74 – 0.80).

Future study should integrate the survey data with secondary financial data; structural equation modelling on latent constructs; and compare ITC with other diversified Indian companies.

Conclusion

This study studied the financial effect of COVID-19 on ITC Limited in relation to the business operations. Both regression and mediation analyses in Excel demonstrate that the COVID-19 disruption has significant effects on business operations and financial performance and that the financial impact of the pandemic is partially mediated by business operations (indirect effect 0.245, 41.6% of total effect). These perceptions did not alter with demographic characteristics. The results highlight the importance of how a company manages and recovers its operations in mitigating loss from a systemic shock, and should be verified using real survey data and audited financial data.

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See the literature cited in Section 3 and the annual reports of ITC Limited (as available during the pandemic).