Developing research orientation

Session 1:
Quantitative Methods in Research

Dr. Atul Prashar A/Prof of Marketing 07-2025

1

00 session objectives
01 scholars of 2025-20XX
02 why learn quant
03 research orientation

2

Session objectives

— Know your fellow scholars
— Understand the significance of quantitative techniques in an overall research project
— Formulate a research problem
— Define research questions
— Extract variables from research question

3

Know me

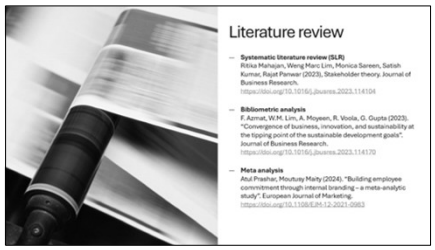
— Name
— Current role
— Years of experience
— Research question
— One statistic

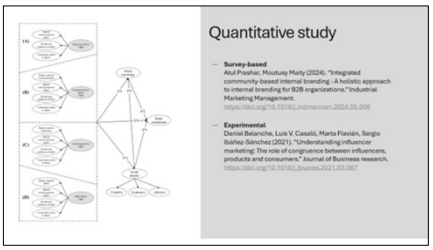
01 Research motivation & objectives 02 Theory & literature review 03 Methodology 04 Re

Ericsson Internal | 2018-02-21

4

Why learn quant?





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Research orientation

1. Identify the problem (the market/ research gap)
2. Write research questions (intent to fill the gap)
3. Extract constructors and variables
4. Formulate the problem and depict is as a model to be tested
5. Identify measurement

6

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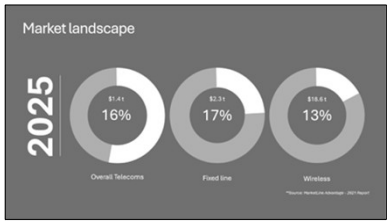
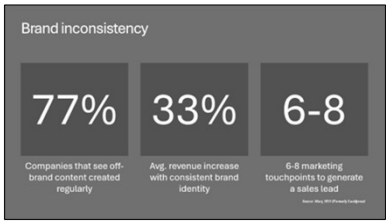
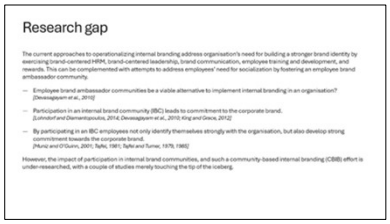
Identify the problem







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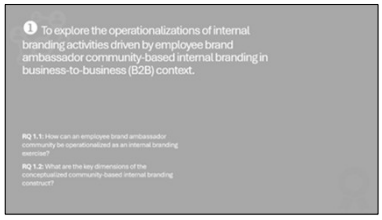
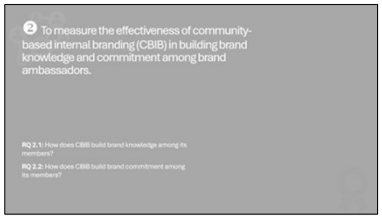
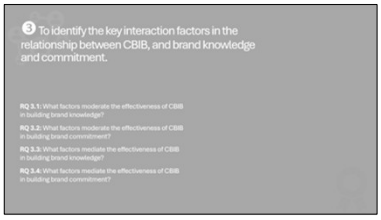
Write research questions







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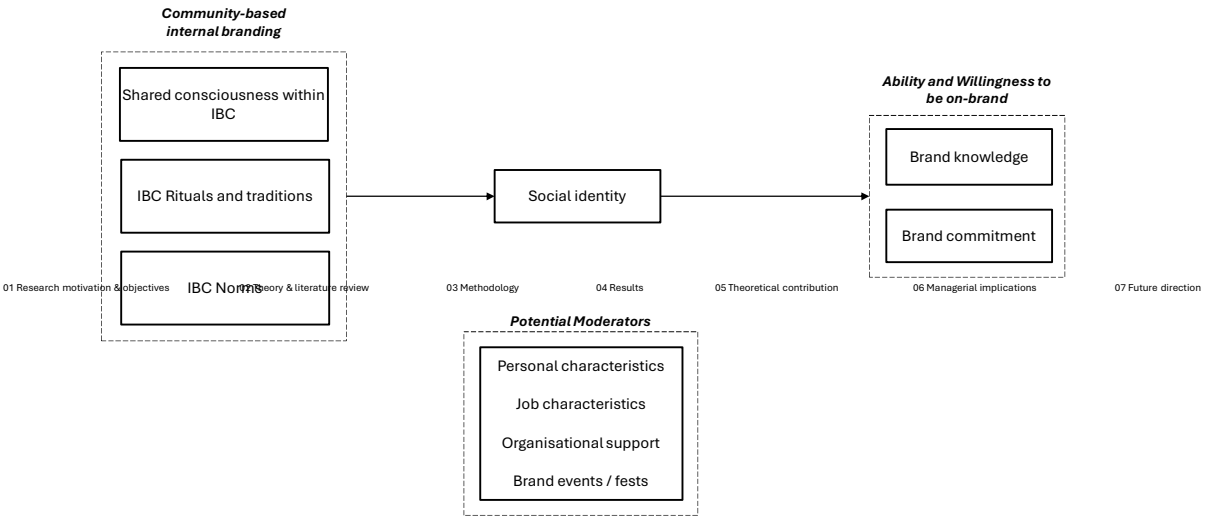
Formulate & model the problem



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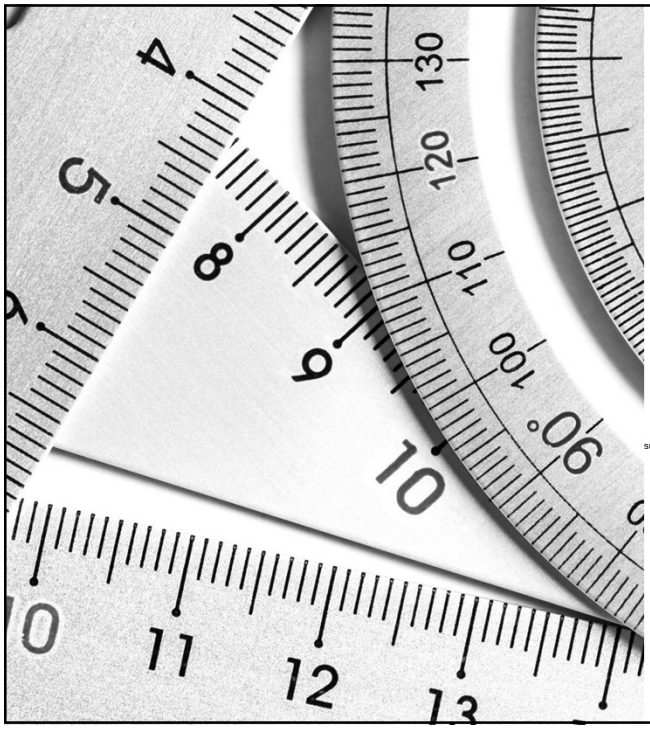


Measurement strategy

Constructs & scales 1/2

First order factor	Item description	Source
Brand commitment	I am proud to work for ...	Ewmann et al (2009)
	I tell about ... to my friends as a great company to work for	Ewmann et al (2009)
	I really care about the future of ...	Ewmann et al (2009)
	My values are similar to those of ...	Ewmann et al (2009)
	I feel like I really fit in at ...	Ewmann et al (2009)
Brand knowledge	I am familiar with our brand communication (e.g., Magazines, internet, exhibitions, etc.)	Baumgarth and Schmidt (2010)
	I am aware of the given cue to its achieve through the brand	Baumgarth and Schmidt (2010)
	I have sound knowledge about the values represented by the brand [name]	Baumgarth and Schmidt (2010)
	I understand however customers can benefit fromour brand	Baumgarth and Schmidt (2010)
	I am familiar with our brand style guide	Baumgarth and Schmidt (2010)
	I know how our brand differentiates us from our competitors	Baumgarth and Schmidt (2010)
	It is clear to me what is promised to our customers by the brand [name]	Baumgarth and Schmidt (2010)
	I have a strong sense o f belonging to my brand ambassador community	Wallpuu (2009)
Shared consciousness of IBC	I feel a strong attachment to my brand ambassador community	Wallpuu (2009)
	I really feel that I am a part of my brand ambassador community	Wallpuu (2009)

Constructs & scales 2/2

First order factor	Item description	Source
Rituals and traditions of IBC	I understand and recognize the special terms or words and symbols used by the members in the discussion forums on the brand ambassador community	Wallpuu (2009)
	I know and understand the norms of my brand ambassador community	Wallpuu (2009)
	I am aware of the conventions of my brand ambassador community	Wallpuu (2009)
	I am aware of the best practices of my brand ambassador community	Wallpuu (2009)
Moral code of IBC	Helping other brand ambassador community members with their problems is very important to me	Wallpuu (2009)
	It is my duty to help other members of my brand ambassador community when they are in trouble	Wallpuu (2009)
	I help other members of the brand ambassador community in their consumption of my brand ambassador	Wallpuu (2009)
Cognitive social identity	I identify with other members of my group	Ellemers et al (1999)
	My group is an important w 'action of who I am	Ellemers et al (1999)
Evaluative social identity	I think my group has little to be proud of	Ellemers et al (1999)
	I feel good about my group	Ellemers et al (1999)
Affective social identity	I would like to continue working with my group	Ellemers et al (1999)
	I dislike being a member of my group	Ellemers et al (1999)

10

Scales, constructs and measurements

Session 2:
Quantitative Methods in Research

Dr. Atul Prashar A/Prof of Marketing 07-2025

11

00 session objectives
01 the variate & its measurement
02 measures of central tendency
03 measures of variability
04 standard deviation & normal distribution

12

Session objectives

— Understand the concept of a variate in multivariate analysis
— Select the appropriate measurement scales based on the type of data
— Examine the datasets with measures of central tendency and dispersion
— Assess the variability in a dataset using standard deviation, z-score and bell curve

13

The variate

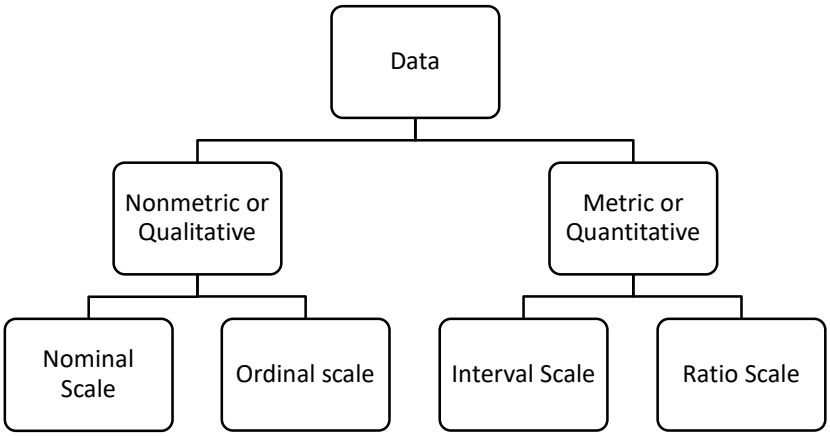
The variate is a linear combination of variables with empirically determined weights.
Weights are determined to best achieve the objective of the specific multivariate technique.
Each respondent has a variate value (Y').
The Y' value is a linear combination of the entire set of variables. It is the dependent variable.

Variate equation: $(Y') = W_1 X_1 + W_2 X_2 + \ldots + W_n X_n$
W_n = empirically determined weights
X_n = independent variables

Potential Independent Variables:
X_1 = income
X_2 = education
X_3 = family size
X_4 = ??

14

Types of Data and Measurement Scales



15

Scale characteristics

Description

- Unique labels or descriptors that are used to designate each value of the scale. All scales possess description.
  - 1. Female, 2. Male, 3. Prefer not to say
  - 1 Strongly disagree, 2 Disagree, 3 Neither agree nor disagree, 4 Agree, and 5 Strongly agree
  - Number of dollars earned annually by a household

Order

- The relative sizes or positions of the descriptors. Order is denoted by descriptors such as greater than, less than, and equal to.
  - A respondent's preference for three brands of athletic shoes
    - Nike
    - Reebok
    - Adidas

Distance

- Absolute differences between the scale descriptors are known and may be expressed in units.
- A scale that has distance also has order and description.
  - Number of persons living in your household
    - A five-person household has one person more than a four-person household, which in turn has one person more than a three-person household.

Origin

- The scale has a unique or fixed beginning or true zero point.
- A scale that has origin also has distance (and order and description)
  - "Annual income of our household" has a fixed origin or a true zero point.
  - 1 Strongly disagree, 2 Disagree, 3 Neither agree nor disagree, 4 Agree, and 5 Strongly agree.
    - 1 is an arbitrary origin or starting point.

16

Measurement Scales

- **Nonmetric**
  - Nominal – size of number is not related to the amount of the characteristic being measured.
  - Ordinal – larger numbers indicate more (or less) of the characteristic measured, but not how much more (or less).
- **Metric**
  - Interval – contains ordinal properties, and in addition, there are equal differences between scale points.
  - Ratio – contains interval scale properties, and in addition, there is a natural zero point.

NOTE:

The level of measurement is critical in determining the appropriate multivariate technique to use!

17

Primary Scales of Measurement (1 / 4)

Scale					
Nominal	Numbers Assigned to Runners				Finish
Ordinal	Rank Order of Winners	 Third Place	 Second Place	 First Place	Finish
Interval	Performance Rating on a 0-to-10 Scale	8.2	9.1	9.6	
Ratio	Time to Finish, in Seconds	15.2	14.1	13.4	

18

Primary Scales of Measurement (2/4)

				Permissible Statistics	
Scale	**Basic Characteristics**	**Common Examples**	**Marketing Examples**	**Descriptive**	**Inferential**
Nominal	Numbers identify and classify objects	Social Security numbers, numbering of football players	Brand numbers, store types, sex classification	Percentages, mode	Chi-square, binomial test
Ordinal	Numbers indicate the relative positions of the objects but not the magnitude of differences between them	Quality rankings, rankings of teams in a tournament	Preference rankings, market position, social class	Percentile, median	Rank-order correlation, Friedman ANOVA
Interval	Differences between objects can be compared; zero point is arbitrary	Temperature (Fahrenheit, centigrade)	Attitudes, opinions, index numbers	Range, mean, standard deviation	Product-moment correlations, t-tests, ANOVA, regression, factor analysis
Ratio	Zero point is fixed; ratios of scale values can be computed	Length, weight	Age, income, costs, sales, market shares	Geometric mean, harmonic mean	Coefficient of variation

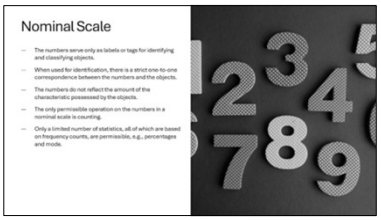
19

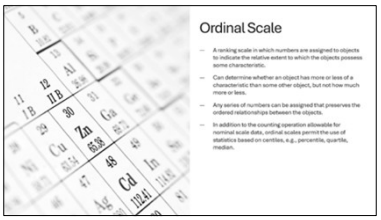
Primary Scales of Measurement (3/4)

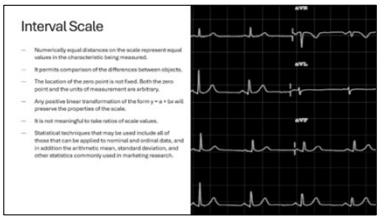
	Nominal Scale	**Ordinal Scale**		**Interval Scale**		**Ratio Scale**
No.	**Store**	**Preference Rankings**		**Preference Ratings**		**$ Spent Last 3 Months**
				1–7	**11–17**	
1.	Nordstrom	7	79	5	15	0
2.	Macy's	2	25	7	17	200
3.	Target	8	82	4	14	0
4.	Kohl's	3	30	6	16	100
5.	JCPenney	1	10	7	17	250
6.	Neiman-Marcus	5	53	5	15	35
7.	Marshalls	9	95	4	14	0
8.	Saks Fifth Avenue	6	61	5	15	100
9.	Dillard's	4	45	6	16	0
10.	Wal-Mart	10	115	2	12	10

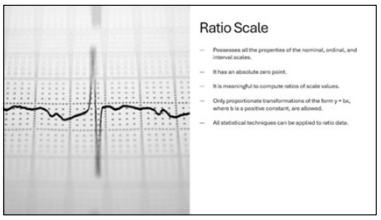
20

Primary Scales of Measurement (4/4)









21

Measurement Error

- All variables have some error.
  - It is the difference between the true value of something and what the tool or method says it is.
  - Measurement error distorts observed relationships and makes multivariate techniques less powerful.
- In addressing measurement error, evaluate
  - **Validity**: Am I measuring what I intend to measure?
  - **Reliability**: If I measure it again, will I get the same result?

Concept	Focus	Type of Error It Deals With	Goal
Measurement Error	The gap between true value and measured value	Can be random, systematic, or both	Needs to be minimized
Reliability	Consistency	Reduces random error	Get the same result each time
Validity	Accuracy (correctness)	Reduces systematic error	Measure the right thing

22

Measures of central tendency

Mean

The **mean**, or average value, is the most commonly used measure of central tendency. The mean, $\bar{X}$, is given by:

$$\bar{X} = \frac{\sum_{i=1}^{n} X_i}{n}$$

Where,

X_i = Observed values of the variable X

n = Number of observations (sample size)

Median

The **median** of a sample is the middle value when the data are arranged in ascending or descending order.

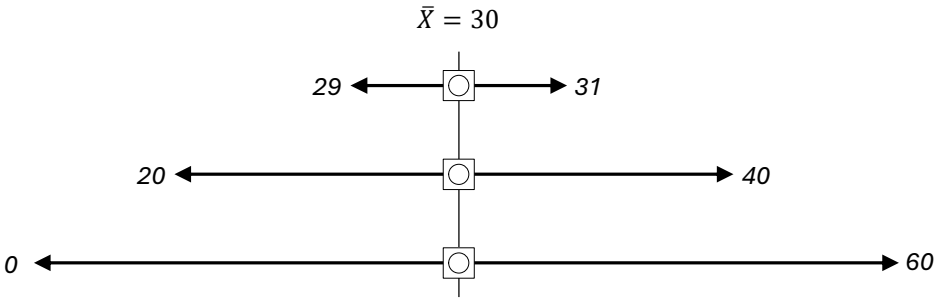
If the number of data points is even, the median is usually estimated as the midpoint between the two middle values – by adding the two middle values and dividing their sum by 2. The median is the 50th percentile.

Mode

The **mode** is the value that occurs most frequently. It represents the highest peak of the distribution. The mode is a good measure of location when the variable is inherently categorical or has otherwise been grouped into categories.

23

Variability



24

Measures of variability (1/2)

Range

— The **range** measures the spread of the data.
  — It is simply the difference between the largest and smallest values in the sample.

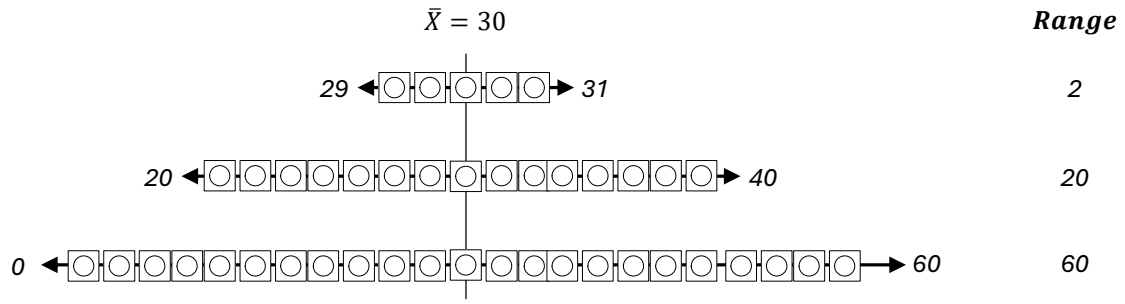
$$\text{Range} = X_{\text{largest}} - X_{\text{smallest}}$$

— The **interquartile range** is the difference between the 75th and 25th percentile.
  — For a set of data points arranged in order of magnitude, the pth percentile is the value that has p% of the data points below it and (100 − p)% above it.

— Depends only on two values.

25

Range



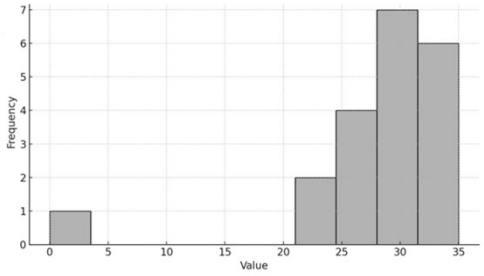
26

Range

Work experience of 20 Ph. D. scholars of 2025 batch at IIM Sambalpur

Mean	Median	Range
27.7	28	35

0	21	24	25	26	27	27	28	28	28
28	29	30	31	32	33	33	34	35	35



27

Measures of variability (2/2)

Standard deviation

— The **standard deviation** is the square root of the mean squared deviation from the mean (variance).

$$s_x = \sqrt{\sum_{i=1}^{n} \frac{(X - \bar{X})^2}{n-1}}$$

— Considers each data point

z-score

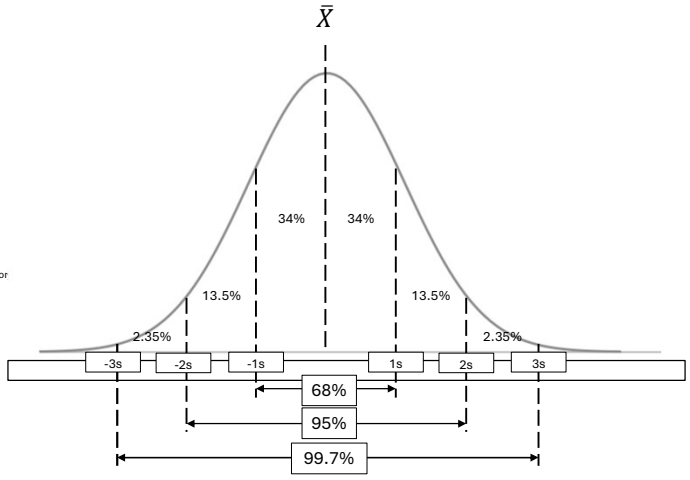
— The **z-score** is a measure of distance (in standard deviations) of an observation from mean.

$$z = \frac{X_i - \bar{X}}{s_x}$$

Mean + 1 SD	Mean + 2 SD	Mean +3 SD
68%	95%	99.7%

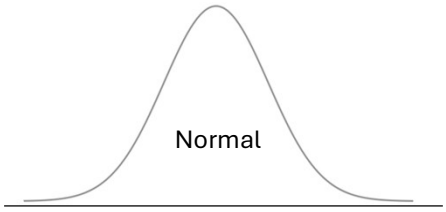
28

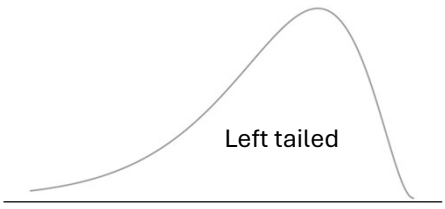
The empirical rule

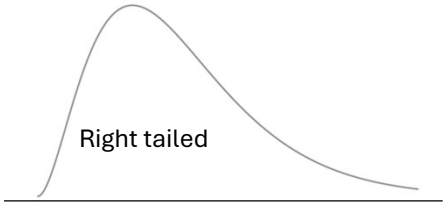


29

Bell curve & its deviations







30

Magnitude of SD

Change in temperature in ***⁰Celsius*** *in Thar desert from April 2000 to April 2025*

Dataset 1	Dataset 2
S = 15	S = 150

Average change in the income (***in ₹****) of a household in DLF societies in Gurugram*

Average change in the income (***in $****) of a household in slums in Mumbai*

31

Supplementary slides

32

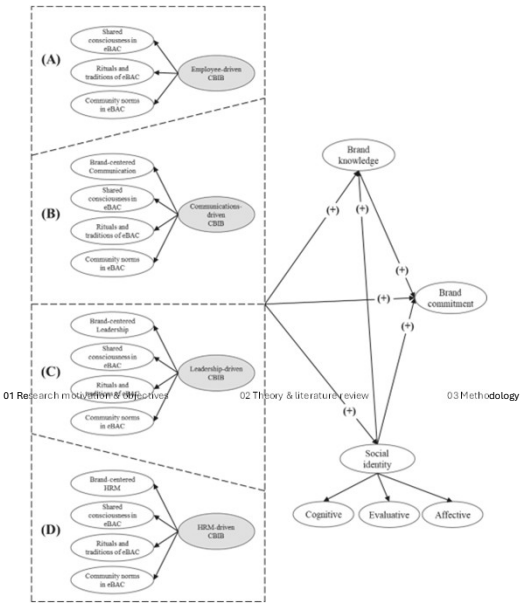
Literature review

- **Systematic literature review (SLR)**
  Ritika Mahajan, Weng Marc Lim, Monica Sareen, Satish Kumar, Rajat Panwar (2023), Stakeholder theory. Journal of Business Research.
  https://doi.org/10.1016/j.jbusres.2023.114104

- **Bibliometric analysis**
  F. Azmat, W.M. Lim, A. Moyeen, R. Voola, G. Gupta (2023). "Convergence of business, innovation, and sustainability at the tipping point of the sustainable development goals". Journal of Business Research.
  https://doi.org/10.1016/j.jbusres.2023.114170

- **Meta analysis**
  Atul Prashar, Moutusy Maity (2024). "Building employee commitment through internal branding – a meta-analytic study". European Journal of Marketing.
  https://doi.org/10.1108/EJM-12-2021-0983

33



Quantitative study

- **Survey-based**
  Atul Prashar, Moutusy Maity (2024). "Integrated community-based internal branding - A holistic approach to internal branding for B2B organizations." Industrial Marketing Management.
  https://doi.org/10.1016/j.indmarman.2024.05.006

- **Experimental**
  Daniel Belanche, Luis V. Casaló, Marta Flavián, Sergio Ibáñez-Sánchez (2021). "Understanding influencer marketing: The role of congruence between influencers, products and consumers." Journal of Business research.
  https://doi.org/10.1016/j.jbusres.2021.03.067

34

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Qualitative study

Albert M. Muniz, Thomas C. O'Guinn (2001). "Brand Community", Journal of Consumer Research. https://doi.org/10.1086/319618

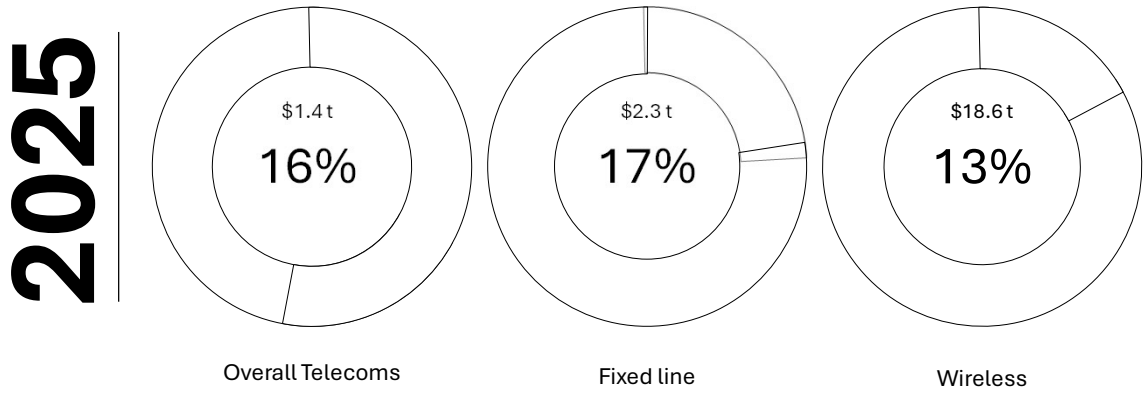
35

Mixed methods

Shaphali Gupta, Pooja Shrivastava and Soniya Gupta, (2023). "More the Merrier: Understanding the effect of available content choices over willingness to pay for over the top subscriptions", **Psychology & Marketing**. https://doi.org/10.1002/mar.21895

36

Market landscape



***Source: MarketLine Advantage – 2021 Report*

37

Brand inconsistency

77%	33%	6-8
Companies that see off-brand content created regularly	Avg. revenue increase with consistent brand identity	6-8 marketing touchpoints to generate a sales lead

Source: Marq 2024 (Formerly Lucidpress)

38

Research gap

The current approaches to operationalizing internal branding address organisation's need for building a stronger brand identity by exercising brand-centered HRM, brand-centered leadership, brand communication, employee training and development, and rewards. This can be complemented with attempts to address employees' need for socialization by fostering an employee brand ambassador community.

— Employee brand ambassador communities be a viable alternative to implement internal branding in an organisation?
[Devasagayam et al., 2010]

— Participation in an internal brand community (IBC) leads to commitment to the corporate brand.
[Lohndorf and Diamantopoulos, 2014; Devasagayam et al., 2010; King and Grace, 2012]

— By participating in an IBC employees not only identify themselves strongly with the organisation, but also develop strong commitment towards the corporate brand.
[Muniz and O'Guinn, 2001; Tajfel, 1981; Tajfel and Turner, 1979, 1985]

However, the impact of participation in internal brand communities, and such a community-based internal branding (CBIB) effort is under-researched, with a couple of studies merely touching the tip of the iceberg.

39

❶ To explore the operationalizations of internal branding activities driven by employee brand ambassador community-based internal branding in business-to-business (B2B) context.

RQ 1.1: How can an employee brand ambassador community be operationalized as an internal branding exercise?

RQ 1.2: What are the key dimensions of the conceptualized community-based internal branding construct?

40

❷ To measure the effectiveness of community-based internal branding (CBIB) in building brand knowledge and commitment among brand ambassadors.

RQ 2.1: How does CBIB build brand knowledge among its members?

RQ 2.2: How does CBIB build brand commitment among its members?

41

❸ To identify the key interaction factors in the relationship between CBIB, and brand knowledge and commitment.

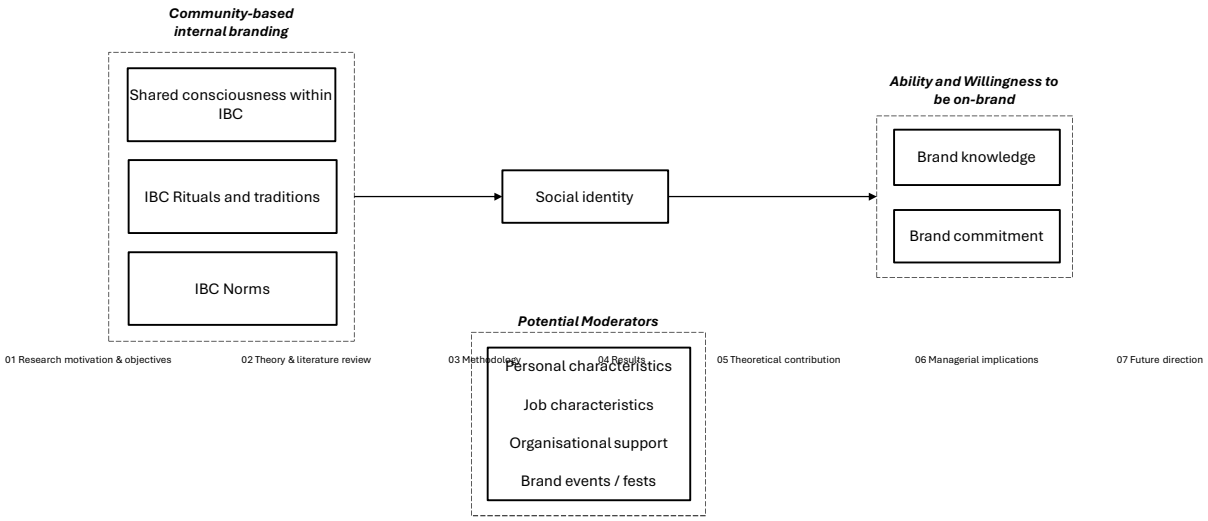
RQ 3.1: What factors moderate the effectiveness of CBIB in building brand knowledge?

RQ 3.2: What factors moderate the effectiveness of CBIB in building brand commitment?

RQ 3.3: What factors mediate the effectiveness of CBIB in building brand knowledge?

RQ 3.4: What factors mediate the effectiveness of CBIB in building brand commitment?

42



43

Constructs & scales 1/2

First order factor	Item description	Source
Brand commitment	*I am proud to work for .....*	*Burmann et al (2009)*
	I talk about ..... to my friends as a great company to work for	*Burmann et al (2009)*
	I really care about the future of	*Burmann et al (2009)*
	My values are similar to those of	*Burmann et al (2009)*
	I feel like I really fit in at	*Burmann et al (2009)*
Brand knowledge	*I am familiar with our brand communication (e.g., Magazines, Internet, exhibitions, etc.)*	*Baumgarth and Schmidt (2010)*
	I am aware of the goals we try to achieve through the brand	*Baumgarth and Schmidt (2010)*
	I have sound knowledge about the values represented by the brand [name]	*Baumgarth and Schmidt (2010)*
	I understand howour customers can benefit fromour brand	*Baumgarth and Schmidt (2010)*
	I am familiar with our brand style guide	*Baumgarth and Schmidt (2010)*
	I know how our brand differentiates us from our competitors	*Baumgarth and Schmidt (2010)*
	It is clear to me what is promised to our customers by the brand [name]	*Baumgarth and Schmidt (2010)*
Shared consciousness of IBC	*I have a strong sense o f belonging to my brand ambassador community*	*Madupu (2006)*
	I feel a strong attachment to my brand ambassador community	*Madupu (2006)*
	I really feel that I am a part of my brand ambassador community	*Madupu (2006)*

01 Res
07 Future direction

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44

Constructs & scales 2/2

First order factor	Item description	Source
Rituals and traditions of IBC	I understand and recognize the special terms or words and symbols used by the members in the discussion forums in the brand ambassador community	Madupu (2006)
	I know and understand the norms of my brand ambassador community	Madupu (2006)
	I am aware of the conventions of my brand ambassador community	Madupu (2006)
	I am aware of the best practices of my brand ambassador community	Madupu (2006)
Moral code of IBC	Helping other brand ambassador community members with their problems is very important to me	Madupu (2006)
	It is my duty to help other members of my brand ambassador community when they are in trouble	Madupu (2006)
	I help other members of the brand ambassador community in their consumption of my brand ambassador	Madupu (2006)
Cognitive social identity	I identify with other members of my group	Ellemers et al (1999)
	My group is an important re¯ection of who I am	Ellemers et al (1999)
Evaluative social identity	I think my group has little to be proud of	Ellemers et al (1999)
	I feel good about my group	Ellemers et al (1999)
Affective social Identity	I would like to continue working with my group	Ellemers et al (1999)
	I dislike being a member of my group	Ellemers et al (1999)

45

Nominal Scale

- The numbers serve only as labels or tags for identifying and classifying objects.
- When used for identification, there is a strict one-to-one correspondence between the numbers and the objects.
- The numbers do not reflect the amount of the characteristic possessed by the objects.
- The only permissible operation on the numbers in a nominal scale is counting.
- Only a limited number of statistics, all of which are based on frequency counts, are permissible, e.g., percentages and mode.

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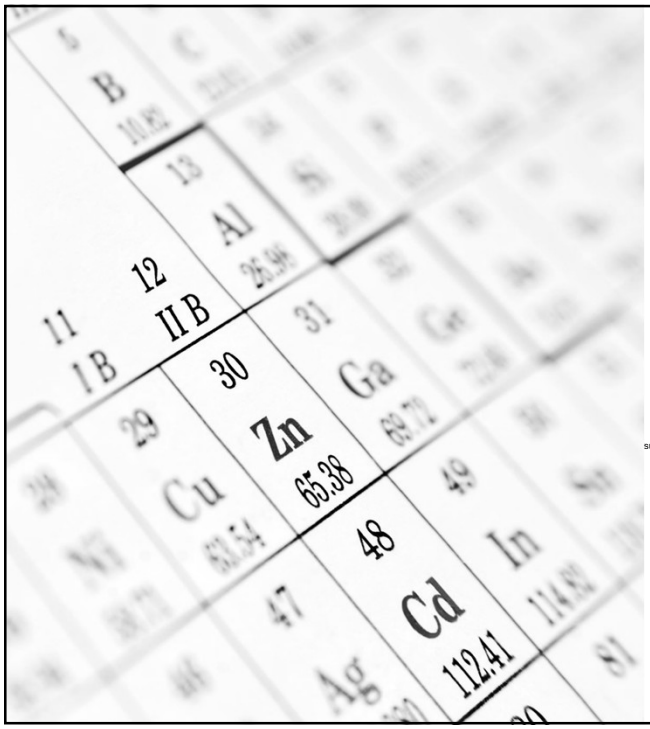
46



Ordinal Scale

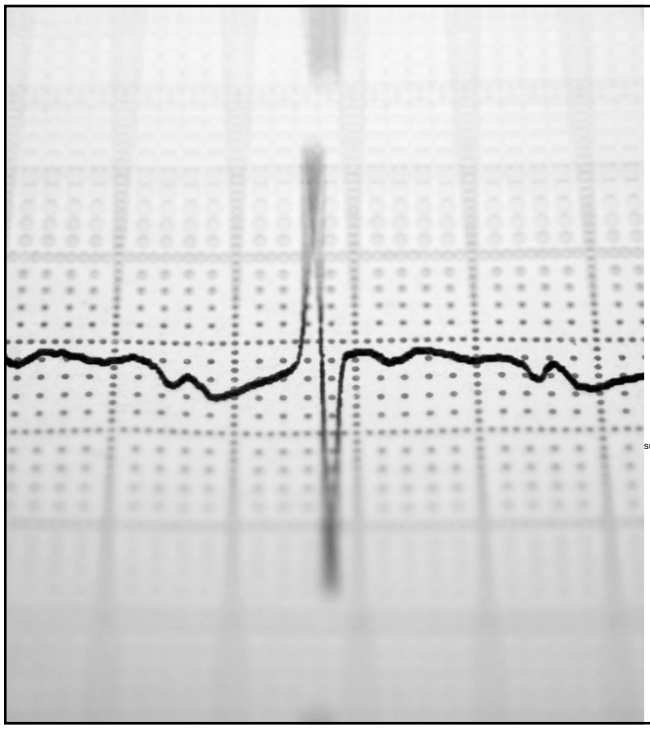
- A ranking scale in which numbers are assigned to objects to indicate the relative extent to which the objects possess some characteristic.
- Can determine whether an object has more or less of a characteristic than some other object, but not how much more or less.
- Any series of numbers can be assigned that preserves the ordered relationships between the objects.
- In addition to the counting operation allowable for nominal scale data, ordinal scales permit the use of statistics based on centiles, e.g., percentile, quartile, median.

47

Interval Scale

- Numerically equal distances on the scale represent equal values in the characteristic being measured.
- It permits comparison of the differences between objects.
- The location of the zero point is not fixed. Both the zero point and the units of measurement are arbitrary.
- Any positive linear transformation of the form y = a + bx will preserve the properties of the scale.
- It is not meaningful to take ratios of scale values.
- Statistical techniques that may be used include all of those that can be applied to nominal and ordinal data, and in addition the arithmetic mean, standard deviation, and other statistics commonly used in marketing research.

48



Ratio Scale

- Possesses all the properties of the nominal, ordinal, and interval scales.
- It has an absolute zero point.
- It is meaningful to compute ratios of scale values.
- Only proportionate transformations of the form y = bx, where b is a positive constant, are allowed.
- All statistical techniques can be applied to ratio data.

49