



Government of
The Republic
of Vanuatu



Telecommunication &
Radiocommunication
Regulator

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ORDER No. 4 of 2012

Designation Order – Dominance Review

Digicel (Vanuatu) Ltd

Purpose:

Review of the interim Telecommunications Regulator's 2009 Designation Order made on 18 June 2009 under clause 10.1 and 10.2 of Digicel (Vanuatu) Limited Telecommunications Licence ("the Licence").

Whereas:

Pursuant to clause 10.1 and 10.2 of Digicel's telecommunications licence ("Licence"), the Telecommunications and Radiocommunications Regulator ("the Regulator") issued an Order on 18 June 2009 declaring Digicel being dominant in the market for retail mobile services and the wholesale market for termination of calls on Digicel's network;

On 8 April 2011, Digicel further request the Regulator to review its designation Order made on 18 June 2009, in particular whether Digicel enjoys a position of economic strength or controls an essential facility affording it the power to behave to an appreciable extent independently of its competitors or customers in the market for retail mobile and the wholesale market for termination of calls on Digicel's network in Vanuatu.

Reasons and Findings:

The Regulator conducted a thorough study to review Digicel's request made on 8 April 2011. Attached to this Order is Schedule 1 outlining the approach and reasons relied upon by the Regulator to support its findings.

Designation Order

1. The Regulator hereby designated Digicel dominant pursuant to clause 10.3 of the Licence. Digicel enjoys a position of economic strength or controls an essential facility affording it the power to behave to an appreciable extent independently of competitors or customers on both markets for retail mobile services and the wholesale market for termination of calls on Digicel's network in Vanuatu.
2. The designation made under clause 10.1 and 10.2 of Digicel's Licence on 18 June 2009 still in effect until revoked by the Regulator.

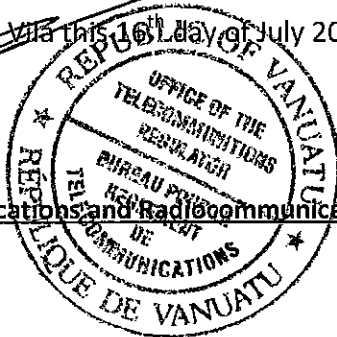
Commencement

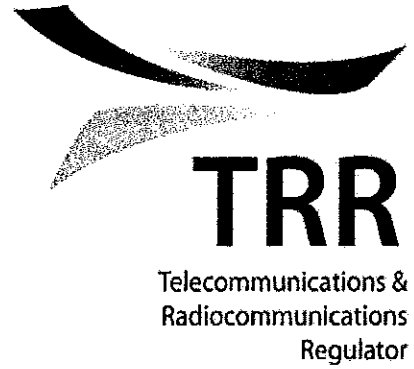
This Order shall come into force on the date it is made, and shall continue in effect until revoked by the Regulator.

Made at Port Vila this 16th day of July 2012.


Alan Horne

Telecommunications and Radiocommunications Regulator





SCHEDULE 1

REVIEW OF THE REGULATOR'S 2009 DOMINANCE DETERMINATIONS UNDER DIGICEL'S LICENCE

[16 July 2012]

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1. INTRODUCTION

- a) On June 18, 2009, the Interim Telecommunications Regulator designated Digicel Vanuatu Limited ("Digicel") a dominant service provider, pursuant to Clause 10.1 of Digicel's licence, in the markets for: (1) retail mobile services and (2) wholesale call termination on Digicel's network ("2009 Designation Order"). See appendix 2.
- b) Clause 10.1 of Digicel's licence requires the Regulator to designate Digicel as dominant in a particular market for the purpose of the Digicel licence if Digicel has 40% or more of gross revenues in that market. The 2009 Designation Order was based on the Regulator's finding that this gross revenues test was satisfied for each of the above markets.
- c) In a letter dated 8 April 2011, Digicel requested that the Telecommunication and Radiocommunication Regulator (TRR) review Digicel's 2009 Designation Order under Clause 10.3 of Digicel's licence. Clause 10.3 provides that Digicel may request a review by the Regulator of a prior determination that Digicel is dominant under Clause 10.1 in a particular market. If the Regulator determines that Digicel does not enjoy a position of economic strength, or control an essential facility, so as to afford it the power to behave to an appreciable extent independently of competitors or customers in that particular market, then Digicel shall not be dominant in that market.
- d) For the reasons set out in the remainder of this Draft Determination, the Regulator finds that, in each of the above markets, Digicel does enjoy a position of economic strength, or control an essential facility, so as to afford it the power to behave to an appreciable extent independently of competitors or customers within the meaning of Clause 10.3, in relation to the retail mobile services market and the wholesale termination market. Accordingly, the prior dominance determination under Clause 10.1 of Digicel's licence remains in effect unless revoked.
- e) In its letter of 8 April 2011, Digicel also requested the Regulator to apply the test in Clause 10.3 of the licence to Digicel's position in a further market that includes services provided by Digicel using fixed terminal equipment. However, these services are not "mobile" services within the prior dominance declarations for Digicel. One reason for this is that they do not deliver the mobility functionality of a "mobile" service. A market

including these services also would need to consider fixed retail services provided by Vanuatu Telecom Limited ("TVL"). Accordingly, since the Regulator has not made a prior determination under Clause 10.1 of the licence that Digicel is dominant in this further market, Clause 10.3 does not apply to this market.

- f) The same conclusion, namely that Clause 10.3 only applies to a prior designation of Digicel's dominance under Clause 10.1 of its licence in a particular market, was also reached by the prior Regulator in the 2009 Designation Order. This conclusion also follows from the language of Clause 10.3, as referred to above. No judicial review or internal review was sought of this decision under the Telecommunications and Radiocommunications Regulation Act No. 30 of 2009 (TRRA).
- g) For the above reasons, the Regulator makes no review determination under Clause 10.3 in relation to this fixed market.

2. RELEVANT PRODUCT MARKETS

Digicel did not ask TRR to review the definition of the two product markets, the subject of the 2009 Designation Order, and Clause 10.3 does not refer to such a review. This review accordingly does not review or revise those product market definitions.

2.1 FIRST PRODUCT MARKET: RETAIL MOBILE SERVICES IN VANUATU

Annex 1 of the 2009 Designation Order indicates that the:

- a). Market for retail mobile services includes the following services:
 - i. Calling to other customers on the same mobile network
 - ii. Calling from a mobile network to customers in another network in Vanuatu
 - iii. Calling from a mobile network to international destinations
 - iv. Calling from a mobile network to voicemail for message deposit or retrieval
 - v. SMS messages

- vi. The services above provided for both residential and business customers
- vii. Both prepaid and post-paid services.

b). Geographic scope of the market is the national territory of Vanuatu.

3. RETAIL MOBILE SERVICES MARKET: ASSESSMENT UNDER CLAUSE 10.3 OF DIGICEL LICENCE

- a) Clause 10.3 of the licence provides for the Regulator, on review of a prior dominance determination under Clause 10.1 of the licence, to determine whether Digicel “enjoys a position of economic strength or controls an essential facility affording it the power to behave to an appreciable extent independently of competitors or customers on that market.”¹
- b) The terms in Clause 10.3 “affording it a power to behave to an appreciable extent independently of competitors or customers in that market” require an assessment of what Digicel is able to do, and accordingly are not limited to an assessment of what Digicel currently is doing, or has done in the past. The term “appreciable” indicates a level that may be noticeable or considered important.
- c) It is illustrative to consider what the European Commission guidelines say about the assessment of appreciable or significant market power by National Regulatory Authorities (NRAs):

“The existence of high market shares simple means that the operator concerned might be in a dominant position. Therefore, NRAs should undertake a thorough and overall analysis of the economic characteristics of the relevant market before coming to the conclusion as to the existence of significant market power. In that regard, the following criteria can also be used to measure the power of an undertaking to behave to an appreciable extent independently of its competitors, customers and consumers. These criteria include among others:

¹ Government of the Republic of Vanuatu. “Telecommunications Licence Digicel (Vanuatu) Limited.” 14 March 2008. ¶ 10.3.

- Overall size of the undertaking
- Control of infrastructure not easily duplicated
- Technological advantage or superiority
- Absence of or low countervailing buying power
- Easy or privileged access to capital markets/financial resources
- Product/services diversification (e.g. bundled products or services)
- Economies of scale
- Economies of scope
- Vertical integration
- A highly developed distribution and sales network
- Absence of potential competition
- Barriers to expansion.

A dominant position can derive from a combination of the above criteria, which taken separately may not necessarily be determinative.”²

a) The concept of being able to act (to some extent) independently of competitors or consumers is referred in competition or antitrust analysis as market power or significant market power. A technical definition is that market power “is the power to raise prices above competitive levels without losing so many sales that the price increase is unprofitable.”³

b) The above definition is misleadingly simple and difficult to implement. More often the assessment of market power is based on a combination of the criteria set forth above. That is the approach we followed.

² Commission guidelines on market analysis and the assessment of significant market power under the Community regulatory framework for electronic communications networks and services.” Official Journal of the European Communities. 7 November 2002 | C 165 | 16, Paragraph 78-9.

³ Herbert Hovenkamp. Federal Antitrust Policy. The Law of Competition and Its Practice. Fourth Edition. West 2011 (page 88).

3.1 DIGICEL HAS A POSITION OF ECONOMIC STRENGTH WITHIN CLAUSE 10.3

- a) Economic analysis of market power typically includes consideration of market share, financial position or resources, market structure, and barriers to entry, and (in network industries), network coverage compared to that of competitors. These matters relate generally to an operator's "economic strength." Accordingly, in assessing whether Digicel enjoys a position of "economic strength" within Clause 10.3 of its licence, the available data concerning the above indicators has been considered.
- b) The extent of Digicel's network coverage supports a conclusion that it enjoys a position of economic strength. Digicel owns and operates a wireless radio telecommunications network with a national footprint covering approximately 90 percent of the population. As Table 1 shows, Digicel's number of cellular base stations (cell sites) and radio network coverage has been growing in the period 2008-2011 and apparently exceeds that of TVL.

Table 1. Digicel and TVL Wireless Radio Network coverage

| Year end | Population Covered (%) | | No. of Base Stations (Cell Sites) | |
|----------|------------------------|------|-----------------------------------|------|
| | Digicel | TVL | Digicel | TVL |
| 2008 | ████ | ████ | ████ | ████ |
| 2009 | ████ | ████ | ████ | ████ |
| 2010 | ██████████ | ████ | ████ | ████ |
| 2011 | ██████████ | ████ | ████ | ████ |

n.a. = data not available.

Source: National Statistics Report 2009 and TRR

- c) Digicel position of economic strength is also evident if we consider that its revenue from retail mobile services amounted to ██████ Vatu during 2011. This signified a market share of approximately 57 percent for 2011. Although minor quarterly fluctuations in Digicel's market share were observed during 2011, the small magnitude of these fluctuations suggests that Digicel's position of economic strength is unchallenged by its only rival, TVL (see Table 2).

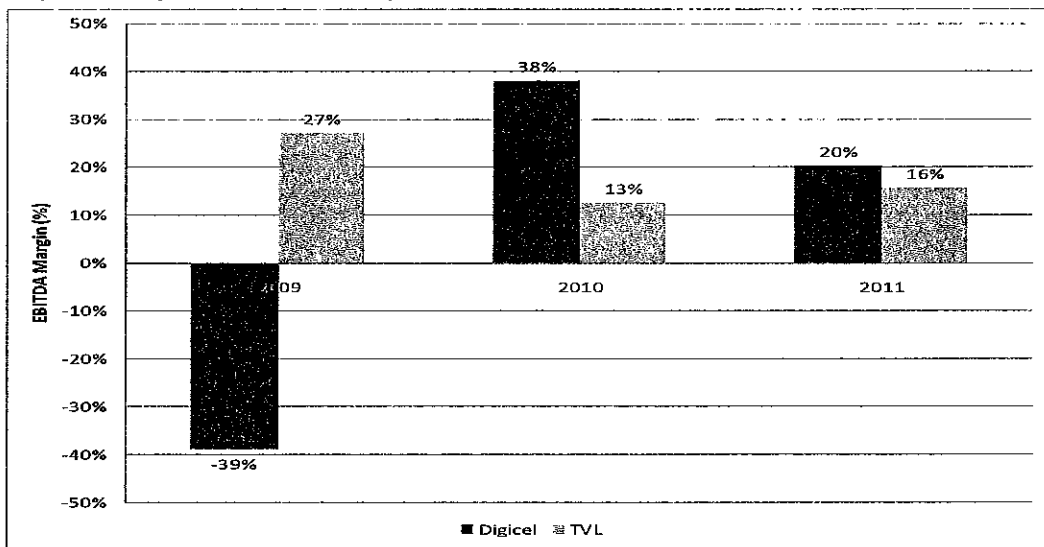
Table 2. Revenue and market share in retail mobile services

| | QI 2011 | QII 2011 | QIII 2011 | QIV 2011 |
|--|---------|----------|-----------|----------|
| | | | | |
| | | | | |
| | | | | |
| | | | | |

Note: Revenue in Vatu. Source: Telecom Vanuatu Limited and Digicel Vanuatu Limited.

- d) Data received from TVL and Digicel on the number of active subscribers also supports the conclusion that Digicel holds a position of economic strength. Although TVL and Digicel do not define active subscribers in the same way, the information supplied nevertheless suggest that Digicel has a market share in excess of 60 percent based on subscriber data for 2011.
- e) Digicel also enjoys a strong financial position. A common measure of a firm's financial strength is profitability as reflected by its EBITDA margin, which is the ratio of earnings before interest, taxes, depreciation, and amortization (EBITDA) to total revenue. In its public accounts for the year ending March 2011, Digicel recorded an EBITDA of 3.83 Million American Dollars representing an EBITDA margin of 20 percent. This shows a significant improvement from its financial position in the year ending March 2009 in which it showed a loss (See Figure 1). However, this is not unusual as that was its first year of operations in which it made substantial investments in Vanuatu. Overall, the above indicators support a conclusion that currently Digicel enjoys a position of economic strength.

Figure 1. Digicel's EBITDA margin 2008-2011



Source: Digicel Vanuatu Limited and Telecom Vanuatu Limited. Financial statements for years ending March 31, 2009, 2010, and 2011.

f) Taking into account the combined effects of Digicel's large market share (whether defined in terms of gross revenues or active subscribers), its large radio network covering approximately 90 percent of the population; the relative stability of its large market share, and the improved financial position of the firm since 2009 we conclude that Digicel enjoys a position of economic strength in this market.

g) Since the "economic strength" test in Clause 10.3 is satisfied, we turn now to the question of whether this allows Digicel the ability to "behave to an appreciable extent independently of competitors or customers in that market."

3.2 DIGICEL HAS THE ABILITY TO BEHAVE TO AN APPRECIABLE DEGREE INDEPENDENT OF COMPETITORS OR CUSTOMERS

- a) A firm's ability to behave to an appreciable degree independent of competitors or customers is what is referred by economists as the ability to exercise market power. A firm with market power has the ability to profitably raise prices above the competitive level for a sustained period of time without incurring a significant loss of sales or revenues.⁴
- b) We are not required to assess whether Digicel prices have been or are currently above the competitive price level. Rather we need to determine whether given Digicel's current position of economic strength gives it the ability to raise prices above the competitive level for a sustained period of time without incurring a significant loss of sales or revenue.
- c) The combination of high market concentration and high barriers to entry in the market for retail mobile services gives Digicel the ability to exercise an appreciable degree of market power. The Herfindahl-Hirschman Index (HHI), a common measure of market concentration, stood slightly above 5,200 in the last quarter of 2011, which indicates a very high market concentration.⁵ For comparative purposes, the U.S. Department of Justice and the U.S. Federal Trade Commission consider an HHI above 2,500 to indicate a high market concentration, which would trigger close antitrust scrutiny of proposed mergers.⁶ Similarly, the Australian Competition & Consumer Commission considers an HHI above 2,000 to raise concerns on proposed mergers.⁷ Although market concentration is not the same as market power, it is used as a surrogate for market power in industries with high barriers to entry. Thus, the high concentration in the market creates a presumption of significant market power. Analysis of other relevant factors provides further support for a conclusion that Digicel is able to exercise an appreciable degree of power in this market.
- d) The existence of high barriers to entry in the market for retail mobile services along with Digicel's large market share and the duopoly structure of this market, allows Digicel the

⁴ See for example, George Hay, 1992. "Market Power in Antitrust." *Antitrust Law Journal*, Vol. 60, 807-827 (page 814). See also Commission guidelines on market analysis and the assessment of significant market power under the Community regulatory framework for electronic communications networks and services." *Official Journal of the European Communities*. 7 November 2002 [C 165]15, Paragraph 73.

⁵ The Herfindahl-Hirschman Index (HHI) of market concentration is computed by adding the squares of the individual firms' market shares in the relevant market. The range of this index goes from zero (for atomistic markets) to 10,000 (monopoly). The estimated HHI of 5,200 for the retail mobile service market in Vanuatu was based on revenue.

⁶ U.S. Department of Justice and the Federal Trade Commission. "Horizontal Merger Guidelines". August 19, 2010. <http://www.ftc.gov/os/2010/08/100819hmg.pdf>

⁷ Australian Competition & Consumer Commission. Nov. 2008. Merger Guidelines (para. 7.14).

ability to exercise an appreciable degree of market power without risking being undercut by its only rival or by a new entrant for a significant period of time.

e) Barriers to entry refer to anything that puts potential entrants at a disadvantage relative to the incumbent firms. We have identified the following important barriers to entry.

- i. First, wireless communications technology exhibit economies of scale and economies of scope implying that firms with large networks such as Digicel enjoy a cost advantage vis-à-vis new entrants which by definitions would have a much smaller network. Faced with a cost disadvantage, would-be entrants may decide not to enter. Similarly, the existence of economies of scope in joint production implies that firms like Digicel offering multiple services would realize lower unit cost of production for each service. Again, this cost advantage over a new entrant raises significant barriers to entry and enhances the ability of Digicel to exercise market power.
- ii. Second, the establishment of a new mobile service provider requires substantial sunk costs such as advertisement and marketing to build a brand name in Vanuatu even before the launch of service. These costs are to a large extent sunk because they are not recoverable if the firm decides to exit shortly after it entered. Similarly the costs of tendering for an obtaining an additional licence, assuming one is available, are largely sunk and represent further barriers to entry that limits contestability and indicates that the existing firms (i.e., Digicel) will enjoy the ability to price above the competitive level without the risk of attracting entry in the short term.⁸ This again, enhances Digicel's ability to behave to an appreciable extent independent of competitors or customers.
- iii. Third, wireless telecommunications services are capital intensive requiring large capital investment and a non-trivial period for network roll-out before service providers can recoup their investment—all of which retards or discourages the entry of competitors. Even if would-be entrants possess the required capital, customer acquisition costs and the prospect of competing with a firm such as Digicel with a network reaching more than 90 percent of the population would

⁸ For an explanation of the theory of contestable markets see Kip Viscusi, John M. Vernon, and Joseph E. Harrington Jr. 2000. *Economics of Regulation and Antitrust*. Third Edition. Cambridge: The MIT Press (page 161).

make market entry a daunting task. Again, this further increases Digicel's ability to exercise market power and behave to an appreciable extent independent of competitors or customers in this market.

- iv. Fourth, the need for radio frequencies to provide retail mobile services imposes further barriers to entry to potential entrants. If sufficient radio frequencies are not available in the table of frequency allocations, the potential entrant would have to petition for an amendment to the table, which would require TRR to initiate a regulatory proceeding. Even if frequencies are available, the right to use these frequencies would have to be assigned (licensed) to the potential entrants—which imposes a delay on entry. If multiple petitioners request the same frequencies, TRR would have to use some method to assign the frequencies to competing claimants. Methods commonly used elsewhere include auctions and beauty contests—all of which delay entry. In addition, permits such as construction permits and right-of-way requirements retard and discourage entry.
- f) For the above reasons, Digicel's position of economic strength affords it the ability to behave to an appreciable extent independent of competitors or customers in the market for retail mobile services. For a more technical explanation using a Cournot model of competition see Appendix 1.

4. WHOLESALE MARKET – FOR WHOLESALE CALL TERMINATION ON DIGICEL'S NETWORK

- a) The second relevant product market from the 2009 Designation Order is the market for wholesale call termination on Digicel's network—that is, the market for incoming calls to Digicel's network. See Annex 1 of the 2009 Designation Order.
- b) Unlike a retail market where the final consumers are the buyers, in the wholesale market the buyers are other service providers. A key characteristic of this market is that each operator is the only service provider that can terminate calls on its network regardless of where these calls originated. This lack of demand or supply-side substitution renders this market unique.

- c) A market for wholesale call termination service arises when two or more telecommunications networks interconnect and payment is owed by the call originating network to the call terminating network. This interconnection is effected by the physical and logical linking of two or more networks operated by service providers.
- d) Annex 1 of the 2009 Designation Order indicates that the geographic scope of the market is the national territory of Vanuatu.

4.1 WHOLESALE MARKET FOR CALL TERMINATION ON DIGICEL'S NETWORK: ASSESSMENT UNDER CLAUSE 10.3 OF DIGICEL LICENCE

- a) Under Clause 10.3 of Digicel's licence we need to determine first whether Digicel enjoys a position of economic strength or controls an essential facility. For the reasons described below we determined that the essential facilities' test is the best approach to follow given the unique characteristics of this market.
- b) We conclude that Digicel controls access to an essential facility and this gives it the power to behave to an appreciable extent independently of its competitors or customers in the wholesale call termination market.

4.2 DIGICEL CONTROLS ACCESS TO AN ESSENTIAL FACILITY WITHIN CLAUSE 10.3

- a) Digicel satisfies the first part of the test – control of essential or bottleneck facility. The TRRA defines "bottleneck facility" as:
 - a. "a facility essential for the production of telecommunications services, which, for technical reasons or due to economies of scope and scale, and the presence of sunk costs, cannot practicably be duplicated by a would-be competitor."⁹

⁹ Republic of Vanuatu. Telecommunications Regulation Act No. 30 of 2009.

- b) As a technical matter, no other service provider can bypass Digicel and terminate calls on Digicel's network. In essence, Digicel has a monopoly on call termination on its network. The question then is whether control of this essential or bottleneck facility affords Digicel the ability to behave to an appreciable extent independent of competitors or customers in this market.

4.3 DIGICEL HAS THE ABILITY TO BEHAVE TO AN APPRECIABLE EXTENT INDEPENDENT OF COMPETITORS OR CUSTOMERS

- a) Digicel control of access to an essential facility (e.g. its network) affords it the ability to behave to an appreciable extent independent of competitors or customers.
- b) Part 6 of the TRRA imposes substantial interconnection obligations on Digicel. In addition it gives the Regulator the ability to regulate call termination rates on Digicel's network.
 - a) Unlike the retail mobile market, the wholesale market for call termination on Digicel's network is subject to substantial regulation under Part 6 of the TRRA. In this case the standard economic assessment of market power or significant market power focuses primarily on the power to exclude rather than the power to price above the competitive level.
 - b) The difficulty of assessing market power in regulated markets such as this is illustrated by Professor Hovenkamp:
 - a. "regulation may designate the price at which a firm must sell. On the one hand, courts have said that market power is measured by a dominant share of a relevant market. On the other, they have defined market power as the ability to control prices. A price regulated public utility may be thought to have substantial market power under the market share

test, but perhaps no market power at all under the test of power to control prices.”¹⁰

- c) For this reason the assessment of market power is best performed by assessing Digicel’s power to exclude competitors in the market for call termination on its network and not on its ability to price above the competitive level. Citing again Professor Hovenkamp:
 - a. “As a result, the most meaningful measure of market power for antitrust purposes is generally the ‘power to exclude competition.’ For example, the great majority of antitrust cases brought against AT&T prior to its breakup were interconnection cases in markets that were price regulated.”¹¹
- d) The technical impossibility of bypassing Digicel to terminate calls in its network gives Digicel a considerable power to exclude competition and as such confer Digicel the ability to behave to an appreciable extent independently of competitors or customers in this market.
- e) As a matter of fact, Part 6 of the TRRA implicitly recognizes the power to exclude of large networks like Digicel’s.
- f) To see how this might happen, suppose a new service provider enters the retail mobile market. Although Part 6 of the Act (and Digicel’s licence) imposes obligations on all service providers (including Digicel) to interconnect in non discriminatory ways, a service provider (e.g. Digicel) may delay interconnection or provide poor quality call termination to delay entry or reduce the quality of service of this competitor in the retail market. As such, Digicel’s control of access to an essential or bottleneck facility and the impossibility of bypassing Digicel to terminate calls on its network confer Digicel the ability to behave to an appreciable extent independent of competitors or customers in this market.

¹⁰ Herbert Hovenkamp. Federal Antitrust Policy. The Law of Competition and Its Practice. Fourth Edition. West 2011 (page 779).

¹¹ Herbert Hovenkamp. Federal Antitrust Policy. The Law of Competition and Its Practice. Fourth Edition. West 2011 (page 779-780).

5. CONCLUSION

Digicel requested that the Telecommunications and Radiocommunications Regulator review Digicel's 2009 Designation order under Clause 10.3 of Digicel's Telecommunications Licence. Clause 10.3 provides that Digicel request a review by the Regulator of prior determination that Digicel is Dominant Service provider under Clause 10.1 and 10.2. The review is based on request that if Digicel does not enjoy position of economic strength, or control an essential facility so as to afford the power to behave to an appreciable extent independently of competitors or customers in that particular market, then Digicel shall not be dominant.

Clause 10.3 of Digicel Licence:

In conclusion Clause 10.3 only applies to prior designation order dated 18th June 2009 to Digicel (see appendix 2); Digicel also requested the regulator to apply the test in Clause 10.3 of the licence to Digicel's position in a further market that includes services provided by Digicel using fixed terminal equipment. However, these services are not "mobile services" within the prior dominance declarations for Digicel; accordingly since the Regulator has not made any prior determination under clause 10.1 of the licence, Clause 10.3 does not apply.

Relevant Market Definition:

Digicel did not ask TRR to review the definition of the two product markets, the subject of the 2009 Designation Order, and Clause 10.3 does not refer to such a review. This review accordingly does not review or revise those product market definitions.

Economic Strength Mobile Retail Market:

In reviewing Digicel's position of economic strength within Clause 10.3, of its licence, and the available data concerning the above indicators. The Regulator uses economic analysis of market power considering the market share, financial position or resources, market structure, barriers to entry, and network coverage compared to the competitor.

The Regulator reviews Digicel's position of economic strength and concludes that Digicel has a 90% network coverage enjoys a significant share of retail mobile service revenue, subscriber base and has a strong financial position. Taking in to account the combined effects of Digicel's large market share, its radio network footprint in Vanuatu, relative stability of its large market share, and improved financial position of the firm since 2009, the Regulator issues the draft determination that Digicel enjoys a position of economic strength in the Mobile Retail Market.

Ability to Behave to an Appreciable Degree of Independent of competitors or customers:

The Regulator determines that Digicel's position of economic strength affords its ability to behave to an appreciable extent independent of competitors or customers in the market for retail market mobile services. A more technical explanation using a Cournot model of competition is in Appendix 1.

Controls an essential facility:

The Regulator determines that Digicel controls access to an essential facility and this gives it the power to behave to an appreciable extent independently of its competitors or customers in the wholesale call termination market. As such, Digicel's control of access to an essential or bottleneck facility and the impossibility of bypassing Digicel to terminate calls on its network confer Digicel the ability to behave to an appreciable extent independent of competitors or customers in this market.

Dominant Service Provider in Mobile Retail Market:

The Regulator hereby determines the review of designation order of 18th June 2009 still applies to Digicel as Dominant service provider in the mobile retail market and that all terms outlined in such order is still effective.



APPENDIX 1. THE COURNOT MODEL - A TOOL TO ANALYZE COMPETITION IN THE RETAIL MOBILE MARKET

1. The Cournot model of competition shows how duopoly markets with high barriers to entry (such as the market for retail mobile services in Vanuatu) enable firms to behave to an appreciable extent independent of competitors or customers. Technically; it shows how firms are able to set prices above the competitive level.
2. The standard Cournot model assumes homogenous products and each firm maximizing its own profits by anticipating how much the other firm is going to produce and then setting its own output level (and indirectly setting the price). The other firm behaves in the same manner and responds to the first firm by setting a level of output which maximizes its own profit. The model reaches an equilibrium in which both firms charge the same price which is lower than the monopoly level but higher than the competitive price. At the equilibrium price-output combination, neither firm wants to change its price-output choices because profits would decline.
3. The standard Cournot model is commonly used in regulatory and competition cases to analyse the ability of firms to exercise market power and the effect of entry or mergers on prices.¹² The Cournot model is intuitively appealing because it predicts that prices would fall when the number of firms in the market (e.g. competition) increases. Table 3 illustrates this property showing that as more firms are added, the ratio of price to marginal cost diminishes. In competitive markets the price will be equal or close to the marginal cost. Table 3 illustrates this case with 100 firms competing and showing in the third column a ratio of price to marginal cost very close to one indicating that the market price will be very close to the marginal cost.¹³ In that situation we would say that firms have no ability to exercise market power.

¹² See for example New Zealand Commerce Commission. Final Determination on merger of Air New Zealand Limited and Qantas Airways Limited. 23 October 2003.(pages 118-119). See also John Kwoka Jr. and Lawrence White. *The Antitrust Revolution* 2004. Fourth Edition, New York: Oxford University Press (pages 118-119).

¹³ The ratio of price to marginal cost is similar to what economist call the markup above marginal cost which is presented in the second column in Table 3.

4. The same Cournot model predicts however, that with just two firms in the market (e.g. duopoly) the ability of firms to price above the competitive level would be the greatest. With two firms the third column in Table 3 shows a ratio of price to marginal cost equal to 2, indicating that the price would be twice the marginal cost and suggesting that firms would be able to substantially price above the competitive level.

Table 3. Changes on the ability to price above the marginal cost as the number of firms increase in the Cournot model of competition.

| No. of firms | Mark up = $(P-MC)/P$ | Ratio Price to MC |
|--------------|----------------------|-------------------|
| 2 | 0.50 | 2.00 |
| 3 | 0.33 | 1.49 |
| 4 | 0.25 | 1.33 |
| 5 | 0.20 | 1.25 |
| 10 | 0.10 | 1.11 |
| 100 | 0.01 | 1.01 |

Note: MC=marginal cost. P=market price. Price elasticity of demand is assumed to be -1.

5. Critics of the standard Cournot model contend that firms do not compete by setting output but prices. An alternative oligopoly model, Bertrand competition, has the firms competing on prices. Many of the assumptions in this model are the same as those in the standard Cournot model (homogeneous products, unilateral or non-cooperative behavior, no economies of scale, knowledge of the market demand). In the Bertrand model each firm anticipates the rival's price and tries to undercut the rival by setting a lower price. In turn the rival behaves in the same way responding by lowering its price until a final equilibrium is reached with a price equal to or close to the competitive level.¹⁴ In this model if both firms have equal costs they would divide the market evenly; however if one firm has lower cost, that firm will capture the whole market but will price at or close to the competitive level. One key assumption in the Bertrand model is that a firm can increase output instantaneously and "steal" the whole market from the

¹⁴ See Kip Viscusi, John M. Vernon, and Joseph E. Harrington Jr. 2000. *Economics of Regulation and Antitrust*. Third Edition. Cambridge: The MIT Press (page 109)

rival. The predictions of this model are in stark contrast with the predictions of the Cournot model. Under duopoly conditions, the Cournot model predicts that firms are able to exercise significant market power while the Bertrand model predicts that firms are unable to exercise significant market power.

6. We do not believe that the Bertrand model is valid in this situation. The Bertrand model assumes that a firm can instantly increase capacity and capture the whole market. This is seldom observed in the real world where firms are capacity constrained in the short term. It is also unrealistic in the market for mobile retail services because of the high barriers to entry which we discussed earlier.
7. The standard Cournot model has been adapted to include price competition by using what economists call a sequential game. In the first period firms choose output or capacity *a la* Cournot while in the second period firms compete on prices *a la* Bertrand. These new more realistic models produce similar equilibrium prices and output than those predicted by the standard Cournot model.¹⁵ Because in the real world firms cannot increase capacity instantly, the Cournot model seems more appropriate for analyzing the retail mobile market in Vanuatu than the Bertrand model. In this respect it is worth noting Professor Carl Shapiro's remarks:

*"The choice between a pricing game and a quantity game cannot be made on a priori grounds. Rather, one must fashion theory in a particular industry to reflect the technology of production and exchange in that industry. For example, competition via sealed bids between firms without capacity constraints fits the Bertrand model quite nicely, whereas competition to install sunk productive capacity correspond to Cournot."*¹⁶

8. Also worth noting are the remarks from the New Zealand Commerce Commission in their assessment of a proposed merger of two airlines:

¹⁵ See for example David M. Kreps and José A. Scheinkman. 1983. "Quantity precommitment and Bertrand competition yield Cournot outcomes." *Bell Journal of Economics*. Vol. 14 (326-337). Leonard F. Herk. 1993. "Consumer choice and Cournot behavior in capacity-constrained duopoly competition." *Rand Journal of Economics*. Vol. 24 (3): 399-417.

¹⁶ Carl Shapiro. "Theories of Oligopoly Behavior." In Richard Schmalensee and Robert Willig (eds.). 1989. *Handbook of Industrial Organization*. Vol. 1. Amsterdam: North Holland. (page: 351).

“ The Commission accepts that the Cournot model provides a useful framework in which to analyze the impact of the proposed Alliance...(…)...An important implication of this model is it cannot be assumed that the presence of two or more firms in a market would be sufficient to ensure that market outcomes are workably or effectively competitive.”¹⁷

9. The standard Cournot duopoly model provides a valid right framework for analyzing this market. The price-output results from its more sophisticated variations that include a sequential game of quantity (or capacity) choice followed by price competition are the same as the standard model. Applying this model to the retail mobile service in Vanuatu clearly shows that Digicel is able to price significantly above the competitive level and thus, behave to an appreciable extent independent of competitors or consumers.

¹⁷ New Zealand Commerce Commission. Final Determination on merger of Air New Zealand Limited and Qantas Airways Limited. 23 October 2003.(page 118).