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Design and Fabrication Project

A Project Report on

“Multi-Utility Laptop Bag”

BY

GROUP - 58

GUIDE

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# MULTI-UTILITY LAPTOP BAG

## 1. Introduction

The usage of laptops among students, working professionals, and travelers has significantly increased, but the current market of laptop bags remains largely storage-focused, offering limited functionality and no transformation capability for productivity.

Through a detailed market study and a user survey, we identified a clear opportunity for a Multi-Utility Laptop Bag that:

- Transforms into a stable workspace
- Works on soft/uneven surfaces (beds, airport seats, trains)
- Integrates tech features (GPS tracking, USB pass-through port for on-the-go charging)
- Supports travel and academic environments
- Adds ergonomic and structural improvements missing in existing products

This report presents a complete market study, user study, feature analysis, material selection, costing, and design opportunities.

## 2. Market Study

The market was analyzed across five major categories to understand overlaps and gaps:

- Traditional Laptop Bags
- Transformable Magnetic Sleeves (Nillkin, Olleada)
- Portable Laptop Desks
- Portable Projector Stands
- Smart Luggage & GPS-enabled Travel Gear

## 3. Competitive Analysis

### 3.1 Traditional Laptop Bags

Examples: HP, Arctic Hunter, Lenovo, SwissGear

Price Range: ₹2,000–₹6,000

Feature	Description
Pros	Durable materials, Multiple compartments, Padding and comfort, Available everywhere
Cons	Purely storage-based, Cannot be used as a workspace, No stability on soft surfaces, No tech integration (GPS/charging)

**Gap Identified:**

No productivity or travel-optimized features.

### 3.2 Transformable Magnetic Sleeves (Nillkin, Olleada)

Price Range: ₹1,200–₹3,000

Feature	Description
Pros	Sleek, lightweight, Quick magnetic fold stand, Good only for static desk use
Cons	Not a bag → no storage, Collapses easily (magnetic dependence), Not usable on soft surfaces, No rigidity for typing, Overheating due to poor ventilation, Not travel-friendly, No tech features

#### Gap Identified:

No sleeve provides stable, multi-angle, travel-friendly workspace.

### 3.3 Portable Laptop Desks

Examples: Portronics My Buddy K2, Lapcare Foldable Desk

Price Range: ₹1,500–₹4,000

Feature	Description
Pros	Ergonomic, Stable, Cooling fans (some models)
Cons	Bulky, Not portable enough, Separate accessory

#### Gap Identified:

No integration into bags.

### 3.4 Portable Projector Stands

Price Range: ₹1,000–₹5,000

Feature	Description
Pros	Adjustable height, Stable platform
Cons	Bulky tripod, Not travel-friendly, Requires separate carrying

#### Gap Identified:

No combination with laptop bags.

### 3.5 Smart Luggage (GPS-enabled)

Example: Safari TrackR GPS Luggage

Link:

<https://safaribags.com/products/safari-trackr-gps-enabled-black-trolley-bag-with-boat-tag-tsa-lock-dual-wheels-and-wet-pouch-organized-interior>

Price Range: ₹4,000–₹8,000

Feature	Description
Pros	GPS tracking, TSA locks, Travel-ready
Cons	Not a laptop bag, No workspace, Too big for daily use

**Gap Identified:**

GPS not embedded in laptop bags.

#### 4. Market Comparison Table

Category	Example Brands	Price Range	Limitations Identified	Gap
Laptop Bags	HP, SwissGear, Arctic Hunter	₹2,000–₹6,000	Storage-only	No desk/stand
Magnetic Sleeves	Nillkin, Olleada	₹1,200–₹3,000	Unstable, no bag	No workspace; no travel usability
Portable Laptop Desks	Portronics, Lapcare	₹1,500–₹4,000	Bulky	Not integrated into bags
Projector Stands	Tarkan, Gator	₹1,000–₹5,000	Separate accessory	No integration with bags
Smart Luggage	Safari Trackr	₹4,000–₹8,000	Travel-only	No productivity features
GPS Trackers	Tracko, Qubo	₹700–₹2,000	Add-ons	Not embedded

#### 5. Market Gaps Identified

##### Gap 1: No laptop bag doubles as a workspace

No product provides a stable desk-like surface, flaps for stability, or ergonomic angles.

##### Gap 2: Travel laptop usage problems are not addressed

From the user survey:

- 51% → no stable surface
- 46.9% → unstable placement

- 51% → charging difficulty
- 16.3% → overheating

### Gap 3: GPS-integrated laptop bags do not exist

Only luggage has GPS.

### Gap 4: Smart features exist but are scattered across products

Charging, cable routing, GPS, stands all separate.

### Gap 5: No product solves soft-surface stability

Beds, airport chairs, sofas require base flaps and side stabilizers.

## 6. User Study (Detailed Analysis – n = 56)

The user study was conducted through a Google Form and received a total of 56 responses. The questions were designed to understand laptop usage habits, travel needs, challenges faced, and expectations from a smart multi-utility laptop bag.

### 6.1 Situations in Which Users Carry a Laptop

Total responses: 56

Situation	Count	Percentage
Office or work commute	19 ▾	33.9% ▾
College or school	49 ▾	87.5% ▾
Business travel	5 ▾	8.9% ▾
Freelance/creative work	16 ▾	28.6% ▾
Personal use	19 ▾	33.9% ▾

Insight:

The majority (87.5%) are students, indicating strong relevance for academic settings. 33.9% also use laptops casually, implying everyday portability needs.

### 6.2 Frequency of Carrying a Laptop Bag

Total responses: 56

Frequency	Count	Percentage
Every day	21	37.5%
A few times per week	24	42.9%

Occasionally	10	17.9%
Hardly ever	1	1.8%

Insight:

80.4% carry their laptop bags regularly, validating the need for comfort, durability, and usability.

### 6.3 What Matters Most When Choosing a Laptop Bag

Total responses: 56

Feature	Count	Percentage
Comfort and portability	40	71.4%
Design and aesthetics	17	30.4%
Durability and device protection	43	76.8%
Smart/tech features	14	25%

Insight:

Durability (76.8%) and comfort (71.4%) are top priorities, but smart features also interest a significant portion (25%).

### 6.4 Do Users Carry Laptop Bags While Travelling?

Total responses: 54

Response	Count	Percentage
Yes	47	87%
No	7	13%

Insight:

A large majority use laptops during travel, making travel-friendly features crucial.

### 6.5 Challenges Faced While Using a Laptop During Travel

Total responses: 49

Challenge	Count	Percentage
No comfortable surface	25 ▾	51% ▾
Unstable placement while working	23 ▾	46.9% ▾
Overheating	8 ▾	16.3% ▾
Charging difficulty	25 ▾	51% ▾
Network issues	1 ▾	2% ▾
No issues	1 ▾	2% ▾
Fear of laptop breaking	1 ▾	2% ▾

Insight:

The top issues (each affecting ~50%) were lack of workspace and no charging access, validating the core problem statement.

## 6.6 Usefulness of a Transforming Workspace (Desk/Stand)

Total responses: 49

Response	Count	Percentage
Extremely useful	30 ▾	61.2% ▾
Somewhat useful	13 ▾	26.5% ▾
Neutral	3 ▾	6.1% ▾
Not useful	3 ▾	6.1% ▾

Insight:

87.7% believe this feature would be useful, validating the transformable design.

## 6.7 Desired Additional Travel-Friendly Features

Total responses: 49

Feature	Count	Percentage
Adjustable stand height	32	65.3%
Cooling vents /	30	61.2%

heat-resistant base		
Foldable mini table	23	46.9%
Built-in light	22	44.9%

Insight:

Travel use requires cooling, support, and better ergonomics, which current bags do not offer.

### 6.8 Interest in Projector Stand Functionality

Total responses: 47

Response	Count	Percentage
Very likely	12	25.5%
Sometimes	15	31.9%
Rarely	18	38.3%
Never	2	4.3%

Insight:

While not essential, around 57% show interest in occasional projector usage.

(Note: Based on market gap, we removed integrated projector idea.)

### 6.9 Importance of Tech Features (GPS, Charging Port)

Total responses: 56

Response	Count	Percentage
Very important	36	64.3%
Somewhat useful	12	21.4%
Neutral	3	5.4%
Not needed	5	8.9%

Insight:

A strong 64% want GPS/charging features, which supports the smart-bag idea.

### 6.10 Interest in GPS “Find My Bag” Feature



Total responses: 56

Response	Count	Percentage
Must-have	26	46.4%
Useful for travel	22	39.3%
Not very important	8	14.3%
Not necessary	0	0%

#### 6.11 Preference for Built-In Power Bank

Total responses: 56

Response	Count	Percentage
Definitely	31	55.4%
Maybe if lightweight	22	39.3%
Only in emergencies	3	5.4%
Not needed	0	0%

#### 6.12 Preferred Battery Capacity

Total responses: 56

Capacity	Count	Percentage
5,000 mAh	10	17.9%
10,000 mAh	19	33.9%
20,000 mAh or more	18	32.1%
Not sure	9	16.1%

#### 6.13 What Would Excite Users the Most?

Total responses: 56

Feature	Count	Percentage
Multi-use transformation	39 ▾	69.6% ▾

Sleek modern design	27 ▾	48.2% ▾
Durable materials	27 ▾	48.2% ▾
Eco-friendly options	14 ▾	25% ▾

#### 6.14 Ideal Budget

Total responses: 56

Price Range	Count	Percentage
₹3,000–₹5,000	34	60.7%
₹5,000–₹8,000	19	33.9%
₹8,000–₹12,000	2	3.6%
Above ₹12,000	1	1.8%

#### 6.15 Additional Suggestions (Open-ended)

Total responses: 26

Recurring themes from qualitative responses:

- Bag must be lightweight (multiple responses)
- Waterproofing is essential
- Should not compromise basic bag design
- Detachable power bank preferred
- More padding for laptop safety
- Anti-theft lock requested
- Comfort-oriented straps
- Accessory compartments (mouse, adapters, keyboard)
- Convertible trolley system
- Solar charging (suggested by 1 user)

### 7. Consolidated User Insights

**Users want:**

- Stability on uneven surfaces
- Better charging access
- A lightweight but durable bag
- Optional GPS
- Extra protection and padding
- Modern, sleek design
- Workspace transformation

### Users do NOT want:

- Heavy bulky mechanisms
- Overly complicated features
- Non-essential electronics

## 8. Final Product Concept: Multi-Utility Laptop Bag

### Key Features

- **Transforming flap-based workspace** for quick setup and ergonomic use anywhere
- **Side stabilizer flaps** for soft surfaces
- **Power bank with USB pass-through** for seamless device charging on the go
- **Transforming flap-based workspace** for quick setup and ergonomic use anywhere for spill resistance and long-lasting durability

## 9. Materials & Construction //to be edited - over to material team

Component	Material	Reason
Outer Fabric	900D / 1680D Polyester (PU-coated)	Waterproof, durable
Inner Lining	Nylon/Microfiber	Scratch-free laptop protection
Structural Panel	5mm + 3mmEVA, PU-coated fabric,Polycarbonate sheet	Rigid desk support & heat insulation
Stabilizer Wings	Polypropylene sheet + Anti-slip rubber	Stability on soft surfaces
Handle & Straps	Nylon webbing	Load bearing
Zippers	SBS/YKK	Durability
Electronics	GPS tag compartment + USB pass-through port	Smart features

## 10. Manufacturing Cost Analysis & Pricing Strategy for the Multi-Utility Laptop Bag

### Revised Unit Cost Estimation

The following table provides a detailed, realistic breakdown of the manufacturing cost for one unit of the Multi-Utility Laptop Bag:

Cost Category	Components	Estimated Cost (₹)
<b>A. Material Costs</b>	Outer Fabric (900D/1680D Polyester, waterproof), Inner Lining (Microfiber/Nylon), EVA/PP Structural Panels, PU-coated fabric, Polycarbonate sheet, Stabilizer Flaps, Foam Padding, Zippers, Buckles, Webbing/Straps, Reflective Strip, Thread/Adhesives	<b>1500-2800</b>
<b>B. Electronics, Technical and other add-ons</b>	GPS Tracker Compartment + Basic Non-Bluetooth GPS Tag (₹1500-2500), USB Pass-through Port, a Compact Laptop PowerBank of 15000mAh(₹2000-4000), NFC Tags	<b>4500-7500`</b>
<b>C. Labor &amp; Manufacturing</b>	Cutting & Stitching, Assembly of panels/flaps, Electronics Installation, Quality Check & Finishing	<b>2300</b>
<b>D. Packaging &amp; Overheads</b>	Shipping fee	<b>1500</b>
<b>TOTAL MANUFACTURING COST (PER BAG)</b>		<b>12,500-14,500</b>

### Total Cost Summary

The final estimated manufacturing cost per bag, integrating all elements from materials to overheads, ranges from **₹2,600 to ₹2,850-Suggested Selling Price & Margin.**

**Recommended Retail Selling Price: ₹3,999 – ₹6,499**

This suggested price range is competitive for premium, functional laptop bags and allows for a sustainable profit margin.

**Pricing Flexibility Depends On:**

- Inclusion or exclusion of the Power Bank.
- Final GPS feature choice
- Choice of premium materials (e.g., 1680D fabric vs. 900D).
- Level of branding and warranty offered.
- Sales channel (Retail vs. Direct-to-Consumer).

#### **Typical Margin Expectations:**

- **Retail Margin:** 30-40%
- **Wholesale Margin:** 20-25%

#### **Overall Conclusion**

The estimated cost to manufacture the Multi-Utility Laptop Bag is **₹2,600–₹2,850**. Setting the selling price between **₹3,999 and ₹6,499** is recommended to align with the premium market segment and achieve a healthy profit margin.

### **11. Market Opportunity**

The current market provides fragmented solutions:

- Laptop bags: storage only
- Sleeves: unstable
- Portable desks: bulky
- Smart luggage: not for laptops
- GPS trackers: add-ons

No comprehensive travel workspace solutions exist.

This product uniquely integrates ALL essential features in a compact, practical way.

### **12. Conclusion**

The Multi-Utility Laptop Bag fills a major gap in the market by merging:

- Productivity
- Portability
- Structural engineering
- Smart features
- Travel convenience

User demand and market gaps strongly validate the need for this product.