

## **Innovation in the Context of a Developing Country: A Case of a Cable Car Project**

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### **Abstract**

This paper presents a case of a cable car project that was implemented in the underdeveloped economy of Nepal. The concept of the project as a whole has been taken as a contextual innovation because of its newness and uniqueness in the context of the country at the time of implementation. This study presents a detail account of the project implementation emphasizing the challenges that the parties in the project faced. It provides important insight into the project that was very successfully implemented in the harsh socio-political environment of an underdeveloped economy. Qualitative approach was used for the research in which the main instrument for collecting primary data was face-to-face semi-structured interviews with the key people involved in the project. The findings have been presented in terms of the categories of challenges as the initial perceived constraints, management level challenges, and project level challenges.

### **Keywords**

Innovation, Cable car project, Project implementation challenges, Underdeveloped economy, Nepal.

### **1. Background**

Nepalese society is predominantly a traditionalistic society. The festivals, ceremonies, rites and rituals in the society as well as in the family are basically rooted in religious and mythological beliefs. All the traditional landmarks, in urban as well as in rural areas, are signified with the religious features such as temples and statues of various deities. Some of the very important religious destinations – such as holy confluences, lakes, caves, and summits – which are believed to be the abodes and birth places of deities, places of awakening, and burial grounds of the relics of holy beings are taken as sacred places for pilgrimage (Allen, 1993). Such pilgrimage destinations are normally located at difficult places which are arduous to reach but the vibes and aura of the locations are considered spiritually fulfilling (Messerschmidt, 1992).

“Manakamana Temple” is one of such pilgrimage destinations located in Gorkha District of Nepal. The temple lies at a summit of a mid hill range of Nepal at the altitude of about 1300 meters above the mean sea level. The existence of the temple has been traced back to the seventeenth century and presently it stands as a traditional edifice of a four-storied two-tiered medium size pagoda with the Goddess Manakamana’s ancient statue inside.

The nearest road end to the temple is about 100 km west from Kathmandu, the capital of the country. Before 1967, people had to walk along the hilly terrain to reach the summit of Manakamana. It used to take about a 10-12 day trek from Kathmandu. After 1967, when some major national highways were

built, the trekking distance reduced to 6 hours from the nearest road head of Abu Khaireni at Mugling-Gorkha Highway.

## **2. The Innovation**

Although the trekking distance was reduced to 6 hours, the route to the temple is still quite difficult – especially for the infirmities and physically challenged devotees – as it goes through several steep hill slopes. People have to stay overnight at the temple site and come down the other day to the road head. Despite the hardship, a huge number of people take their vow and flock at the summit to seek the blessings of the Goddess. It was estimated that about 207,000 people visited the temple in 1988 and it was predicted that the number of visitors would increase steadily (A Ministry of Works and Transport, HMG/N study as cited by Shimkhada and Upadhaya (2004)). In 1999 it was estimated that about 500,000 people visited the temple (Bleie, 2003). The public sentiment of the religious and mythological beliefs might have created so much flux of pilgrims at the temple. Besides the pure pilgrimage, there could be attraction for the pleasure seeking trekkers who would visit the scenic route to the temple.

Aiming at the mass of domestic pilgrim tourists for their comfortable journey, in early nineties the then His Majesty's Government of Nepal (HMG/N) initiated the concept of a modern transportation technology – a passenger cable car system – from a nearest highway link to the temple summit. The concept was later translated into a concrete project by a Nepalese private entrepreneur in 1996. The project was successfully implemented by the entrepreneur within a couple of years, and the cable car system was put into operation from 1998.

The passenger cable car is the first and so far the only one of its kind of transportation system in Nepal (Spotlight, 2002; Newar, 2005). Although the first cable supported transportation system, generally known as ropeway was started in 1924 and then after numerous other systems were installed, all of them were used to transport the materials in villages, construction sites and in local industries, and most of them were not in operational condition due to lack of repair and maintenance (Gyawali and Dixit, 2004). There was no state-of-the-art passenger carrying cable car system in Nepal before 1998 (Shrestha, 2004). As such the success of the project was an outstanding breakthrough in the concept of the mode of passenger transportation in the general Nepalese context. Therefore in this research, the first Nepalese passenger cable car project is taken as an important concept innovation for a case study.

## **3. The Cable Car Project**

The project was named as “Manakamana Cable Car Project”. The project includes the main cable car system supported by the entire infrastructure required for the general public service. The bottom station of the cable car is its main entry station which lies at the bank of Trishuli River besides the Prithvi Highway at Kurintar area of Darechaur Village Development Committee (VDC) in Chitawon District. The altitude of the bottom station is 258 meters above the mean sea level. From the bottom station the cable car runs across the Trishuli River, then up above the hill slopes to the top station near the Manakamana Temple. The altitude of the top station is 1302 meters above the mean sea level. The top station is located at a few minutes walking distance from the Manakamana Temple which lies at the Manakamana VDC in Gorkha District (Trishuli River divides the Chitawon and Gorkha Districts of Nepal).

The cable car system is fully equipped with the Austrian technology which was delivered by Doppelmayr, an Austrian cable car system manufacturer and supplier company. The system includes thirty-six six-person passenger gondolas and three freight carriers as the main conveyor boxes. The system is detachable monocable system supported by 20 intermediate towers between the bottom and top stations. The inclined length between the bottom and top stations is 3.02 km, horizontal length 2.78 km, and the vertical rise is 1034 meters. The average gradient of the rise is 37.26%. The speed on line is maximum 6

m/s and the one way trip time is 8.40 minutes with the maximum speed. The trip time varies from 8.40 to 15.00 minutes on different operational speeds. The hourly service capacity of the system is 600 persons.

The cable car system is supported with the safety measures such as centrally controlled sensors at each tower, automatic back-up generator that operates itself after 4-5 seconds of the power failure, hydraulic emergency drive in case of the generator failure, and a fully trained manual rescue team.

The total site area of the project including the land covered by the bottom and top stations and the towers was about 94,000 square meters. The total built-up area was about 7,200 square meters.

The total capital investment in the project was NRs. 430 million.

#### **4. The Project Team**

There were four main parties involved in the construction of the project – (a) Chitawon Construction and Engineering Company Private Limited, (b) ENGAR Consult, (c) Doppelmayr, and (d) Himal Hydro and General Construction Limited.

Chitawon Construction and Engineering Company Private Limited, known as Chitawon Co-E Nepal Private Limited was the main party which took the initiative and successfully implemented the Manakamana Cable Car Project. Founded in 1966, the company was basically one of the large and established local contractors in Nepal. The company also had five subsidiary groups of enterprises. The Manakamana Darshan Private Limited (MDPL) was one of the subsidiaries which was established in 1996 for the project. The Chitawon Co-E launched the MDPL as the developer of the Manakamana project. At the same time, utilizing its core competency, Chitawon Co-E also took the responsibility of the main contractor of the project.

Chitawon Co-E appointed ENGAR Consult as the architectural and engineering consultant for planning, designing, detailing, quantity survey and construction supervision of all the buildings and ancillaries of the project. The ENGAR Consult, which was established in 1990, was a small local consultant specialized in building works.

Doppelmayr was the manufacturer, supplier and consultant of the cable car system in the project. It was a leading multinational cable car manufacturer and supplier company domiciled in Austria. It had an extensive experience in the cable system all over the world.

The Chitawon Co-E appointed Himal Hydro and General Construction Limited as its sub-contractor for the civil works in the tower erection, and cable stringing and tensioning. Himal Hydro is a Nepalese public limited construction company established in 1978. It is an A-class contractor with about 26 years of track record especially in hydropower, tunneling, water & waste water, and electrical transmission line projects in Nepal.

#### **5. Challenges in the Project**

##### **5.1. Initial Perceived Constraints**

Chitawon Co-E was the party which undertook the initiative and responsibility of the actual implementation of the concept. The company played the role of both the developer (client) and the main contractor of the project. As such the company had to bear the potential constraints pertaining to both the roles. The constraints can broadly be explained in terms of the local socio-political, national political and financial aspects.

*Local Socio-political Aspects:* Generally, a major infrastructure project is perceived to have a strong potential in changing the otherwise stagnated local socio-economic set-up of the rural areas in Nepal. As such the information about the upcoming project affects the aspirations of local people and thus the project issue might become politically quite sensitive.

In the Manakamana Temple area, the cable car project could change the route of the pilgrims from the old trekking route to the new alignment of the cable car. The project could also change the pilgrims' need of staying overnight at the temple summit because the cable car reduces the travel time drastically. This might affect the lucrative hotel and restaurant business of the local people along the old route and at the temple summit. The change in route might also affect the land value at the cable car area. In such situation, the interests and aspirations of the local elites and political groups could get affected and if they feel any adversity, they could create obstructions for the project. In order to tackle with this potential local socio-political constraint, Chitawon Co-E kept the information about the project confidential till it completed the land acquisition process after receiving the license for the project.

*National Political Aspects:* There were two major national political constraints that could potentially disturb the project. First was the Maoist rebels and the second was the fluid political situation in the central government.

From 1996 the Maoists started their violent movement to change the political set-up of the country. Gorkha District is one of the Maoist affected districts and therefore the Communist rebels could forcibly stop the project if it affected their strategic interest in the area.

After restoration of democracy in 1990, the central government have been quite unstable due to the infightings in and among the political parties. It is a fact in the Nepalese context that any major project in the country attracts the political attention even at the national level. The project therefore had to take care of the political interests for its successful implementation.

Chitawon Co-E had to deal with both the Maoists and the central government problems as the potential national political constraints for the project.

*Financial Aspects:* Financing a relatively large scale infrastructure project in the country could be a major potential constraint for a local entrepreneur. It is natural that the private entrepreneurs would not prefer to bear all the financial needs and risks unilaterally. They would normally prefer sharing the financial needs and returns with the financial institutions. Such institutions, however, stringently evaluate the risk factors before committing a major project investment in the Nepalese context. Chitawon Co-E had to do an extensive exercise in selecting and convincing the local lenders. There were considerable risks in the project in the uncertain political setting of the country. On top of that, the project was first of its kind in the country and there was no prior track record of similar project in the country. However, with the promising feasibility study and with the company's reliable track record, Chitawon Co-E was eventually successful in acquiring consortium loan from the four major lenders in the country.

## **5.2. Management Level Challenges**

Hurdles in Custom Clearance: It was relatively easier for Chitawon Co-E to receive the project license from the government. There was a clear government priority in encouraging the private sector in the project. However, the government did not have clear policy regarding the cable car or ropeway industry. The implication was that Chitawon Co-E had to face problems in clearing the custom of the imported cable car system components from Doppelmayr. As it was an entirely new set of imported goods, the government did not have clear duty demarcation. It was even difficult to distinguish whether the cable car industry was duty-privileged or not. As a private sector it was natural that Chitawon Co-E tried for

concession in the duty claiming that the cable car was an innovative concept in Nepal, it would promote tourism development in the country and the system was environment friendly.

Because of the lack of clear regulatory framework, the cable car system components were got stuck at Birgunj Custom point – one of the entry points into Nepal at the border with India. It took time to furnish decision on the newly imported goods by the officials at the Ministry of Finance. Chitawon Co-E vigorously lobbied for the custom clearance with the claim of the duty concession. With much effort, the entire process took about four month to get the clearance. However, the government did not categorize the cable car system components as the duty-privileged import.

The custom clearance process delayed the project for about four months. Doppelmayr sent its technical team at the project site after getting the information that the shipment had reached at the custom point. Due to the clearance delay the technicians had to stay idle for about three months because of which they were annoyed and they were about to leave the project taking other assignment from their head office. Chitawon Co-E had to persuade them showing the cause that was beyond the company's capacity to be solved. The company had to pay the technical team despite they stayed idle for about three months.

Interests and aspirations of the Local People: Chitawon Co-E had to deal with the interests and aspirations of the local people both at the construction and operational stage. During the construction stage the issue of land acquisition was directly related to the interests of the local people. Although almost all the land were purchased without disclosing the purpose, the local people later knew about the project while the land plots for the towers were to be acquired. Chitawon Co-E had to pay more to the private owners for the land plots. For the community forest land, the company had to pay NRs. 6000 per month. The company also had to compensate for the trees felled during construction and installation of the towers. About 30,000 tree saplings were also planted around the project site.

At the operational stage, the challenges that cropped-up due to clash of interest with the local people were more intense. The conflict in the economic interests – especially with the hotel and restaurant business people along the old trekking route and at the temple summit – created skepticism and displeasure among the local people. They raised the issues of the pilgrims' staying time at the temple area, local VDC revenue from the project, and special concession in the cable car ticket rates for the local people.

The local people demanded that the ticket should be issued with a condition that the passenger should stay overnight at the temple area. But it was not practical. Later after some negotiation, local people agreed with an arrangement of closing the operation after 5PM, which gave them hope that passengers who would board the cable car at around 5PM would stay overnight. The provision of closing the operation during one and half hour lunch break was also kept into practice so that the local hoteliers could serve their pilgrim guests during the break. Cable car tickets were also made valid for one week return time so that the pilgrims can stay overnight at the temple summit if they wish to.

As a source of local VDC revenue, a provision was made such that 2% VDC tax would be levied in each passenger ticket. MDPL on behalf of Chitawon Co-E made agreement for five years with the two VDCs (Manakamana VDC at Gorkha side and Darechaur VDC at Chitawon side) to donate a sum of NRs. 500,000 per VDC per year for local development. This agreement was not compulsive after five years but it is likely that the amount would rather increase. Besides these, for the welfare of the local villagers a master-plan was also developed that would promote local community development activities such as chicken farming, goat farming, flower farming, and souvenir industries.

As the local people expected special concession for the cable car ticket, MDPL provided privilege cards to them with which they could get 80% discount in the round trip ticket. In August 2001, there was a fierce dispute between the MDPL and local VDC officials over the authority of distributing the privilege card and the use of the donation amount. The cable car operation was disrupted for a few days because the

VDC people vandalized the cable car office demanding the authority and other favors from the company. The dispute was settled after both the parties signed a negotiation paper in the presence of the Gorkha Chief District Officer.

Maoist rebels also tried to disrupt the cable car operation in June/July 2004. They bombed one of the towers because according to them the cable car company helped the Government in transporting the security personnel and moreover the company did not pay the extortion money that they demanded. The bomb however did not damage the tower structure. The service was resumed within a week.

### **5.3. Project Level Challenges**

Land Preparation Works: The acquired land for the bottom station was very rough and steep and on such land it was very challenging to erect the project structures. Massive earth works mainly in fillings were required for the land preparations. A huge amount of soil had to be hauled from a nearby site for the filling purpose.

At the same time, substantial slope stabilization works such as soil treatment, vegetation and gabion wall (about 900m long) erection along the boundary of bottom station land and the Trishuli River bank, had to be done to prepare the land for construction.

Nearly NRs. 100 million (25% of the total project cost) was spent only for the land preparation and site development works.

Material Transportation at the Project Site: Construction material transportation at the project site was quite challenging for both Chitawon Co-E and Himal Hydro. It was especially challenging for the towers and for the top station because there was no vehicle road across the Trishuli River, and the terrain was steep and rugged.

The challenge at the site was crossing the Trishuli River for the site movements from Prithvi Highway side. Initially a local suspended cable system was used for hauling the materials. Later a new suspended cable system was built across the river.

Labors and mules were used to transport the materials. For the bottom station and for the nearby towers, the materials were transported from the side of Prithvi Highway; whereas for the top station and for the nearby towers, the materials were transported from the side of Abu Khaireni.

Tower Erection: Fixing a straight line route alignment with 1mm in 3km accuracy from bottom to top station points was technically quite challenging. The longitudinal profile of the alignment was notoriously rugged with several physical and visual obstructions.

Assembling and erecting the towers at the steep hill slopes was also a challenging task. The towers were not designed to be erected in the plumb line. Some of them had to be erected at 40 degree angle with the ground.

Another challenge was the transportation of the massive tower components which were fabricated at a temporary workshop located at a few kilometers away from the project site. Himal Hydro used labors, mules, and helicopter for transportation and placement of the tower components. Air lifting and placing the heavy tower components were particularly challenging.

Nuts and Bolts Delay: The steel components of tower were manufactured by a sister organization of Himal Hydro. The steel was imported from Norway and assembled partly in Butwal – a town at the southern belt of Nepal – and partly at the temporary workshop near the project site. The sister

organization had a problem in getting the specific nuts and bolts for the towers from an Indian company at Ludhiana. The Indian company did not consider the order seriously and delayed the shipment as it was less in quantity and it had to be specifically imported from Norway. Himal Hydro had to closely work with the ordering process and its Project Manager along with the Managing Director of MDPL had to go to Ludhiana to get the shipment. The difficulty in nuts and bolts shipment had actually delayed the work for about two months.

## **6. Success of the Innovative the Project**

The first passenger cable car project was one of the most successful private undertakings in Nepal. Chitawon Co-E initiated the work on the project in 1996, started the construction in January 1998 and inaugurated the operation in November 1998. The company was successful in tackling the local socio-political hurdles in the construction as well as in operation stages. Despite the gloomy national political situation, it successfully secured the loan from the leading banks and financial institutions of the country. The company also had to manage all the management and project level challenges. Despite all the hurdles, the construction was completed within eleven months and since November 1998 the project is in operation with consistent public demand. By the end of the seventh year of operation, i.e. at the end of 2005, the MDPL had cleared the entire outstanding loans.

At the corporate side, Chitawon Co-E was successful in establishing the MDPL as its new portfolio in the cable car transportation service business. The company bagged several national and international awards for the outstanding performance in the project.

At the social front, the cable car has become a popular means to visit the Manakamana Temple for both the pilgrims and pleasure seekers. By the end of 2005, about 2.5 million visitors had used the cable car service. The average number of visitors was about 356,000 per year.

Even with all the success, there were rooms for improvement in the project. The cost of the project could be controlled to some extent. The land development cost which amounted to 25% of the total cost was remarkably high. The ticket price is much higher than the lower and lower middle class people in the country could afford. The project showed that cable car is technically feasible transportation system in country. However, cost-wise it is questionable because the ticket price is at least thirty times more expensive than the road transportation to cover the 3km distance.

At the cultural side, there was an argument that the comfortable mechanical transportation system could devalue the core essence of pure pilgrimage. The traditionalists argue that the sacred place should be isolated from the modernism if the value of such place is to be sustained.

At the socio-economic side, the livelihood of the local hotel and restaurant businesspeople along the old trekking route was adversely affected by the new route of the cable car. Although the project has created more economic activity at the temple summit, the grievances of the adversely affected people will persist till they are settled and accommodated in the changed economic environment around the project area.

At the environmental side, local people expressed their concern that a government approved levelling work done by Chitawon Co-E at the summit disturbed the natural drainage system. It created flooding at the temple area during monsoon which damaged the stone foundation of the temple.

At the political side, local people complained that the government issued the license to an outsider private company without consulting the relevant stakeholders on the entry/exit points at the top and bottom stations and at the route of the cable car. They opined that the decision on the project permission was not democratic. However Chitawon Co-E had totally different view point on this issue. If the information of

the project were disclosed beforehand, the socio-political complications would have been unbearable to initiate the project.

With all these odds, the project can be taken a successful and outstanding concept innovation in the passenger transportation system in Nepal.

## 7. References

- Allen, M. R. (1993). Procession and Pilgrimage in Newar Religion, In *Change and Continuity in the Nepalese Culture of Kathmandu Valley*, Lienhard, S. (Ed.), CESMO (Centro Studi del Medio ed Estremo Oriente), Turin, Italy.
- Bleie, T. (2003). Pilgrim Tourism in the Central Himalayas: The Case of Manakamana Temple in Gorkha, Nepal. *Mountain Research and Development*, 23 (2), 177-184.
- Gyawali, D. and Dixit, A., (2004). Gaun-Besi Ropeways: An Alternative Future?, In *Ropeways in Nepal*, Gyawali, D., Dixit, A., and Upadhya, M. (Ed.), pp. 215-250, NWCF (Nepal Water Conservation Foundation) and KEVA (Kathmandu Electric Vehicle Alliance), Kathmandu, Nepal.
- Messerschmidt, D. A. (1992). *Muktinath: Himalayan Pilgrimage, A Cultural and Historical Guide*, Sahayogi Press, Kathmandu, Nepal.
- Newar, N. (2005). Gloom and Doom on the Highways: The Conflict Turns Popular Highway Stops into Ghost Towns. *Nepali Times Weekly*, January, Issue 231, Kathmandu.
- Shimkhada, U. and Upadhya, D. (2004). The Study of Ropeways: A Review of Past Efforts, In *Ropeways in Nepal*, Gyawali, D., Dixit, A., and Upadhya, M. (Ed.), pp. 33-53, NWCF (Nepal Water Conservation Foundation) and KEVA (Kathmandu Electric Vehicle Alliance), Kathmandu, Nepal.
- Shrestha, R. B. (2004). Manakamana Cable Car: Path Breaking Step in Promoting Domestic Tourism, In *Ropeways in Nepal*, Gyawali, D., Dixit, A., and Upadhya, M. (Ed.), pp. 175-183, NWCF (Nepal Water Conservation Foundation) and KEVA (Kathmandu Electric Vehicle Alliance), Kathmandu, Nepal.
- Spotlight (2002). Manakamana Cable Car: Success Story. *SPOTLIGHT Weekly*, 21 (30), Kathmandu.