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Proceso de selección flexible por competencias aplicado al puesto de Dircom

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RESUMEN

El puesto de Director de Comunicación es relevante para la reputación de una empresa, pues influye a través de su propia imagen y reputación personal; por tanto, la selección de este directivo debe ser cuidadosa. En este trabajo proponemos un proceso de selección flexible basado en la lógica borrosa, para ajustar las competencias de los candidatos al puesto y dar apoyo a la toma de decisiones. Presentamos dos técnicas: una en la que se selecciona al mejor solicitante y otra en la que se compara a los candidatos con un ideal construido con información facilitada por directores españoles.

Palabras clave: conjuntos borrosos, *impression management*, reputación corporativa, reputación personal, selección de personal

ABSTRACT

The Communication Manager position is relevant to the reputation of an organization, because it influences through its own personal image and reputation; therefore, the selection of this manager has to be painstaking. In this paper we propose a flexible selection process based on fuzzy logic, to fit the skills of candidates for the job and to support decision making. We present two techniques: one that selects the best applicant and another one that compares candidates with an ideal constructed with information provided by Spanish managers.

Keywords: fuzzy sets, impression management, corporate reputation, personal reputation, personnel selection

Este trabajo presenta un modelo borroso flexible de selección de personas por competencias, elaborado según las variables presentadas en el modelo relacional de reputación, desde la teoría de la *impression management* (IM) o gestión de las impresiones de Jácome (2015). Dicho modelo sienta sus bases en la visión integradora y relacional de las tres dimensiones constitutivas de la IM, equivalentes a los tres elementos clave de la reputación, tanto personal como organizacional (identidad personal, identidad social e identidad profesional o corporativa). Esta premisa, unida a la noción de que la reputación puede ser transferida del individuo a la organización y viceversa (Schweizer & Wijnberg, 1999), ha permitido explicitar en qué medida la IM puede ser considerada como antecedente o generador de reputación personal (RP) y a su vez cómo la reputación a nivel corporativo (RC) podría ser considerada como beneficio o resultado de una RP favorable.

El objetivo de este estudio es aplicar dicho modelo conceptual a un modelo flexible de selección de directores de comunicación o Dircom en España. Estos profesionales, situados en la línea de la alta dirección de las empresas en las que trabajan, por su desempeño y las responsabilidades que ostentan, suelen formar parte de los consejos de administración. Se trata, por tanto, de trabajadores que juegan un papel relevante en la toma de decisiones y en el diseño de la estrategia corporativa de la organización a la que representan. Dentro del marco institucional en el que desarrollan su actividad, su representatividad se extiende al hecho de ser responsables de velar por la imagen del máximo ejecutivo de la compañía –su presidente– así como de tratar de controlar la proyección pública de la organización ante los grupos de interés, internos y externos, incluida la opinión pública.

El término anglosajón IM hace referencia al proceso por el que las personas, de forma más o menos consciente, tratan de controlar la imagen que proyectan al exterior con el objetivo de causar en los demás unas determinadas impresiones (Leary & Kowalski, 1990; Schlenker, 1980). La perspectiva de la gestión de las impresiones que propone este trabajo es una visión integradora de la teoría de la IM, que estaría fundamentada sobre la base de la integridad del

comportamiento (*behavioral integrity*) o la adecuación entre lo que una persona dice y lo que hace (Kacmar & Tucker, 2014; Palanski, Kahai, & Yammarino, 2011; Simons, 2002). El proceso de la IM abarca una serie de técnicas y modos de obrar que afectan a los distintos ámbitos del comportamiento humano. Se trataría de gestionar una serie de técnicas de comunicación verbal —autopromoción, ejemplaridad, súplica o petición— para ayudar a definir qué se dice y cómo se dice, así como de comunicación no verbal —apariencia física, expresiones faciales, posturas e incluso el mobiliario y la decoración de que se rodea una persona— (Rosenfeld, Giacalone, & Riordan, 1995). Todo ello con el objetivo de proyectar una determinada imagen de la dimensión de la propia identidad (personal, social o profesional), para ser percibidos por los demás de forma favorable.

La distorsión de las propias impresiones sería más susceptible de ser lograda en orden a conseguir transmitir una dimensión concreta de la identidad no acorde con la propia personalidad a nivel operativo y táctico —a corto y medio plazo—; sin embargo, es en el largo plazo donde se plantea la necesidad de poner en relación la IM con la gestión de la reputación. Una visión integradora de las tres dimensiones de la identidad en los diferentes contextos o entornos (ético, social y organizativo) llevaría a la idea de la consistencia en el comportamiento (Jácome, Bañón, Guillén, & Canós, 2013). Contar con una buena reputación implicaría que la persona pueda ser estimada, valorada, respetada y admirada en todos los contextos y de manera sostenida en el tiempo; es por esto que se han considerado las competencias identificadas de las escalas que miden las distintas técnicas de IM como antecedentes de la RP. Esta comienza a construirse a partir de la formación de unas percepciones iniciales sobre las características personales del individuo y sus comportamientos que, si se hacen consistentes en el tiempo, dejan una huella por la que los demás reconocen y hacen evaluaciones morales y éticas de la persona en término de buena o mala (Anderson & Shirako, 2008; Bromley, 2001; Foste & Botero, 2012). Estas competencias o comportamientos observables y habituales constitutivos de la RP, según se han identificado

en el modelo relacional de reputación de Jácome (2015) son la confianza y el liderazgo. Asimismo, la literatura ha utilizado variedad de escalas para medir los distintos atributos de la IM, lo que ha permitido la identificación de una serie de competencias de dimensión ética, afectiva y técnica, según las tres dimensiones de la confianza (Mayer, Davis, & Schoorman, 1995) y el liderazgo (Guillén & González, 2001), que se han considerado como antecedentes de la RP (Figura 1).

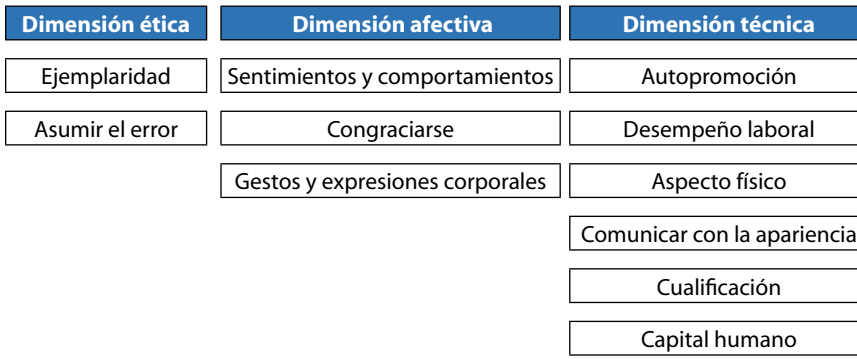

Figura 1. Competencias de la *impression management* según las dimensiones de la confianza y el liderazgo. Fuente: Elaboración propia a partir del modelo relacional de reputación personal de Jácome (2015).

Por otro lado, la definición de RC que se ha adoptado en este trabajo de acuerdo con la escuela relacional de reputación sería "la suma relativamente estable de las percepciones de los grupos de interés internos y externos para lograr juicios evaluativos y como resultado, suscitar comportamientos de apoyo u oposición a una organización" (Jácome, 2015, p. 109). La imagen (lo que los grupos de interés externos piensan que es la organización), la identidad (lo que los grupos de interés internos creen que la organización es actualmente: cultura corporativa) y la identidad deseada (lo que la organización comunica que es: misión, visión y valores) serían los elementos clave que, sumados, contribuirían a construir RC (Chun, 2005). Se trata de un juicio evaluativo en términos comparativos de bueno, correcto, positivo o malo, incorrecto, negativo, basado en un conjunto de percepciones y en la experiencia, que se forma a lo

largo del tiempo siendo un fenómeno más o menos estable, duradero y focalizado en lo que la persona hace y en cómo se comporta (Brown, Dacin, Pratt, & Whetten, 2006; Chun, 2005; Fombrun, 1996; Scott & Lane, 2000; Walker, 2010). La variedad de escalas que se han utilizado en la literatura para medir los distintos atributos de la RC han permitido la identificación de una serie de competencias de dimensión ética, afectiva y técnica que, en este trabajo, se han considerado como consecuentes de la RP (Figura 2).

Dimensión ética	Dimensión afectiva	Dimensión técnica
Ética	Orientación al cliente	Competencia
Honestidad	Credibilidad	Autonomía
Responsabilidad social	Entusiasmo	Prestigio
Integridad	Factores motivadores	Habilidades directivas
	Comunicación emocional	Promoción
	Cultura corporativa	Buena apariencia
		Análisis del entorno
		Calidad
		Solvencia financiera
		Estrategia corporativa

Figura 2. Competencias de reputación corporativa según las dimensiones de la confianza y el liderazgo. Fuente: Elaboración propia a partir del modelo relacional de reputación personal de Jácome (2015).

Dos de las principales aportaciones de la IM a la gestión de las organizaciones se encuentran en las políticas de selección de personas y en el ajuste del candidato al puesto y a la organización a través de la evaluación (Cable & Judge, 1997; Chen & Lin, 2014; Higgins & Judge, 2004; Kristof-Brown, 2000). En este contexto, muchos trabajos enmarcados en el ámbito de los recursos humanos se han centrado en el análisis de dos técnicas, congraciarse y autopromoción, ambas destinadas a conectar con el interlocutor que puede ser el

responsable de un proceso de selección, si el individuo pretende incorporarse a una determinada organización, o bien un superior, en el caso de tratarse de una evaluación de personal (Bolino, Klotz, & Daniels, 2014; Ellis, West, Ryan, & DeShon, 2002; Jones & Pittman, 1982; Proost, Schreurs, Witte, & Derous, 2010; Wayne & Kacmar, 1991).

El proceso de selección de personas puede ser complicado por el tipo de vacante que se desea cubrir o por la cantidad de candidatos que se presentan para el trabajo. Además, pueden entrar en juego varios criterios, con lo que los responsables del proceso han de ejecutar una agregación de información eficiente y flexible para tratar los datos con precisión sin perder la calidad de la información (Larsen, 2002). En este trabajo se define la selección de personal como un proceso en el que un responsable elige a una o varias personas en función de su ajuste a las características de un puesto de trabajo vacante (Canós, 2005; Valle Cabrera, 2003). Obviamente, el resultado de este proceso será una ordenación de los candidatos en función del criterio que se haya utilizado para medir su ajuste al puesto de trabajo vacante.

En este contexto, podemos considerar la aplicación de técnicas flexibles de selección de personas. La teoría en la que se ha basado la propuesta es la desarrollada en los 60 sobre subconjuntos borrosos (Zadeh, 1965). Aunque existen distintas maneras de incluir la incertidumbre en el formalismo de un modelo de decisión, se ha optado por esta teoría por varios motivos (Canós & Liern, 2008; Liern & Canós, 2003):

- Evita que la rigidez de las limitaciones del modelo hagan que resulte poco factible o sin sentido.
- Impide ignorar soluciones del problema que resultarían provechosas, pero que no se pueden obtener con una formalización matemática tradicional.
- Incorpora al modelo la subjetividad del decisor y la incertidumbre del proceso por su propio planteamiento, lo que resulta ideal para la toma de decisiones sobre recursos humanos dada su casuística.

La teoría de conjuntos borrosos se basa en la sustitución de los conjuntos tradicionales (en los que un elemento puede pertenecer o no pertenecer) por funciones de pertenencia. Las funciones de pertenencia son aplicaciones de un conjunto referencial dado X en el intervalo [0,1] (Goguen, 1967, 1969; Zadeh, 1965). Si $\mu_{\tilde{A}}$ es la función de pertenencia del subconjunto borroso $\tilde{A}$ entonces $\mu_{\tilde{A}}(x)$ se interpreta como el grado de pertenencia del elemento x al conjunto $\tilde{A}$ (Kaufmann & Gil Aluja, 1987). Si el grado de pertenencia de un elemento es cero, no existe pertenencia al conjunto; si es uno, pertenece por completo como en los conjuntos tradicionales (booleanos); si la pertenencia es un número intermedio existe una incertidumbre que será interpretada de diversos modos según cada aplicación (Liern & Canós, 2003).

Identificación y definición de competencias más significativas para el desarrollo del puesto de Dircom

Para el desarrollo del puesto de Dircom se han considerado un total de 12 competencias identificadas a partir de la simplificación del modelo relacional de RP propuesto por Jácome (2015). Se han incluido cuatro variables adicionales: *capital humano*, *credibilidad*, *integridad* y *prestigio* porque, a pesar de no encontrase en dicha simplificación del modelo relacional de RP del Dircom español, sí que se encuentran en el modelo general; por tanto, se ha decidido añadirlas para su evaluación por considerarlas representativas a la hora de ser valoradas en un proceso de selección de personas para un puesto de Dircom. A continuación se ofrece una breve descripción de cada una de ellas:

1. Capital humano. Constituye la parte de los activos intelectuales conocidos como valores intangibles (Fombrun & Low, 2011; Zinko, Ferris, Humphrey, Meyer, & Aime, 2012). Según Fombrun y Low (2011), el valor de una organización no solamente reside en el capital financiero y en los activos físicos sino también en el capital humano. En este sentido, la formación y la experiencia de los trabajadores reconoci-

dos como tales constituyen un antecedente de dimensión técnica de la RP.

2. Competencia. Consiste en poseer la capacidad para desarrollar una actividad específica (Helm, 2005). Se trata de uno de los cinco factores de la personalidad humana establecidos por Aaker (1997) y que posteriormente algunos autores, basándose en la metáfora de la personificación, han utilizado para atribuírselos a una marca u organización (Davies, Chun, da Silva, & Roper, 2004). Los conocimientos, las competencias o aptitudes y las habilidades se tienen más en cuenta cuando se pretende establecer la idoneidad de un candidato al puesto de trabajo en procesos de recursos humanos (Kristof-Brown, 2000).
3. Confianza. Es "la decisión de una persona de hacerse vulnerable ante una acción de otro. Esta decisión está basada en la suposición de que la persona en la que se confía hará bien esa acción sin que se le controle" (Mayer et al., 1995, p. 712). En este trabajo se ha considerado esta variable como uno de los dos integrantes de la RP.
4. Congraciarse. Es la capacidad de conseguir la benevolencia, la aprobación o el afecto de alguien (Kumar & Beyerlein, 1991), así como la empatía y cierta atracción interpersonal (Ellis et al., 2002). En el modelo propuesto en este trabajo de investigación se trata de un antecedente de la RP de dimensión afectiva.
5. Credibilidad. Es uno de los factores principales que determinan el poder de la comunicación persuasiva, ya que tiene que ver con la autenticidad del carácter del orador para inspirar credibilidad en su audiencia (*logos*). Como consecuente de la RP de dimensión afectiva, la credibilidad de una organización reside en la creencia por parte de los consumidores de la intención de la compañía en un determinado momento, de que la organización puede diseñar y ofrecer productos y servicios que satisfagan sus deseos y necesidades (Keller, 1993).

6. Desempeño laboral. Forma en que los trabajadores desempeñan bien su trabajo. Afecta a la competencia del empleado para desempeñar un determinado puesto (Foste & Botero, 2012). Se evalúa mediante revisiones del rendimiento laboral. En este trabajo es una competencia considerada como antecedente de la RP de dimensión técnica.
7. Ética. "La confianza en la expectativa de que una persona o grupo actuará de una manera moralmente responsable al interactuar con otras en una operación o intercambio" (Adams, Highhouse, & Zickar, 2010, p. 40). Esta definición se ha tomado de los autores que han desarrollado la escala de la desconfianza para medir el impacto de esta competencia en la reputación a nivel organizacional. Además de esperar que una de las partes actúe según lo acordado, para estos autores la actuación ética se refiere también a las expectativas del conjunto social que espera que una organización se rija por un proceso de toma de decisiones morales. En este trabajo se ha considerado esta competencia como una variable de la RC de dimensión ética, consecuente de la RP.
8. Honestidad. Es una cualidad intangible que, aplicada a una marca, se identifica con la honradez, la lealtad, la sinceridad y la justicia, puesto que la marca no es solo un nombre, un logo, un símbolo o un nombre comercial (Afzal, Khan, ur Rehman, Ali, & Wajahat, 2010). La honestidad es parte de la sinceridad, uno de los atributos de las marcas que la autora Jennifeer L. Aaker mide con su modelo de los cinco factores. Esta escala está basada en la metáfora de la personificación consistente en asociar características de la personalidad humana a una marca (Aaker, 1997, p. 352). Se trata de una competencia de dimensión ética consecuente de la RC.
9. Integridad. Es la consistencia interna del carácter, lo que hace a una persona recta e intachable en su conducta (Afzal et al., 2010). Al igual que la competencia anterior, se trata también de una cualidad intangible relacionada con la marca, una competencia de dimensión ética consecuente de la RC.

10. Liderazgo. Es una reacción establecida por el sujeto actuante desde la libertad y sin obligación externa de seguir a otra persona, el líder. "El liderazgo va más allá del poder formal, implica un continuo intercambio de influencia y de aceptación gratuita" (Guillén & González, 2001, p. 176). En este trabajo se ha considerado esta variable como uno de los dos integrantes de la RP junto con la confianza. Se ha tomado como referencia la definición de los autores Guillén y González (2001) ya que, como se ha explicado anteriormente, se han adoptado las tres dimensiones del liderazgo que ellos establecen a las dimensiones de las competencias identificadas en nuestro modelo de reputación.
11. Prestigio. Consiste en ser considerado en alta estima por aquellas personas que observan al individuo desde fuera de la organización. El prestigio de un individuo depende, entre otros, del prestigio de aquellos con los que socializa y le aceptan como un igual (Sung & Yang, 2008). La definición de esta competencia se basa en la idea de que las personas muestran admiración por las organizaciones fundamentalmente a través del respeto y el asombro. Es decir, una entidad tiene prestigio si se admira, porque es importante por su honor e integridad (Highhouse, Brooks, & Gregarus, 2009). En este trabajo la variable del prestigio se ha considerado como un consecuente de la RC de dimensión técnica.
12. Responsabilidad social. Se refiere a las expectativas que la organización genera en sus trabajadores en cuanto a la igualdad en el trato y la adhesión de la compañía a las reglas establecidas (Walsh & Beatty, 2007). En la escala de reputación corporativa basada en el cliente desarrollada por dichos autores, los cuatro ítems que definen la categoría de responsabilidad social y medioambiental son: "Parece que pone empeño en crear nuevos puestos de trabajo; estaría dispuesto a reducir sus beneficios por asegurar un entorno ambiental limpio; parece que es medioambientalmente responsable; se ofrece para apoyar buenas causas" (Walsh & Beatty, 2007, p. 135).

Siguiendo lo establecido en el modelo relacional de RP del Dircom español (Jácome, 2015), estas 12 competencias se agrupan del siguiente modo (Figura 3):

- Pertenecen a la categoría de IM como antecedentes a la RP: 1) Capital humano; 4) Congraciarse; 6) Desempeño laboral.
- Pertenecen a la categoría de RC como consecuentes de la RP: 2) Competencia; 5) Credibilidad; 7) Ética; 8) Honestidad; 9) Integridad; 11) Prestigio; 12) Responsabilidad social.
- Pertenecen a la categoría de RP como integrantes del constructo: 3) Confianza; 10) Liderazgo.

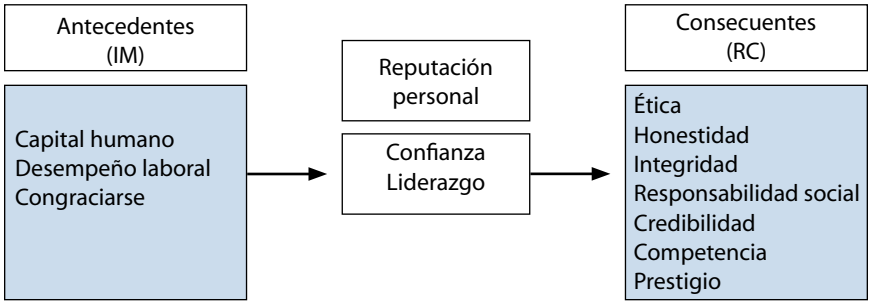

Figura 3. Agrupación de competencias según el modelo de antecedentes y consecuentes de RP de Jácome (2015). Fuente: Elaboración propia a partir de Jácome (2015).

Aplicación de técnicas flexibles de selección de personas para un puesto de Dircom

Nuestra propuesta parte del supuesto de que existe un puesto vacante de Dircom en una organización de cualquier tipo y que los cinco candidatos finalistas han obtenido los siguientes resultados en la evaluación de sus competencias (Tabla 1).

Tabla 1

Evaluación de las competencias de los candidatos

	Candidato 1		Candidato 2		Candidato 3		Candidato 4		Candidato 5	
	Mín.	Máx.	Mín.	Máx.	Mín.	Máx.	Mín.	Máx.	Mín.	Máx.
Capital humano	5	7	8	9	5	6	2	5	5	7
Competencia	3	6	7	10	6	8	9	10	2	6
Confianza	6	7	9	9	5	8	4	6	9	10
Congraciarse	5	8	8	9	7	10	3	5	5	5
Credibilidad	2	3	8	9	9	9	7	7	7	7
Desempeño laboral	4	5	10	10	4	7	7	10	6	9
Ética	1	2	9	10	6	10	5	6	3	4
Honestidad	1	3	8	10	8	9	6	9	6	8
Integridad	2	5	9	10	5	7	5	7	6	10
Liderazgo	4	6	7	9	6	9	3	7	8	10
Prestigio	2	4	7	9	4	9	7	8	7	8
Responsabilidad social	2	2	6	9	6	7	7	9	7	9

Fuente: Elaboración propia a partir de Jácome (2015).

Los candidatos han sido evaluados usando intervalos para flexibilizar el proceso. Es habitual valorar a una persona en algo como "más o menos bueno" o "regular", y una forma de trasladar estas afirmaciones a la formalización de los modelos de decisión es a través de los intervalos.

Sin candidato ideal

La primera idea que puede tener el responsable de la selección de personal es la de maximizar las competencias que puedan tener los candidatos para ordenarlos y conocer quién es el mejor en términos globales. En realidad, se trata de una comparación con el máximo posible. Esta es una opción válida, sobre todo si se da el caso de que, por ejemplo, no existe un ideal, porque no es posible definirlo en industrias de reciente creación (Fullér, Canós, & Canós, 2012); no obstante, su aplicación en situaciones normales no está exenta de críticas, pues una persona que empieza a trabajar

en un puesto para el que no se ajustan sus competencias puede resultar frustrada y querer cambiar de trabajo en cuanto tenga una oportunidad.

En este caso, para simplificar el proceso, se ha buscado un representante de cada intervalo, considerando la media entre el mínimo y el máximo. Se podría haber elegido otro punto, por ejemplo, con una fórmula más optimista, pero se entiende que esta representación es adecuada.

Puesto que en realidad se está comparando con el máximo posible, hay que calcular una media para cada candidato (su valoración para la ordenación final) midiendo la distancia de cada una de las competencias con el máximo, que en este caso, toma el valor de 10. Entonces, se aplica la siguiente expresión (Fullér et al., 2012):

$$\frac{1}{R}\sum_{i=1}^{R}\left(1-b_{ci}^{j}\right)$$

Donde R es el número total de competencias y b es la valoración de cada una de las competencias para cada uno de los candidatos. Siguiendo el ejemplo propuesto, el resultado final después de aplicar este método es: Candidato 1 = 6,04; Candidato 2 = 1,29; Candidato 3 = 3,41; Candidato 4 = 3,75; Candidato 5 = 3,16.

A continuación se ordena a los candidatos de menor a mayor resultado, pues lo que se está midiendo es la distancia con el máximo (el que esté más cercano al máximo es el mejor). Los resultados muestran que el Candidato 2 sería el primero en ocupar el puesto, si se sigue esta herramienta de decisión. Este resultado tiene sentido, pues ya se intuía *a priori* por las altas valoraciones en las competencias que, de forma general, tenía el Candidato 2 en la presentación de los datos.

Con candidato ideal

Otras técnicas de ordenación que el responsable del proceso de selección puede utilizar son las que se basan en la comparación con un candidato ideal, construido con la opinión de expertos (Canós & Liern, 2004). En este caso, los expertos en los que se fundamenta el ideal que se va a presentar han sido ocho directores de comuni-

cación de empresas internacionales sitas en Madrid, Barcelona y Valencia (Tabla 2). El ideal es la media de cada competencia y se ha calculado utilizando los puntos medios de las valoraciones mínimas y máximas que cada experto ha dado a cada competencia.

Con estos datos, se analiza el ajuste entre los datos procedentes de los candidatos y el ideal propuesto por los directores de comunicación utilizando el índice de adecuación, que se define formalmente como:

$$\mu_{\tilde{I}^{\phi}}(\tilde{P}_j^{\phi}) = \frac{1}{n}\sum_{i=1}^{n}\mu_{\tilde{I}^{\phi}}^{x_i}(\tilde{P}_j^{\phi}), \text{ donde } \mu_{I^{\phi}}^{x_i}(\widehat{P}_j^{\phi}) = \frac{\text{long}([b_{x_i}^1, b_{x_i}^2] \cap [a_{x_i}^1, a_{x_i}^2])}{\text{long}([b_{x_i}^1, b_{x_i}^2] \cup [a_{x_i}^1, a_{x_i}^2])}.$$

Los resultados se ordenan de mayor a menor, pues el candidato más adecuado para el puesto es el que tiene una mayor similitud con el perfil ideal previamente definido: Candidato 1 = 5,78; Candidato 2 = 8,11; Candidato 3 = 9,94; Candidato 4 = 9,27; Candidato 5 = 8,72. El Candidato 3 es el que tiene un mayor valor, por lo que es el más adecuado para ocupar el puesto según el coeficiente de adecuación.

Como se puede observar, utilizando la herramienta del índice de adecuación, el resultado es diferente al que podríamos haber supuesto *a priori* al ver las valoraciones de las competencias de los candidatos. Considerando el máximo absoluto, esto es, el candidato más cercano a la perfección en todas las competencias, el Candidato 2 era el óptimo, mientras que con esta técnica, formalizada para ajustar el puesto a la persona, queda relegado al puesto número cuatro y el Candidato 3 es el primero en la lista ordenada. La decisión final depende del responsable del proceso de selección. En este proceso, las herramientas de ayuda a la toma de decisiones presentadas en este capítulo pueden ser de utilidad.

Tabla 2

Evaluación de las competencias del ideal con información proporcionada por Dircom

	Experto 1		Experto 2		Experto 3		Experto 4		Experto 5		Experto 6		Experto 7		Experto 8		
	Mín.	Máx.	Mín.	Máx.	Mín.	Máx.	Mín.	Máx.	Mín.	Máx.	Mín.	Máx.	Mín.	Máx.	Mín.	Máx.	Ideal
Capital humano	7	10	8	10	4	9	8	10	9	10	6	9	7	10	9	9	8,44
Competencia	8	10	8	10	4	10	7	9	9	10	6	10	8	10	10	10	8,69
Confianza	6	10	10	10	5	10	8	10	9	10	6	10	6	10	10	10	8,75
Congraciarse	3	10	8	10	4	9	7	9	5	7	4	8	5	8	3	3	6,44
Credibilidad	7	10	9	10	6	10	7	9	9	10	6	9	10	10	10	10	8,88
Desempeño laboral	5	10	5	10	5	10	7	9	9	10	5	10	7	10	6	6	7,75
Ética	4	10	9	10	7	10	10	10	9	10	8	9	10	10	10	10	9,13
Honestidad	4	10	10	10	7	10	10	10	9	10	7	10	10	10	10	10	9,19
Integridad	6	10	10	10	7	10	10	10	9	10	6	9	10	10	10	10	9,19
Liderazgo	3	8	5	10	6	10	7	9	9	10	5	8	7	10	8	8	7,69
Prestigio	8	10	8	10	4	9	10	10	7	8	4	8	6	8	5	5	7,50
Responsabilidad social	6	10	5	7	5	10	5	7	9	10	3	8	5	7	3	3	6,44

Fuente: Elaboración propia a partir de Jácome (2015).

Conclusiones, limitaciones y futuras líneas de investigación

Este trabajo presenta un modelo flexible de selección de personas adaptado a la elección de un Dircom; para ello, se han usado técnicas borrosas, de forma que se ha incluido en el proceso la subjetividad inherente a la toma de decisiones sobre personas y la flexibilidad que requiere la valoración de ciertas competencias, actitudes, aptitudes, etc., en el ámbito de los recursos humanos. En la aplicación de la herramienta se han distinguido dos casos: cuando no existe un referente y cuando se puede comparar a los candidatos al puesto con un ideal.

En este orden de ideas, se proponen una serie de competencias identificadas en las escalas que miden distintas técnicas de IM como antecedente de la RP y RC como su consecuente, destiladas de la literatura. Estas competencias son: capital humano, competencia, confianza, congraciarse, credibilidad, desempeño laboral, ética, honestidad, integridad, liderazgo, prestigio y responsabilidad social. Asimismo, para corroborar estas características, se ha consultado a ocho Dircom que, además de dar su opinión sobre un posible candidato ideal para ocupar este puesto, han confirmado la importancia de estas competencias. En este sentido, los Dircom consultados han puesto en valor la creación de un candidato ideal a través de su experiencia y deseos de mejora, en la definición del puesto de trabajo.

Como principal limitación se puede citar la dificultad de encontrar un proceso real de selección de Dircom al que aplicar estos modelos. Aunque la fiabilidad de las herramientas ha sido probada en empresas reales y se ha confirmado que los resultados ayudan a la toma de decisiones del Director de Recursos Humanos (Canós, Casasús, Crespo, Lara, & Pérez, 2011; Canós, Casasús, Lara, Liern, & Pérez, 2008), es complicado que quede una vacante en este tipo de puesto por su especialidad y porque la mayoría de las empresas no tienen este puesto explícitamente definido. Nuestra intención es encontrar alguna oportunidad en el futuro para poder presentar resultados reales que no procedan de una simulación.

Del mismo modo, pensamos mejorar los modelos presentados adaptándolos a otras políticas de recursos humanos relacionadas con la selección de personal, como son la evaluación del desempeño, la formación o la motivación. El objetivo final sería el diseño de una herramienta integral de gestión de recursos humanos que se realimentará con la información que se genere en los distintos procesos por los que pasa un empleado, desde el momento en que es contratado en la empresa.

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Benchmarking Non Public Hospitals in Puerto Rico: A Key Component in the Financial Performance

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ABSTRACT

Benchmarking is considered a key component of the organizational performance measurement system. This study examines a sample of 53 profit and nonprofit hospitals registered in the American Hospital Directory, through four financial dimensions: liquidity, efficiency, profitability and capital structure. The purpose of the study is to validate whether the financial industry benchmark differs or not from a group of 17 selected financial ratios of profit and nonprofit hospitals, to determine if their financial performance is efficient or inefficient in the Puerto Rico health care system. The findings from the research show that 53% or more of the 17 selected financial ratios, compared globally, suggest being efficient in both types of hospitals. This means that these financial ratios were greater than or equal to the industry benchmark.

Keywords: industry benchmark, ratio analysis, financial statements, decision making, financial performance.

RESUMEN

El *benchmarking* se considera un componente clave del sistema de medición del desempeño de una organización. Este estudio examina una muestra de 53 hospitales con y sin fines de lucro adscritos al Directorio Americano de Hospitales, a través de cuatro dimensiones financieras: liquidez, eficiencia, rentabilidad y estructura de capital. El propósito del estudio es validar si el *benchmark* de la industria difiere o no de un grupo de 17 índices financieros seleccionados, para determinar si su desempeño es eficiente o ineficiente en el sistema hospitalario de Puerto Rico. Los resultados muestran que el 53% o más de los índices financieros seleccionados, comparados globalmente, sugieren ser eficientes en ambos tipos de hospitales. Esto significa que estos índices financieros fueron mayores o iguales que el *benchmark* de la industria.

Palabras clave: *benchmarking* de la industria, análisis de *ratios*, estados financieros, toma de decisiones, desempeño financiero.

Healthcare facilities are turning towards benchmarking practices due to compliance with the standards of accreditation by the Joint Commission on Accreditation of Healthcare Organization (JCAHO) and the Center for Medicare & Medicaid Service (CMS) (Sorying Consulting, 2012). JCAHO accreditation and certification is recognized nationwide as a symbol of quality since many healthcare institutions and facilities, which are beneficiaries of Medicare and Medicaid, are accredited by this organization (JCIASH, 2014). The CMS (2015) is an agency of the U.S. Department of Health & Human Services responsible for the administration of several key federal health care programs (Phillips, 2015). JCAHO and CMS command that all the healthcare facilities provide safe and high quality care to their beneficiaries. In their initial process of certification, when an entity seeks to participate in Medicare, the first step is to complete and submit an enrollment application known as CMS-855A. This application's request is to fill out a questionnaire about enrollment, payment rules and financial solvency (CMS, 2015); therefore, it is very important to establish that, if the hospital wants to participate in Medicare programs, it needs to have financial solvency.

Most of the benchmarks used by the JCAHO and CMS in their hospital accreditations only measure the practices against norms and standards, comparing the quality of services (surgical techniques, therapeutic approaches, etc.), not the financial performance or solvency of the institution. In accordance with recent studies, such as Ettorchi, Levit, and Michel (2012), benchmarking in health care is not a subject that has ever been studied in a systematic and standardized way. It is confirmed by literature review that benchmarking, as an industry practice, is rarely implemented; other approaches similar to benchmarking are used.

For more than ten years now the demand for financial performance has become a primary issue for the health care system due to control cost factors, management risk structure, setup, quality care and patient expected satisfaction. These demands have been forcing the amplification of many projects for development and comparison indicators. The term benchmarking emerges within this context of comparison process (Ettorchi, Levit, & Michel, 2012).

Many studies in literature, such as Camp (1989), Zairi (1992), Smith, Ritter, and Tuggle (1993), Vaziri (1992), Watson (1993), Kleiner (1994), Rogers, Daugherty, and Stank (1995), Kozak (2004), and others, agree in their investigations that benchmarking is the most useful strategic tool for hospitals to help leaders achieve and enable a higher level of quality in the decision making process and best practices from the "best in class" companies inside and outside the industry. The points of convergence in their investigations mostly are: the multiple definitions of the concept, the advantages and uses of benchmarking, the beginning of the concept in history, comparison of benchmark quality in services, etc.; they rarely used the tool with a financial perspective or validated it as efficient or inefficient using the industry benchmark.

Our study is based on meeting these needs in the literature, especially in the healthcare system. In an era of resource constraints, the ability to validate efficient hospitals over their inefficient counterparts by the tool of benchmarking provides a great help for hospital managers to discover and reduce potential inefficiencies, and to provide the health administration authorities measures that may be used to promote financial solvency (Almeida & Fique, 2011).

This paper addresses the improvement of healthcare system financial performance through the benchmarking tool. Our primary interest is to focus, confirm, and validate with the industry benchmark, whether or not the financial performances of the profit and nonprofit hospitals in Puerto Rico are at the same financial position level with the "best companies" in the same industry. We want to examine and provide a better understanding of the utilization and validation of the benchmark industry in the organization; moreover, to become acquainted with the real situation in the healthcare system in comparison with the industry, to help the top administration examine and detect early warning signals of danger, take corrective actions, and prevent further erosion of the organization's financial health. To address these concerns, the remainder of the paper is organized as follows: the first section looks at a literature overview; furthermore, this paper provides the proposed hypothesis research method, results, theoretical and managerial

implications, limitations of the study, and future research. The paper ends with a discussion and some concluding remarks.

Literature Overview

The term *benchmarking* was for the first time introduced in the industrial sector in the 1980s by the Xerox Company and its initial use was as a method of comparing the production cost with competitors in the same sector. Later, it became a method for continuous quality improvement in any sector (Ettorchi, Levit, & Michel, 2012).

Subsequently, in the '80s and '90s, researchers such as Camp (1989) and Geber (1990) defined the concept of benchmarking as the process of finding examples of world-class product, service or system and then, adjusting or matching them to overcome the rules. They describe benchmarking as a continuous process of measuring products or services and practices against the toughest competitor of the most recognized companies as industry leaders.

As the concept of benchmarking evolved, other researchers, such as Vaziri (1992), Watson (1993), and Kleiner (1994) support the definition that benchmarking is an excellent tool used to identify a target for improving organizational performance, partners who have achieved these goals and practices that are applicable to incorporate an effort to redesign or restructure the company. They agree that benchmarking is a continuous input of new information to an organization and its three most important principles are: (a) the maintenance of quality, (b) customer satisfaction, and (c) continuous improvement. The concept of benchmarking has changed over the time; has multiplied and diversified its definitions, which are found mainly in the industrial sector as we see in Table 1.

Table 1

Benchmarking Definitions

Authors	Year	Definitions
David Kearns, Executive Director, Xerox Corporation (Cited in Camp, 1989)	1980	Benchmarking is the continuous process of measuring products, services, and practices against the toughest competitors or those companies recognized as industry leaders.
Robert C. Camp	1989	Benchmarking is the search for best practices for a given activity that will ensure superiority.
Geber	1990	A process of finding the world-class examples of a product, service or operational system and then adjusting products and services to meet or beat those standards.
Geral J. Balm	1992	The ongoing of comparing one's own process, product or service against the best known similar activity so that challenging but attainable goals can be set and a realistic course of action implemented to efficiently become and remain best of the best in a reasonable time.
Watson	1993	The continuous input of new information to an organization.
Kleiner	1994	An excellent tool to use in order to identify a performance goal for improvement, identify partners who have accomplished these goals and identify applicable practices to incorporate into a redesign effort.
Cook	1995	A kind of performance improvement process that identifies understands and adopts outstanding practices from within the same organization or from other businesses.
APQC (American Productivity and Quality Center)	1999	The process of continuously comparing and measuring an organization against business leaders anywhere in the world, to gain information that will help the organization take action to improve its performance.
EFQM-European Benchmarking Code of Conduct	2009	The process of identifying and learning from good practices in other organizations.

Source: Balm (1992); Camp (1989); EFQM (2009).

Despite some researchers coinciding and agreeing on many assertions, others have raised controversies on these approaches; for instance, studies from Kozak (2004) suggest that benchmarking is not a continuous process but it is a perishable and time-sensitive one. He considers and pushes forward that what is a standard of excellence today can be tomorrow's expected performance; thus, the improvement in company performance should be an ongoing process, and benchmarking can be considered a part of that process. Likewise, Ettorchi, Levit, and Michel (2012) studies agree that benchmarking often refers to the comparison in a time limited approach, and it is not often perceived as a tool for continuous improvement and change support. Benchmarking comparison of outcome indicators in the health care system dates back to the 17th century and its primary application was to compare mortality in hospitals (Braillon, Chaine & Gignon, 2008). In this period, benchmarking also emerged in the United States and in the United Kingdom with the purpose of comparing hospitals' outcomes and rationalizing their funding (Camp, 1998; Dewan, Daniels, Zieman & Kramer, 2000).

From the mid to late 1990s in the United States, it began as a structure method and was used to improve the quality of services as a requirement of the JCAHO (Phillips, 1995; Bullivant, 1998; Camp, 1998). The JCAHO is an independent nonprofit organization that accredits and certifies nearly 21,000 healthcare organizations and programs in the United States. It is a nationwide organization recognized as a symbol of quality and many institutions and facilities of healthcare, which are beneficiaries of Medicare and Medicaid, are accredited by this organization (JCIASH, 2014).

The JCAHO and the CMS command that all healthcare facilities provide safe and high quality care to their beneficiaries. The CMS defines safe and quality care by setting standards or benchmarks that the healthcare organization must accomplish in several measurable areas and by being comparable with the CMS benchmarks indicating success or failure in their performance (Phillips, 2015). These benchmarks are known as accountability measures (previously core measures) that are part of the collective joint commis-

sion hospital quality measures. These accountability benchmarks measure or quantify: healthcare processes, outcomes, patient perceptions, and organizational structure or systems that are associated with the ability to provide high-quality health care and that relate to one or more quality goals for health care; these goals include: effective, safe, efficient, patient-centered, equitable, and timely care (CMS, 2015). The benchmarks used by the JCAHO on their hospital accreditation are benchmarks that measure the quality of services but not the financial performance or solvency of the institution.

According to Camp (1989), Zairi (1992), Smith, Ritter, and Tuggle (1993), and Rogers, Daugherty, and Stank (1995), the advantages of using the tool of benchmarking help the organization understand where there are strengths and weaknesses; they enable the organizations to realize the level of performance and how they can still improve; however, given these advantages, two further points need to be considered. First, studies about benchmarking in the healthcare sector have experienced several modifications, and second, there are still many gaps in the literature regarding the healthcare system (Bayney, 2005; Collins-Fulea, Mohr, & Tillett, 2005; Ellershaw, Gambles, & McGlinchey, 2008; Meissner, Mescha, Rothaug, Zwacka, Gottermann, Ulrich, & Schleppers, 2008). In the first instance, benchmark was essentially the comparison of performance outcomes to identify differences, and later it included an analysis of process and success factors for producing higher levels of performance. The most recent modifications of the concept were related to the need to meet patients' expectations (Ellis, 2006).

In the second instance, there are still many gaps in the literature regarding the healthcare system and evidence that supports this position can be found in Dorsch and Yasin's (1998) studies. They have found that the academic community is lagging behind in terms of providing and promoting models and frameworks that integrate multiple facets of benchmarking in the organization. Both authors point out that most research in the literature often lacks a systematic approach to the evaluation of results; however, benchmarking affects all aspects of an organization, but studies tend to focus on

one zone: comparing similar functions in different organizations, exchanging knowledge on a particular activity with the aim of improving the field under study, and comparing the processes and the exchange of best practices in clinical care. Benchmarking is not integrated with other organizational processes such as the measure of the financial performance or solvency of the hospital system using the industry benchmark.

Dorsch and Yasin (1998) also claim that the literature lacks studies of costs and benefits of benchmarking and these should be strengthened. Organizations that operate today in the public dynamic environment should not and cannot ignore the importance of benchmarking focused on both processes. Before considering quality of services, it is important to note that financial solvency is linked to quality of services, if the organization wants to be successful. At the same time, according to Ellis (2006), nowadays the concept of benchmarking is often compromised by limiting it to a simple comparison of the results, while in reality it should be taken further, to promote discussion among the top management practice professionals in order to stimulate cultural and organizational change within organizations.

In accordance with Bodinson (2005), the success of a hospital organization is mainly due to how well their leadership can create a culture of excellence, and achieve financial security and improvements in their operational methods. That financial security can be achieved through the use of best assessment practices, the implementation of effective methods and the tools for analysis of their financial information in assessing its financial statements for decision-making.

When it comes to achieving an efficient financial performance, many elements are related: the patient experience, organizational structure, financial performance, and the satisfaction of the staff. The leaders in each of these elements have a responsibility to implement best practices and to focus on strategies that lead the company to success (Bodinson, 2005).

As we have read in this literature overview, there are many gaps that we need to fill in as researchers associated with the benchmark-

ing tool. It is important to know the definitions of the concept, its advantages and disadvantages, and what its role is in the healthcare system; but, we need studies whose primary premise is to focus and validate the benchmarking tool in the financial perspective of the organization with the commission to help the executives and the healthcare system top management identify and correct weak and distress areas in their organization. To date, no systematic investigation has considered examining this financial perspective. Although we know that the standard of excellence today may be the expected performance of tomorrow (Kozak, 2004), the continuous improvement of an organization's performance against the best in the industry can maintain quality, productivity, efficiency, customer satisfaction, competitive advantage, and a clear understanding where they have strengths, weaknesses or opportunities to identify gaps in performance. On what follows, we present a hypothesis concerning the comparison of the financial performance between for profit and nonprofit hospitals and the industry benchmark between the dimensions of liquidity, efficiency, capital structure, and profitability.

Hypothesis

The underlying theoretical foundation behind our approach is that for more than ten years now, the demands for performance have become a primary issue for the healthcare system due to factors of control costs, structure management risk, quality care setup, and satisfaction of patient's expectation. These demands have been forcing the amplification of many projects for indicator development and comparison. Recent studies, like Ettorchi, Levit, and Michel (2012), explain that benchmarking in healthcare is not a subject that has ever been studied in a systematic and standardized way, and confirm that in a review of the literature, benchmarking as practiced in industry is rarely implemented; other approaches similar to benchmarking have been used. Our studied hypothesis is based on fulfilling this need of a study in a systematic and standardized way in the healthcare system. Based on this reasoning we hypothesize the following:

H_0: In Puerto Rico, the financial performance of for profit hospitals does not significantly differ from the industry benchmark among the dimensions of liquidity, efficiency, capital structure, and profitability compared to nonprofit hospitals.

H_a: In Puerto Rico, the financial performance of for profit hospitals significantly differs from the industry benchmark among the dimensions of liquidity, efficiency, capital structure, and profitability compared to nonprofit hospitals.

The null hypothesis will be tested at a significance level of .05 where: P value < .05 the null hypothesis is rejected; that is, the financial performance of for profit hospitals significantly differs from the industry benchmark among the dimensions of liquidity, efficiency, capital structure, and profitability compared to nonprofit hospitals. P value > .05 null hypothesis is retained; that is, the financial performance of for profit hospitals does not significantly differ from the industry benchmark among the dimensions of liquidity, efficiency, capital structure, and profitability compared to nonprofit hospitals.

The principal premise of this quantitative study is to validate whether the financial industry benchmark differs or not from a group of 17 selected financial ratios of for profit and nonprofit hospitals, to determine if their financial performance is efficient or inefficient in the healthcare system of Puerto Rico. Contrary to previous researches, such as Bayney (2005), Collins-Fulea, Mohr, and Tillett (2005), Ellershaw, Gambles, and McGlinchey (2008), and Meissner, Mescha, Rothaug, Zwacka, Gottermann, Ulrich, and Schleppers (2008) our goal in this research is to focus and confirm if the financial performance of the hospitals in Puerto Rico is at the same financial position level with the "best companies" in the healthcare industry through the tool of benchmarking.

In accordance with Jacobs (2001), increasing emphasis is being placed on measures of efficiency in hospitals to compare their relative performance given the need to ensure the best use of scarce resources. Few studies have, however, assessed the consistency of ef-

ficiency rankings across different methodologies. It is often argued that health care institutions are not expected to be efficient, as they do not adhere to neo-classical firm optimization behavior; nonetheless, given the vast amount of resources that go towards funding such institutions, there is a great and growing interest in examining efficiency in hospitals with the driving force for such concern being valued for money.

The idea behind validating the industry benchmarking is to measure a group of selected hospital financial ratios against an external standard as the industry benchmark. It is a way to learn which companies are the best in carrying out certain activities and functions and then imitate or, even better, improve their techniques.

Method

In this study the data was collected from the American Hospital Directory (AHD) as shown in their website (http://www.ahd.com), for a trial period of five years from 2008 to 2012. AHD is a private organization founded in 1996 that provides online database and financial information from more than 6,000 for profit, nonprofit, and government hospitals of the United States and Puerto Rico. This website is the source of each indicator used in this study. In this website we can access the hospital profiles, statistics of services provided, utilization statistics, accreditation status, financial information, and key statistics of: bed size, discharges, patient days, and gross patient revenue. Also, we can access the audited financial statement of all the hospitals as balance sheet and income statement, and a financial indicators section with 17 financial ratios previously calculated from their financial formula. For this study, we use all the financial ratios provided from the financial indicators section, for the years 2008 to 2012.

The financial information in this website is from the Medicare cost reports that are maintained in cooperation with Cost Report Data Resources, an online source for cost report data. We use this secondary data because it contains the most recent version (i.e. as submitted, settled, and reopened) of each cost report filed with

CMS, since federal FY 1996. Cost reports are filed annually by hospitals, according to their individual reporting years. This dataset is updated quarterly by CMS. According to Schuhmann (2008), the Cost Report data is a useful tool that can be used to examine trends in hospitals individually and in groups during different years.

The total population in the study was 53 (N) hospitals, $n_1 = 33$ for profit hospitals and $n_2 = 20$ nonprofit hospitals in a sample applied to the healthcare system in Puerto Rico. The sample is distributed as following: 38% of the sample corresponds to nonprofit hospitals and the remaining 62% to for profit hospitals. From this total, 30% corresponds to hospitals with fewer than 99 beds, 47% to hospitals with between 100-199 beds, and 23% to hospitals with more than 200 beds. We use the 100% of for profit and nonprofit hospitals registered to the AHD website. We did not use the government hospitals because the information in the directory was not updated and it was incomplete.

Panel data was used for the organization of the data. This technique provides us with very valid information following the hospital financial ratios over time and offers a more complete vision about the problem that guides us to best interpreting the dynamics of changes. We organize the data in an Excel Microsoft table with descriptive information about the sample of the 53 hospitals: their names, hospital type (profit or nonprofit), bed size, and each financial ratio obtained from AHD website organize by dimensions (liquidity, efficiency, capital structure, and profitability) and by years (2008-2012). We incorporated the financial ratio data into multiple tables, which undergo testing and evaluation of the statistical program SPSS.

The study involves similar samples from both groups of hospitals. To ensure that homogeneity, for profit and nonprofit hospitals were divided into three different groups or categories, based on their number of bed size (< 99, 100-199 and > 200 beds). These size categories are commonly used by national organizations in the US to classify hospitals for comparison, such as the Nationwide Inpatient Sample (NIS). According with the Agency of Healthcare Research and Quality (AHRQ) (2012), NIS is the largest publicly

available all-payer inpatient health care database in the United States. The sample of hospitals in the NIS is stratified on hospital size and weight to the American Hospital Association (AHA) universe to better represent the universe of hospitals. In AHA report, bed size refers to the number of beds the hospital is licensed to use (AHA, 2009). NIS estimates five hospital sampling strata, which are the following: (a) Geographic Region: Midwest, Northeast, West, and South; (b) Ownership: government, investor-owned (profit), and nonprofit nongovernment, (c) Location*:* urban and rural; (d) Teaching Status*:* teaching and non-teaching; and (e) Bed size: small, medium, and large, specific to the hospital's location and teaching status. Table 2 shows NIS bed size categories:

Table 2

Bed Size Categories

Location and Teaching Status	Bed Size		
	Small	Medium	Large
Rural	1-49	50-99	100+
Urban, nonteaching	1-99	100-199	200+
Urban, teaching	1-299	300-499	500+

Source: American Hospital Association (2009).

In Puerto Rico, according to the hospital profile data of the AHD, all the hospitals are listed as urban, nonteaching hospitals; therefore, we use the classification of the groups in accordance with NIS bed size categories: small (less than 99 beds), medium (100-199 beds), and large (more than 200 beds) (AHD, 2012).

In each hospital category (< 99, 100-199, and > 200 beds), by dimension, we compared a group of selected financial ratios of each type of hospital and validated them with the industry benchmark by the statistic tool of one sample t-test and established whether their difference is significantly lower, significantly higher or not significant. Econometrically, the setup is $y_{it} = a + bx_{it} + u_{it}$; where y_{it} is the dependent variable (financial performance), a is the intercept term, b is a $k \times 1$ vector of parameters to be estimated on

the explanatory variables, x_{it}; $t = 1, T$ (2008-2012); $i = 1, N$ (financial ratios); u_{it} refers to purely random error. Our study validates if the financial industry benchmark differs or not from a group of selected financial ratios of for profit and nonprofit hospitals, to determine whether or not their financial performance is efficient or inefficient in the healthcare system of Puerto Rico. The econometric model is related to the benchmark as:

$$\text{Finaratio}_{it} = b_1 + b_2 \text{bench}_{it} + a_{it} + \text{year08}_i + \varepsilon_{it}$$

Finaratio = Financial ratios
Bench = Industry benchmarks
year08 = 2008, 09 if 2009, 10 if 2010, 11 if 2011, and 12 if 2012

The dependent variable in this study is a categorical variable, which is the financial performance divided into two mutually exclusive groups and coded with a value of 0 for efficient financial performance and a value of 1 for inefficient financial performance. According to Bhunia, Mukhuti, and Roy (2011), financial performance is defined as the act of conducting financial activity. In a broader sense, financial performance is the degree to which financial objectives have been achieved. It is the process of measuring the results of business policies and operations in monetary terms. It is used to measure the overall financial health of the firm for a certain period of time and can be used to compare similar businesses through the same industry or to compare different industries or sectors. An efficient financial performance refers to a degree to which financial activity meets the needs of the organization. Efficiency is a quantitative economic measure that defines the use of resources of the organization for a given level of customer satisfaction (Kaplan & Norton, 2001). An inefficient financial performance means, on the contrary, that the financial activity does not cover the needs of the organization.

For the evaluation of the five years (2008-2012), we used the financial benchmark prevailing in the industry for 2012 and corresponding to a group of generic benchmarks taken in the health-

care industry from several sources like the *Almanac of Hospital Financial & Operating Indicators 2014* (Optuminsight, 2014); *2012 Annual Global Corporate Default Study and Rating Transitions* (Vazza & Kraemer, 2012); *Becker's Hospital Review* (2012); and the Healthcare Financial Management Association (HFMA) (2012). Generic benchmarking is an effective tool used when an important process needs significant improvement and would benefit from some revolutionary ideas. It primarily focuses on the need for drastic process improvement regardless of the industry or organization you compare it with (Amerinet, 2013).

In this study, we are focused on validating whether the financial industry benchmark differs or not from a group of selected financial ratios of for profit and nonprofit hospitals, to determine if their financial performance is an efficient or inefficient one in the healthcare system of Puerto Rico. In each category of hospitals (< 99, 100-199, and > 200 beds), we compare whether or not the averages of the variables of the two types of hospitals are equivalent or significantly differ from the industry benchmark and establish whether or not the difference is significantly lower, significantly higher, or not so significant at all. To establish these differences, we use the following researcher criteria, as set forth in Table 3.

Table 3

Industry Benchmark Evaluation Criteria

Criteria	Description
Significantly Higher	The financial ratios exceed the industry benchmark by 50%.
Significantly Lower	The financial ratios are lower than industry benchmark by 50%
Not Significant	The financial ratios do not exceed the industry benchmark.

Source: Own elaboration.

These evaluation criteria are used based on Kelessidis (2000) studies, which point out that using the external benchmarking tool (industry benchmark), the organization may have the ability to compare their results with other organizations with global operations, as well as organizations included in its industrial sector. If external benchmarking results have scores above 50%, it means that the results were significantly higher than other companies worldwide and within their industry. In other words, this determines who were leading the comparative category; on the contrary, if the scores are less favorable than the external benchmarking or lower than 50%, this determines who are not the leaders in the comparative category (The Social Workplace, 2012).

The understanding of these comparisons provided the momentum necessary for the organization to make the needed improvements in the most critical areas in need of change. The desire of the organization is to remain competitive within the industry, to maintain turnover, and to ensure that key talent and experience is not lost.

The dependent variable is going to be measured as follows: we compare the 17 financial ratios, with the industry benchmark separated into the three categories (< 99, 100-199, and > 200 beds); then, we point out those that are greater or equal than the industry benchmark, taking in consideration the above criteria. Second, we point out those that were lower than the industry benchmark, also taking into consideration the above criteria. When all is identified, we calculate the percentage (of the total of 17 financial ratios) for the first group and the second group. This is going to be performed to for profit and nonprofit hospitals. The criterion used was: if 50% or more of the total of financial ratios are greater or equal than the industry benchmark this is classified as efficient performance. This means that the financial activity of the hospital meets the financial needs of the organization in comparison to the best in class of the industry. Otherwise, if fewer than 50% of the total financial ratios are greater or equal than the industry benchmark, this is classified as inefficient performance. This means that the financial activity of the hospital does not meet the financial needs of the organization in comparison to the best in class of the industry. The independent

variables are the 17 financial ratios classified by dimension and obtained from the AHD website, which is show in Table 4:

Table 4

Independent Variables

#	Variable Code	Description	Financial Dimension
1	CUR	Current Ratio	Liquidity
2	QKR	Quick Ratio	Liquidity
3	DCH	Days Cash on Hand	Liquidity
4	DCHAS	Days Cash on Hand All Sources	Liquidity
5	DNPAR	Days in Net Patient Account Receivables	Liquidity
6	DNTR	Days in Net Total Receivables	Liquidity
7	APP	Average Payment Period (days)	Efficiency
8	INT	Inventory Turnover	Efficiency
9	TAT	Total Assets Turnover	Efficiency
10	LDNA	Long Term Debt to Net Assets	Capital Structure
11	TDNA	Total Debt to Net Assets	Capital Structure
12	AAP	Average Age of Plant	Capital Structure
13	OPM	Operating Margin	Profitability
14	EXM	Excess Margin	Profitability
15	PEX	Personnel Expense as a Percent of Total Operating Revenue	Profitability
16	ROE	Return on Equity	Profitability
17	ROA	Return on Assets	Profitability

Source: Own elaboration.

We also take into consideration the criteria or the Expected Effect established by the HFMA (2012) when evaluating the financial ratios. Our study uses this evaluation metric because the HFMA is the most important organization in the United States, with more than 40,000 nationwide memberships. This organization builds and supports other healthcare associations and industry groups, to achieve consensus on the solutions needed for the challenges facing the healthcare system today. This association identifies gaps

throughout the healthcare system and is the bridge and link for the creation and exchange of knowledge and best practices in the system.

The HFMA regularly conducts extensive research on the finance healthcare industry through evaluations, survey, consultations, etc., in order to acquire information on the current state of the financial management of health and new trends in the field. We are confident that the Expected Effect Established by the HFMA (2012) used for the analysis is a representative metric and a reliable tool, to decide on what is efficient or inefficient in the healthcare system in this study. According to Pink, Holmes, Slifkin, and Thompson (2009), norms, standards, and assessments of financial ratios of the HFMA are updated regularly and the organization compiles data from 11 financial agencies with high prestige and reliability as: Standard & Poors, Fitch, Thomson Healthcare, Advantage Data Corp., INGENIX, and Premier, Inc. These standards of evaluation established by the HFMA are shown in Table 5:

Table 5

Expected Effect Established by the HFMA (2012)

Independent Variables-Financial Ratios Expected Effect (HFMA, 2012)			
#	Variable Code	Description	Expected Effect Greater Better (+) Lower Better (-)
1	CUR	Current Ratio	1.5 – 3.0
2	QKR	Quick Ratio	(+)
3	DCH	Days Cash on Hand	(+)
4	DCHAS	Days Cash on Hand All Sources	(+)
5	DNPAR	Days in Net Patient Account Receivables	40-50
6	DNTR	Days in Net Total Receivables	40-50
7	APP	Average Payment Period (days)	(-)
8	INT	Inventory Turnover	(+)
9	TAT	Total Assets Turnover	(+)
10	LDNA	Long Term Debt to Net Assets	(-)

11	TDNA	Total Debt to Net Assets	(-)
12	AAP	Average Age of Plant	(-)
13	OPM	Operating Margin	(+)
14	EXM	Excess Margin	(+)
15	PEX	Personnel Expense as a Percent of Total Operating Revenue	(-)
16	ROE	Return on Equity	(+)
17	ROA	Return on Assets	(+)

Source: HFMA (2012).

Before doing further regression analysis, we check the existence of multicollinearity for a perfect or exact linear relationship among all the explanatory variables of the regression model. In this study, the Variance Inflation Factor (VIF) index is used to determine whether a test result is reliable or not. In multiple regressions, according to Hair, Anderson, Tatham, & Black (1995), the variance inflation factor (VIF) is used as an indicator of multicollinearity and computationally; it is defined as the reciprocal of tolerance: $1 / (1 - R^2)$. All researchers want lower levels of VIF and it is known that higher levels of VIF affect the results associated with a multiple regression analysis adversely.

Various recommendations for acceptable levels of VIF have been published in the literature. Perhaps most commonly, a value of 10 has been recommended as the maximum level of VIF (Hair, Anderson, Tatham, & Black, 1995; Kennedy, 1992; Marquardt, 1970; Neter, Wasserman, & Kutner, 1989); however, a recommended maximum VIF value of 5 (Rogerson, 2001) and even 4 (Pan & Jackson, 2008) can be found in the literature. It would appear that researchers can use whichever criterion they wish to help serve their own purposes. In this study, we performed the test of multicollinearity with the standardized predictors, and the results of the VIFs are down to an acceptable range of 10.

Parametric tests were deemed appropriated in this study because they are methods that make assumptions about the parameters (defining properties) of the population distributions from which one's

data are drawn. We performed statistic tests for the data by using the one sample t-test that allowed us to validate the industry benchmark, with the selected financial ratios of for profit and nonprofit hospitals, and to know which one significantly differs in their financial performance from the other. Also, to confirm the results from extreme data, we use the independent t-test to reinforce if the null hypothesis holds, and to compare the two independent groups (nonprofit versus for profit hospitals).

In previous studies as Bayney (2005), Collins-Fulea, Mohr, and Tillett (2005), Ellershaw, Gambles, and McGlinchey (2008), Meissner, Mescha, Rothaug, Zwacka, Gottermann, Ulrich, and Schleppers (2008) they do not validate or compare the industry benchmark with financial ratios. To date, no systematic investigation has considered this perspective; our study is the first to evaluate this combination of ratios, dimension and industry benchmark.

Results

Results by Financial Dimensions

Given the nested nature of our data, we tested our hypothesis by using the one sample t-test, with the key advantage that this test allowed us to compare and validate whether the financial industry benchmark differs or not from the selected financial ratios of for profit and nonprofit hospitals, and to determine whether their financial performance is an efficient or inefficient one in the healthcare system of Puerto Rico.

Since our data are divided into two types of hospitals (for profit and nonprofit hospitals), three categories of hospitals by bed size (< 99, 100-199, and > 200 beds), and by financial dimensions, we tested the null hypothesis considering these three elements.

Table 6 provides the descriptive statistics and results of the financial ratios using the one sample t-test, to validate the industry benchmark in the three categories of for profit and nonprofit hospitals (< 99, 100-199, > 200 beds), in the dimension of liquidity. To test our hypothesis, we ran an analysis in all the control variables belonging to this dimension.

In the results, it is important to point out that the financial ratios of Days in Net Patient Account Receivable (DNPAR), for profit hospitals in the three categories of beds have significant differences with the industry benchmark. As we see in Table 6, the financial ratios of < 99 beds (M = 98.02, p = .008), between 100-199 beds (M = 113.30, p = .000) and > 200 beds (M = 68.42, p = .011) get a significance level (2-tailed) of less than 0.05. They were greater than the industry benchmark that was 45.02. According to the proposed hypothesis, the financial performance for these financial ratios differ significantly from the industry benchmark; thus, we rejected the null hypothesis.

Nonprofit hospitals also have a comparable situation with for profit hospitals. In the three categories of beds, the average for < 99 beds (M = 118.3, p = .017), between 100-199 beds (M = 113.3, p = .000), and > 200 beds (M = 106.82, p = .026) gets a significance level (2-tailed) of less than 0.05. The financial ratios were greater than the industry benchmark (45.02). According to the proposed hypothesis, the financial performance for these financial ratios differs significantly from the industry benchmark; thus, we rejected the null hypothesis.

Other ratio with similar results was Days in Net Total Receivables (DNTR). For profit hospitals in the three categories, the financial ratios for < 99 beds (M = 109.2, p = .008), between 100-199 beds (M = 134.69, p = .014), and > 200 beds (M = 76.17, p = .005) get a significance level (2-tailed) of less than 0.05. They were greater than the industry benchmark, which was 50.80. According to the proposed hypothesis the financial performance for these financial ratios differs significantly from the industry benchmark, so we rejected the null hypothesis. Nonprofit hospitals also have the similar situation than for profit hospitals. The financial ratios for < 99 beds (M = 123.3, p = .021), between 100-199 beds (M = 88.86, p = .010), and > 200 beds (M = 125.16, p = .011) get a significance level (2-tailed) less than 0.05. They were greater than the industry benchmark, which was 50.80. Concurring with the proposed hypothesis the financial performance for these financial ratios differs significantly from the industry benchmark, so we rejected the null hypothesis.

The most significant impact of these results was in the category of hospitals between 100-199 beds, because the result shows that all financial ratios to for profit hospitals differ significantly from the industry benchmark. They were lower than the benchmark for the industry ($p < .05$), which the study suggests in the liquidity dimension, for profit hospitals between 100-199 beds have no liquidity or they have very poor.

Table 6

Dimension of Liquidity-Comparison Between the Average of Ratios and the Industry Benchmark, for Profit and Nonprofit Hospitals

Liquidity			< 99 Beds				100-199 Beds				>200 Beds			
	Ratios	Industry Bench-mark	FP n = 10	Sig	NFP n = 6	Sig	FP n = 16	Sig	NFP n = 9	Sig	FP n = 7	Sig	NFP n = 5	Sig
1	CUR	2.15	2.84	0.495	2.61	0.687	1.42	.000*	1.88	.0376	3.94	0.518	1.28	.027*
2	QKR	1.65	2.72	0.293	2.48	0.474	1.32	.047*	1.77	.651	3.91	0.421	1.24	151
3	DCH	30.5	34.48	0.915	30.13	0.983	15.16	.002*	35.76	.471	25.12	0.568	10.74	.010*
4	DCHAS	93.8	228.01	0.487	32.73	.018*	33.35	.004*	41.13	.000*	34.77	.008*	12.14	.000*
5	DNPAR	45.02	98.02	.008*	118.3	.017*	113.30	.000*	80.45	.000*	68.42	.011*	106.82	.026*
6	DNTR	50.8	109.2	.008*	123.3	.021*	134.69	.014*	88.86	.000*	76.17	.005*	125.16	.011*

Note. * = $p < .05$, FP = for profit hospital, NFP = nonprofit hospitals.
Source: Own elaboration.

Table 7 provides the descriptive statistics and results of the financial ratios using the one sample t-test, to validate the industry benchmark in the three categories of for profit and nonprofit hospitals, in the dimension of efficiency. To test our hypothesis, we ran an analysis in all the control variables belonging to this dimension.

As we see in Table 7, in the dimension of efficiency, the majority of the financial ratios in all the categories gets a significance level (2-tailed) greater than 0.05; therefore, the financial performance in these ratios does not differ significantly from the industry benchmark. The exception was in the financial ratio of Inventory Turn Over (INT) of for profit hospitals. As we see in Table 7, the financial ratios of < 99 beds ($M = 86.2$, $p = .021$), between 100-199 beds ($M = 48.87$, $p = .016$), and > 200 beds ($M = 84.37$, $p = .049$) get a significance level (2-tailed) of less than 0.05. They were greater

than the industry benchmark, which were 28.72. Concurring with the proposed hypothesis, the financial performance for these financial ratios differs significantly from the industry benchmark; consequently, we rejected the null hypothesis.

Table 7

Dimension of Efficiency-Comparison Between the Average of Ratios and the Industry Benchmark, for Profit and Nonprofit Hospitals

Efficiency			< 99 Beds				100-199 Beds				> 200 Beds			
	Ratios	Industry Benchmark	FP n=10	Sig	NFP n=6	Sig	FP n=16	Sig	NFP n=9	Sig	FP n=7	Sig	NFP n=5	Sig
1	APP	51.8	75.8	0.151	175.7	0.095	97.44	.032*	119.9	0.332	89.51	0.118	139.72	0.056
2	INT	28.72	86.2	.021*	64.2	0.175	48.87	.016*	75.13	.017*	84.37	.049*	70.72	0.062
3	TAT	1.00	0.96	0.889	1.15	0.535	1.04	0.645	1.28	0.105	1.87	0.156	1.9	.025*

Note. * = p <.05, FP = for profit hospital, NFP = nonprofit hospitals
Source: Own elaboration.

Table 8 provides the descriptive statistics and results of the financial ratios using the one sample t-test, to validate the industry benchmark in the three categories of for profit and nonprofit hospitals, in the dimension of capital structure. To test our hypothesis, we ran an analysis in all the control variables belonging to this dimension.

As we see in the results in Table 8, the majority of the financial ratios in all the categories gets a significance level (2-tailed) greater than 0.05; therefore, the financial performance in these ratios does not differ significantly from the industry benchmark. The exception in the financial ratio of Total Debt to Net Assets (TDNA) in nonprofit hospitals was fewer than 99 beds (M = –4.24, P = .036, benchmark 3.02) and for profit hospitals was fewer than 99 beds (M = .886, p = .016, benchmark 3.02), Long Term to Net Assets (LDNA) for profit hospital more than 200 beds (M = 2.07, p = .052, benchmark .03) and Average Age of Plant (AAP) in for profit hospitals for more than 200 beds (M = 4.38, p = .047, benchmark 10.2). All these ratios get a significance level (2-tailed) of less than 0.05; so, concurring with the proposed hypothesis, we reject the null hypothesis, because the financial performance differs significantly from the industry benchmark.

Table 8

Dimension of Capital Structure-Comparison Between the Average of Ratios and the Industry Benchmark, for Profit and Nonprofit Hospitals

Capital Structure			< 99 BEDS				100-199 BEDS				>200 BEDS			
	Ratios	Industry Bench-mark	FP n=10	Sig	NFP n=6	Sig	FP n = 16	Sig	NFP n = 9	Sig	FP n = 7	Sig	NFP n = 5	Sig
1	LDNA	0.3	1.06	0.158	-2.46	0.143	0.473	0.798	9.69	0.221	2.07	.052*	-5.98	0.153
2	TDNA	3.02	0.886	.016*	-4.24	.036*	2.91	0.376	12.99	0.06	3.27	0.766	-2.15	0.35
3	AAP	10.2	14.13	0.443	-2.01	0.252	12.35	0.133	13.4	0.299	4.38	.047*	10.62	0.91

Note. * = p < .05, FP = for profit hospital, NFP = nonprofit hospitals
Source: Own elaboration.

Table 9 provides us the descriptive statistics and results of the financial ratios, using the one sample t-test to validate the industry benchmark in the three categories of profit and nonprofit hospitals in the dimension of profitability. To test our hypothesis, we ran an analysis in all the control variables belonging to this dimension.

As we see in the analysis, the results show that in the profitability dimension the majority of the financial ratios in all the categories get a significance level (2-tailed) greater than 0.05; therefore, the financial performance in these ratios does not differ significantly from the industry benchmark. The exception was in the financial ratio of Operating Margin (OPM) in nonprofit hospitals for the three categories of beds where the financial ratio for < 99 beds (M = –10.46, p = .042), between 100-199 beds (M = –2.02, p = .004), and > 200 beds (M = –5.78, p = .022) gets a significance level (2-tailed) of less than 0.05. The values were in negative numbers and the industry benchmark was a positive number of 2.64. These were lower than the industry benchmark and the difference is significant. According to the proposed hypothesis; thus, we rejected the null hypothesis.

Personnel expense as a Percent of Total Operating Revenue (PEX) in nonprofit hospitals gets a significance level (2-tailed) of less than 0.05 in the three categories of hospitals (< 99, M = 39.6, p = .007, 100-199, M = 40.9, p = .000, and > 200 beds, M = 42.18, p = .001); the industry benchmark was 57.5; so, the financial perfor-

mance for these financial ratios differs significantly from the industry benchmark. The PEX also was less than 0.05 in the categories of hospitals between 100 to 199 beds (M = 39.16, p = .000) and more than 200 beds (m = 38.28, p = .000) for profit hospitals; the industry benchmark was 57.5; so, they differ significantly from the industry benchmark which leads us to reject the null hypothesis.

Table 9

Dimension of Profitability-Comparison Between the Average Ratios and the Industry Benchmark, for Profit and Nonprofit Hospitals

Profitability			< 99 Beds				100-199 Beds				> 200 Beds			
	Ratios	Industry Benchmark	FP n=10	Sig	NFP n=6	Sig	FP n=16)	Sig	NFP n =9	Sig	FP n=7	Sig	NFP n=5	Sig
1	OPM	2.64	-0.87	0.731	-10.46	.042*	-1.96	0.218	-2.02	.004*	2.7	0.949	-5.78	.022*
2	EXM	3.82	1.4	0.79	-3.83	0.155	2.01	0.572	2.72	0.493	3.88	0.942	-1.32	0.127
3	PEX	57.5	43.76	0.083	39.6	.007*	39.16	.000*	40.9	.000*	38.28	.000*	42.18	.001*
4	ROE	5.7	-1.86	0.834	31.2	0.314	17.42	0.587	-42.38	0.513	21.02	0.124	-38.56	0.397
5	ROA	4.3	3.2	0.87	-5.11	0.244	5.33	0.633	3.74	0.815	9.09	0.356	-0.54	0.094

Note. * = p < .05, FP = for profit hospital, NFP = nonprofit hospitals
Source: Own elaboration.

Results From Independent Two Sample T-Test

An independent two samples t-test was conducted to compare for profit and nonprofit hospitals. The results show that there are no significant differences between for profit and nonprofit hospital with fewer than 99 beds and between 100-199 beds for all the 17 financial ratios tested. In the sample of hospitals with more than 200 beds only the financial ratio of DNTR statistically shows significant differences between for profit and nonprofit hospitals. Since p value (Sig. 2 tailed) = 0.037 < 0.05 we reject the null hypothesis because they were less than the industry benchmark. This result probably suggests that both types of hospitals are facing serious problems in their account receivable.

Results and Analysis by Years 2008-2012

Hospitals with less than 99 beds. The results show that for the years: 2008, 2011, and 2012, more than 60% of financial ratios of for profit hospitals, statistically were greater than or equal to the industry benchmark; however, more than the 60% of the financial ratios of nonprofit hospital were statistically greater than or equal to the industry benchmark for the years 2010, 2012, and for the average as well. The results show that only for the year of 2010, 33% of the financial ratios on for profit hospitals were statistically greater than or equal to the industry benchmark. These results suggest that for the years 2008, 2009, 2011, 2012, and the average, the financial performance of both types of hospitals was efficient because, when we validate with the industry benchmark, they were greater than or equal to the industry, except for the year 2010 that the percentage was lower.

Hospitals with 100-199 beds. The results show that for the years 2008 to 2012 and the average, more than 60% of the financial ratios between the two types of hospitals were statistically greater than or equal to the industry benchmarks. These results suggest that for the years 2008 to 2012 and the average, the financial performance of both types of hospitals was efficient because the validation with the industry benchmark was to be greater than or equal to the best in class of the industry.

Hospitals with more than 200 beds. The results show that for the years 2008 to 2012 and the average, 6% to 35% of the financial ratios of both types of hospitals were greater than or equal to the industry benchmark. These results suggest that the financial performance of both types of hospitals was inefficient when we compare or validate it with the industry benchmark. They were lower than the industry.

Discussion

The results of all the 17 financial ratios validated between the Expected Effect of HFMA (2012) and the industry benchmark for profit and nonprofit hospitals with fewer than 99 beds imply some areas of

concern. First, as we have mentioned before, financial ratios related to the collection of receivables as Days in Net Patient Accounts Receivables and Days in Net Total Receivables suggest being inefficient when we validated them with the industry benchmark. They were lower than the industry benchmark, lower than the "best in class" for the sector of health care. This means that both types of hospitals are facing serious problems in their accounts receivables, because they exceed the expected standards set by the HFMA for 2012 of an ideal collection period of 40-50 days. This result suggests that the solvency of both hospitals is poor and possibly the assets of the companies may be claimed by creditors, plus a high risk in the operation, and they could have difficulty obtaining loans for new projects.

The matter of interest in the results of hospitals between 100-199 beds is that 8 of the 17 financial ratios (47%), of for profit hospitals, and 9 of the 17 financial ratios (41%), of nonprofit hospital, suggest being inefficient when we compare them with the industry benchmark. They were lower than the industry benchmark. The results suggest that in this category the ability to pay or to meet the commitments in the short term obligations is inefficient compared to the industry benchmark. These results imply that for profit hospitals between 100-199 beds have no liquidity or they have a very poor one. This suggests that for profit hospitals do not have enough resources to pay its debts in the next 12 months, they cannot meet their obligations without relying too much of their inventory, they do not have a reasonable amount of days to pay their operating costs in cash if none of the receivables are collected, and they have serious problems to efficiently collect their accounts receivables.

Finally, the results of hospitals with more than 200 beds were similar to those of hospitals between 100-199 beds. In this category, 7 of the 17 financial ratios (41%) of for profit hospitals and 8 of the 17 financial ratios (47%) of nonprofit hospital suggest being inefficient when we validate them with the industry benchmark. They were lower than the industry benchmark. This implies that in this category the managers need to make adjustments in their finances for the better use of their physical assets to generate earnings in the companies. For the category of hospitals between 100-199 beds

and 200 beds, in both types of hospitals, the results in the financial ratio of PEX suggest being inefficient when we validate them with the industry benchmark. They were lower than the industry benchmark. This is the financial ratio that measures the value of expenses related to personnel, salaries, benefits, and payroll, similar training and social charges incurred by the organization. It implies that it is possible that both types of hospitals have problems with high payroll costs in their organizations.

The results with the financial ratio of Operating Margin for the three categories of nonprofit hospitals suggest being inefficient when we validate them with the industry benchmark. These were lower than the industry benchmark. In the three categories of hospitals bed size (< 99, 100-199, and > 200 beds), all financial ratios were negative, possibly implying that hospitals in this category have experienced money loss.

Theoretical Implications

This study validates 17 selected financial ratios, from audited statement of for profit and nonprofit hospitals registered in the AHD with the industry benchmark of the healthcare system. The study improves the understandings, with valuable information to the healthcare system, about the financial performance of for profit and nonprofit hospitals in Puerto Rico. The analysis of the financial ratios of the nonprofit hospitals with the industry benchmark suggests that the nonprofit hospitals have serious collection problems with their accounts receivables, significant pressure on cash flow, difficulties to pay their short-term obligations, and poor inventory turnover, which probably could be symptoms of excess in inventories, slow-moving of goods, or obsolete inventories. Also, they have difficulty paying their creditors, and are having problems with high payroll costs in their organizations. With for profit hospitals there was no exception, but in minor scale.

Managerial Implications

Benchmarking allows the managers of the company to determine the best practices to prioritize improvements in their oppor-

tunities. It also helps to improve performance on the patient's expectations, and to go through the traditional cycle of change. It also helps managers understand the most accurate and efficient means of carrying out an activity, to learn how to actually achieve lower costs and take steps to improve cost competitiveness in a company.

According to Sower (2007), benchmarking is not a tool to copy what other successful organizations are doing; this implies not only a better understanding of what they are doing to be successful, but also what is there to do to achieve their goals and objectives. The top management with this tool can understand that the financial improvement efforts and progress can be monitored over time, to determine whether the measures taken are effective and close all the gaps between the performance of a hospital and the industry benchmark or not. The management can take that information and apply it to their organizations, to determine how to achieve comparable results for internal and external conditions. Benchmarking helps the top managers of the organization to understand where there are strengths and weaknesses. The tool helps them realize how to enable the organization to reach the level of performance and how they can still improve (Camp, 1989; Zairi, 1992; Smith, Ritter, &Tuggle, 1993; Rogers, Daugherty, & Stank, 1995).

Limitations and Future Research

The above results must be viewed in the light of the study's limitations, which offer potentially fruitful avenues for future research on benchmarking. One important limitation this study presents is that benchmarking has simply helped spot areas which need improvement; it does not contribute to solving the issues in hand. Benchmarking can just be the first of many steps to improve a company's performance. Another limitation is that benchmarking is considered to be an ongoing process; it does not mean that once a company has set a benchmark, it would never have to set the benchmark again in the future; therefore, it is important to keep benchmarking updated and according to the market situation.

Other limitation is that there are different financial benchmarks to for profits and nonprofits in the same healthcare industry, and may even be different financial benchmarks for different categories or volume of beds in the industry. We use generic financial benchmarks in this study based on the premise that Nicholson, Pauly, Burns, Baumritter, and Asch (2000) affirm that for profit hospitals are a valid benchmark for the nonprofit hospital, because they are both subject to the same business conditions. Also, Horak (2014) states that both, for profit and nonprofit hospitals, operate profitably. Nonprofits hospitals must still operate profitably; their revenue must exceed expenses or they will go out of business. Both types of hospitals generally face the same economic and regulatory conditions; and, when prudent, both must manage and sometimes reduce expenses, including personnel costs. Generic benchmarking is the best tool used when an important process needs significant improvement and would benefit from some revolutionary ideas. It primarily focuses on the need for drastic process improvement regardless of the industry or organization you compare it with (Amerinet, 2013). Our primary interest is to focus, confirm, and validate it with the industry benchmark, if the financial performance of for profit and nonprofit hospitals in Puerto Rico are at the same financial position level with the best companies in the same industry.

Finally, future research might be to reconfirm the results with a qualitative research, ensuring that benchmarking on the healthcare system meets its goal, mainly to improve the financial performance in the hospital system. Another area to study is the internal benchmarking, comparing one operating unit or function with another within the same industry.

Conclusion

This article describes the method and results of the validation of 17 selected financial ratios affiliated to the ADH with the industry benchmark. We conducted a quantitative study with a sample of 53 hospitals, 20 nonprofit and 33 for profit hospitals, to test the hypothesis whether in Puerto Rico, the financial performance of

for profit hospitals does not differ or significantly differs from the industry benchmark among the dimensions of liquidity, efficiency, capital structure, and profitability compared to nonprofit hospitals. When this study takes these results into a general consideration with all the analysis, not by dimensions, 53% or more of the 17 financial selected ratios globally compared suggest being efficient in both types of hospitals, when we validate them with the industry benchmark; this means that these financial ratios were greater than or equal to the industry benchmark.

Based on these results and according to the proposed hypothesis, we retained the null hypothesis and conclude that, in Puerto Rico, the financial performance of for profit hospitals does not significantly differ from the benchmark for the industry among the dimensions of liquidity, efficiency, capital structure, and profitability compared to nonprofit hospitals.

When we made the comparative analysis considering the financial dimensions and the different categories of hospitals there are significant differences; especially in the category of 100-199 beds, the study implies the fact that both types of hospitals are facing serious problems in their accounts receivables. Accounts receivables are one of the most important assets for the company. Our study suggests that the tool of benchmarking is a key component and a valuable technique, for quickly lifting the financial performance of the organization and to push the boundaries to best practices. A good analysis of the financial situation through benchmarking provides opportunities of learning from the best practices and experiences of others who are at the leading edge.

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Puerto Rico and the United States Under the Cabotage Laws: A Breach to the World Trade Organization's Member Agreement?

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ABSTRACT

The objective of this essay is to evaluate the governmental and self-regulated power of Puerto Rico, regarding the cabotage laws and its relation with the United States. The history of Puerto Rico with the United States, certain laws and jurisprudence, as well as, the responsibility of the United States and the World Trade Organization is studied. It is concluded that Puerto Rico, although enjoying certain sovereign attributes, remains a territory under the control of the United States Congress.

Keywords: Puerto Rico, United States, cabotage laws, territory, World Trade Organization

RESUMEN

El objetivo de este ensayo es evaluar el poder gubernamental y auto regulatorio de Puerto Rico, en relación con las leyes de cabotaje y su relación con Estados Unidos. Se estudia la historia de Puerto Rico con Estados Unidos, ciertas leyes y jurisprudencia, así como la responsabilidad de Estados Unidos y la Organización Mundial del Comercio. Se concluye que, aunque Puerto Rico goza de ciertos atributos de soberanía, sigue siendo un territorio bajo el control del Congreso de Estados Unidos.

Palabras clave: Puerto Rico, Estados Unidos, leyes de cabotaje, territorio, Organización Mundial del Comercio

Puerto Rico (P.R.) has been a territory of the United States (U.S.) since 1898. In 1900, the Foraker Act, the first constitutional law governing the relation between P.R. and the U.S., decreed that all maritime transportation between the mainland and the island shall be conducted in vessels under the U.S. flag (Foraker Act, 1900), as a result of the nationalization of all vessels owned by Puerto Ricans in the island.[1] From there onwards, the Foraker Act defined that the coastal transportation between the U.S. and P.R., would be regulated according to U.S. laws and regulations.

In 1917, the second constitutional law between the U.S. and P.R., known as the Jones Act, defined via an amendment in 1920 that from then onward, all maritime transportation between the U.S. mainland and the island of P.R. would be conducted exclusively with vessels operating under the U.S. flag; this amendment is called the Merchant Maritime Act of 1920, also known as the cabotage laws. Different from the period that initiated in 1900, when the U.S. nationalization of the Puerto Rican vessels occurred, the amendment defined that the maritime trade between the U.S. mainland and P.R. should occur exclusively in U.S. flagged vessels.

The cabotage laws sanction in Section 27, among other things, that the coastwise trade should be conducted under vessels registered with the U.S. flag; in addition, no ship used for coastwise trade can be manufactured outside of U.S. dockyards. Finally, the vessel crew in particular the captain, engineers, and sailors must be U.S. citizens (Jones, 1921).

The U.S. cabotage laws apply to P.R., although it is important to recognize that they also apply arbitrarily to other non-mainland ports. In the same line of thought, they also exclude certain non-mainland ports. It is important to explain that the cabotage laws apply both to U.S. states and territories (George, 1990). There are several exceptions on their application that benefits U.S. territories

[1] The Foraker Act of 1900, article 9, established the first step for the eventual implementation of the cabotage laws of 1920. Under the Foraker Act, the vessels owned by the inhabitants of P.R. were nationalized under the U.S. flag and regulated under the U.S. coastal maritime laws; this process constituted a foundation for the implementation later of the 1920 legislation.

and not the states. P.R. is in a complicated position; the cabotage laws apply to the island as well as to two U.S. states Hawaii and Alaska, and the territory of Guam; but these laws do not apply to the U.S. Virgin Islands, a jurisdiction next to the Puerto Rican archipelago in the Caribbean.

As of today in 2017 and for almost 100 years, Puerto Ricans living in the island import 85% of all the goods consumed locally. They have to pay between 20% and 60% more for the goods imported from the mainland (Dietz, 1987); this is due to the fact that the U.S. maritime flag is the most expensive in the world. Since the 1920 legislation, 3.5 million Puerto Ricans pay more than the rest of American citizens for the same goods that are much cheaper on the mainland (Valentín-Mari & Alameda-Lozada, 2012).

It is our contention that the U.S. has created an exclusive maritime zone within its borders that privileges the American capital, both by way of exclusive transport rights, as well as increasing the value of the products exported to P.R. from the U.S. mainland. In this sense, P.R. constitutes an economic zone that discriminates against non-U.S. based capital, in the service industry of maritime transportation and the manufacturing industry of goods exported to P.R. (Lazarus & Ukepere, 2011).

Keeping alive the U.S. cabotage laws of 1920 can be in itself a type of protectionist measure, which might be against the U.S. position at the World Trade Organization (Oyedemi, 2011); nonetheless, since the U.S. joined said international organization, it raised its position to allow it to exclude the cabotage laws from the interference of the World Trade Organization (WTO). Up to this date, the cabotage laws of the U.S. are excluded, by way of a reserve or exclusion, from the WTO.[2]

What makes the case of P.R. a unique jurisdiction within the U.S. is that P.R. is a colonial territory, which belongs to the U.S. by virtue of Article IV, section 3 of the U.S. Constitution. Since 1898, P.R. belongs to the U.S. and since the Insular Cases of 1901 it is admin-

[2] The U.S. joined the WTO in 1995; since then, it managed to excluded by way of exercising a reserve in paragraph 3 of the General Agreement on Tariffs and Trade of 1994 (Van Grasstek, 2013).

istered by the U.S. Congress, with a civilian government with no voting political representation in the U.S. Congress.[3] It is evident that the U.S. laws as they are applied to P.R., in particular the cabotage laws render the Puerto Rican people incapable of questioning, modifying, or suspending them (Magee, 2002).

What makes P.R. different from Hawaii, Alaska, or the U.S. Virgin Islands? In 1950, through U.S. constitutional reforms in P.R., the U.S. government promoted a kind of self-government for the island, called Commonwealth of Puerto Rico, which placed it in a different position to the rest of the territories. P.R. is today the only U.S. territory that has a self-rule government and whose constitution was drafted by the local people. In addition, the entire government of P.R. is locally elected.[4] What P.R. does not have is equal representation in the U.S. Congress. The colonial condition of P.R. in relation to the application of the cabotage laws, distinct from Hawaii, Alaska, and the territory of the U.S. Virgin Islands, rests on the fact that P.R. suffers from the negative impact of such laws without having the capacity to challenge them legally or politically.[5]

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[3] The exception is under the Foraker Act (1900) that established the position of Resident Commissioner for the Puerto Rican people, who is elected every four years, with capacity to participate in the House of Representative of the U.S. Congress, but who does not have the right to vote.

[4] On June 13, 2016 the U.S. Supreme Court decided the case of *Commonwealth of Puerto Rico v. Sánchez-Valle* (2016); this case challenged, modified, or partially qualified the existing legal and politically reasoning of what P.R. is, in particular, how much self-rule or "sovereign powers" it has or how much a classic colonial territory P.R. is. For the purpose of the discussion in the text, it suffices to state that as a colonial territory with a self-rule government, P.R. is in no condition or position to challenge the cabotage laws of the U.S.

[5] During June 2016, the U.S. Supreme Court decided two cases, which are of paramount importance today to define the U.S.-P.R. political relationship; these are the cases of *Commonwealth of Puerto Rico v. Sánchez Valle* (2016) and *Commonwealth of Puerto Rico v. Franklin California Tax Free* (2016), decided in June 9th and 13th, respectively; both cases affirm that P.R. is a U.S. territory, under the U.S. Constitution (Article IV, section 3) and the Congress plenary powers. Within the recently affirmed logic, the U.S. Congress has the ultimate say in what concerns to P.R., and how to conduct business with the territory; this includes, amongst others, preserving the cabotage laws.

By way of U.S. Public Law 600 of 1950, the Congress authorized P.R. to enact its own constitution, creating a unique condition which de facto produces a "sovereign" jurisdiction which can be treated differently and not equally to the rest of the state and territories (*Commonwealth of Puerto Rico v. Sánchez Valle*, 2016).[6] In this sense, the U.S. has different "sovereign zones" within its own border. One example of an internal equal-sovereign zone can be Alaska or Hawaii; however, a non-sovereign zone, although treated differently can be the U.S. Virgin Islands.

In the case of P.R., a question to be answered is whether once the Commonwealth self-government was created by the sovereign power of the people of P.R., was a different territorial zone established and whether harsher economic regulations can be imposed to the trade of P.R. with the U.S. I contend that if the answers are affirmative, such actions are a breach by the U.S. to its obligations before the WTO.[7]

Can the U.S., which is a signatory to the WTO, promote an internal zone market in which it de facto excludes non-national capital and transport companies? Can non U.S. nationals interested in participating in P.R., which is the fifth largest world consumers market of mainland goods, challenge the current situation created by the cabotage laws? Can a formal complaint be presented against the U.S. before the WTO by the Puerto Rican people, or by non-U.S. citizens interested in participating in the commercial market of the island? These are the questions that this research project and literature review will seek to answer.

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[6] In *Commonwealth of Puerto Rico v. Sánchez-Valle* (2016), the U.S. Supreme Court stated on page 13, the following: "Those constitutional developments were of great significance—and, indeed, made Puerto Rico "sovereign" in one commonly understood sense of that term. At that point, Congress granted Puerto Rico a degree of autonomy comparable to that possessed by the States. (…) As this Court has recognized, Congress in 1952 "relinquished its control over [the Commonwealth's] local affairs[,] grant[ing] Puerto Rico a measure of autonomy comparable to that possessed by the States."

[7] As it will be discussed in the text, the U.S. convenient position in relation to the cabotage laws, is against the principle of free trade and competition, promoted in its agreement with the WTO. See World Trade Organization (2014), Hamilton (2002), and Liu (2009).

The above questions have been raised and to some extent answered by the U.S. Government Accountability Office (GAO) in 2013. According to the GAO, the effect of increasing the prices of the U.S. goods imported to P.R. is not only limited to this consideration and the situation also impacts on the trade and consumer capacity of Puerto Ricans. This U.S. government office states most of the trade today of goods entering P.R. is no longer conducted on U.S. vessels but on "foreign flagged" vessels, as 67% of all the vessels that enter Puerto Rican ports are foreign-flag based and only 33% are U.S.-flag.[8]

The outcome today of the U.S. 1920 cabotage laws applied in P.R. is that they are having an opposite effect by which local entrepreneurs in the island have been purchasing fewer goods from the U.S. This result is against the interest of U.S. manufacturing and agricultural industries (Slattery, Riley, & Loris, 2014).[9]

In this literature review essay, I will explore the above questions among others. In the first part, I will present the U.S.-P.R. legal basis as from the Foraker Act of 1900 up to the Federal Relations Act of 1950. In the second part, I will discuss the constitutional reforms of P.R. from 1946 to 1952, which lead to the establishment of the Commonwealth of Puerto Rico. In the third part, I will explore the U.S. commitments before the WTO in relation to free-market and trade access. Finally, I will provide the conclusion.

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[8] This is a very interesting fact. What is important to raise is that the 33% of the maritime trade which occurs in U.S. flagged vessels amounts to the core of the business. P.R. lives out of the trade with the U.S. An 85% of what we consume comes from the U.S. The report does not explain what is the content of the 33% of the trade conducted in U.S. flagged vessels (Government Accounting Office, 2013); nevertheless, using different data, one realizes the value of trade today between the U.S. and P.R.

[9] According to the Heritage Foundation working paper on the cabotage laws, the U.S. position is only sustained today in all the international free trade agreements, because it is "a sensitive area" for the U.S. government, (Slattery, Riley, & Loris, 2014); yet, as the authors documented in their working paper, the opposite is happening: the U.S. economy is losing in innovation, in competitiveness, and, moreover, in interrelating and integrating with other investment markets (Slattery et al., 2014).

The U.S. Rule Over P.R.: From the Foraker Act to the Federal Relations Act

The U.S. took formal control over P.R. after the Spanish-American War of 1898. Article II of the U.S.-Spain peace treaty signed on December 10, 1898 established that: "Spain cedes to the U.S. the island of Porto Rico and other islands now under Spanish sovereignty in the West Indies, and the island of Guam in the Marianas or Ladrones" (Treaty of Paris, 1899, p. 616).

Within the logic of the above article, P.R. became part of the U.S. federation controlled according to Article IX of said treaty, by the sovereign power of the U.S., and in particular by the U.S. Congress. It was established in said article of the Treaty of Paris (1899) that:

> Spanish subjects, natives of the Peninsula, residing in the territory over which Spain by the present treaty relinquishes or cedes her sovereignty, may remain in such territory or may remove therefrom, retaining in either event all their rights of property, including the right to sell or dispose of such property or of its proceeds; and they shall also have the right to carry on their industry, commerce and professions, being subject in respect thereof to such laws as are applicable to other foreigners. In case they remain in the territory they may preserve their allegiance to the Crown of Spain by making, before a court of record, within a year from the date of the exchange of ratifications of this treaty, a declaration of their decision to preserve such allegiance; in default of which declaration they shall be held to have renounced it and to have adopted the nationality of the territory in which they may reside. *The civil rights and political status of the native inhabitants of the territories hereby ceded to the U.S. shall be determined by the Congress* [emphasis added]. (p. 619)

As from 1898, Puerto Ricans have been struggling to understand, acquire, or modify the existing relationship between the U.S. and the island; no one was clear at the initial stages, even today, of

how over broad and extensive such U.S. constitutional disposition is. To be under U.S. Congressional authority is for the Puerto Rican people a very confusing if not inexplicable experience. What entails for the Puerto Rican people to be under the plenary powers of the U.S. Congress?[10] The first U.S. constitutional reforms for P.R. as well as for other U.S. territories, took place in 1900, when the Foraker Act was enacted.

As result of the judicial decision by the U.S. Supreme Court in *Commonwealth of Puerto Rico v. Sánchez-Valle* (2016), a new development has emerged which qualifies this conversation. According to the majority opinion issued by Justice Kagan, P.R. has no "sovereign" powers in the traditional sense, although for certain matters can be treated as a state of the U.S. federation, which indeed has sovereign powers. As a colonial territory, organized under Article IV, section 3, of the U.S. Constitution, P.R. only enjoys a delegated power for self-rule government (*Commonwealth of Puerto Rico v. Sánchez Valle*, 2016).

Returning to the original legal history the Foraker Act of April 2, 1900 was enacted to organize a civil government for P.R. It provided for the development of a republican type of government (executive, legislative, and judicial powers) structured by Congress, and executed by the U.S. president. In particular, all members of the Puerto Rican Senate, the local Supreme Court, and the governor were to be appointed by the U.S. president.

In what respects to specific terms about the transportation of maritime goods, the Foraker Act (1900) established in Sec. 9:

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[10] Year 2016 has been so far the year in which the three branches of powers of the U.S. government—the executive, the legislative, and the judiciary—have been more active on issues related to P.R., probably since the 1950-1953 period. As an example, recently the U.S. Congress enacted the PROMESA Act (that in English means promise), which is a type of federal financial oversight legislation over the P.R. government and economy. PROMESA is consistent with the will of the U.S. executive power, by way of the constitutional limitation that it is the responsibility of the U.S. Congress to handle the Puerto Rican affairs. This position is also consistent with the legal stance enunciated by the U.S. Supreme Court in the case *Commonwealth of Puerto Rico v. Sánchez Valle* (2016).

> That the Commissioner of Navigation shall make such regulations, subject to the approval of the Secretary of the Treasury, as he may deem expedient for the nationalization of all vessels owned by the inhabitants of Porto Rico on the eleventh day of April, eighteen hundred and ninety-nine, and which continued to be so owned up to the date of such nationalization, and for the admission of the same to all the benefits of the coasting trade of the United States; and the coasting trade between Porto Rico and the United States shall be regulated in accordance with the provisions of law applicable to such trade between any two great coasting districts of the United States. (p. 79)

The beginning of the implementation of the cabotage laws of 1920 commenced with the above-mentioned section. The island was perceived as belonging to the U.S. federation because the U.S. Congress established that P.R., for effect of the legal treaty, was part of the U.S. border and within its jurisdiction for internal control of the maritime traffic.

In the Insular Cases, from 1901 to 1922, the U.S. developed an understanding of the scope of the Foraker Act, which was explained in constitutional terms. In the controversial case *Downes v. Bidwell* (1901), in a majority-divided opinion, the U.S. Supreme Court ruled that P.R. belonged to the U.S. but was not part of the federation. Although that decision did not set a precedent, 20 years later in the case *Balzac v. Porto Rico* (1922), the U.S. Supreme Court, in a majority decision, adopted the recommended decision in *Downes v. Bidwell* (1901) and established that certain constitutional rights do not apply to P.R., as the island was a non-incorporated territory.

In light of the reasoning in *Balzac v. Porto Rico* (1922), today we need to explore the decision of *Commonwealth of Puerto Rico v. Sánchez-Valle* (2016). If P.R. is merely a U.S. territory organized under the U.S. Congress, then the U.S. citizens living in the island are exposed to a trade-discrimination pattern. That situation is not less different and complicated than that to which is exposed a foreign national attempting to conduct trade with the U.S. in P.R. Puer-

to Ricans are as to what respect to maritime trade, discriminated against for their place of origin and residence.

In this regard, since 1952 when P.R. adopted a self-rule government where the sovereign power of the people determined their own constitution, a claim of equality begun. Since 1952 P.R. has been recognized as an entity with different local government to the U.S. mainland, although as a congressionally-controlled U.S. territory; nevertheless, P.R. to date has no legal representation and equal rights in the U.S. Congress; therefore, the application of the cabotage laws, created multiple tiers of discriminatory practices both at the level of foreign trade and human rights.[11] This is an atypical critique or grievance, not recognized by the WTO, but which colonial territories such as P.R. do face.

The category of non-incorporated territory was introduced in 1901 by Judge White. This non-binding decision, established the foundations for the resolution of *Balzac v. Porto Rico* (1922). In the latter case, Judge Taft issued the opinion of the U.S. Supreme Court, where the court unanimously and with legal consequences, ruled that the island of P.R. was a non-incorporated territory, subject to the will of the U.S. Congress; as such, the rights and obligations of the U.S. citizens living in the island will be determined by the U.S. Congress.

The difference between the case of *Downes v. Bidwell* (1901) and *Balzac v. Porto Rico* (1922) rests on the historical circumstance that

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[11] As stated under footnote 9, the U.S. by creating the cabotage laws of 1920 and maintaining a position that is not a protectionist trade barrier, should then accept the bottom line consideration: that it is discriminating against Puerto Rican people who have no equal political rights to those of the mainland. Due to the colonial condition, P.R. as a territory lacks the political power to claim to the U.S. Congress equal rights; therefore, P.R. cannot claim either to be fully independent o annexed to the U.S. federation. P.R. remains as a colonial territory where fundamental human rights are violated. In particular, the Universal Declaration of Human Rights, Article 7 (The United Nations General Assembly, 1948), reads: "All are equal before the law and are entitled without any discrimination to equal protection of the law. All are entitled to equal protection against any discrimination in violation of this Declaration and against any incitement to such discrimination." This is consistent with the International Covenant on Civil and Political Rights, Article 14 (The United Nations General Assembly, 1966), to which the U.S. is signatory since 1992.

in 1917 the U.S. Congress enacted the second organic act for P.R., the Jones Act, properly known as the Jones-Shafroth Act. This is an important distinction, because this law only applies to the territory of P.R. As part of the U.S.-Spanish Treaty of Peace of 1898, the U.S. Congress acquired various territories, which until then belonged to Spain. From 1900, the U.S. regulated in a separate way each territory acquired from Spain, meaning that the Jones Act has its own variations in other territories, for example, in the Philippines. This other territory was organized under the Jones Act, which created the mechanisms to confer full legal sovereignty and independence to the people of Philippines.

In 1920, the U.S. Congress enacted a series of legislative measures under the Jones Act, which are also commonly known as the cabotage acts. The correct name of such legislation is the Merchant Marine Act of 1920, which was enacted to regulate internal transport of goods in U.S. ports. It also includes the manufacturing of the ships used in the U.S. maritime trade and the origin of the crews and engineers employed in the ships used to transport the goods. The cabotage laws apply to the U.S. states of Alaska and Hawaii, and also to the U.S. territories of Guam and P.R., yet it does not apply to other U.S. territories, such as the Virgin Islands.

The crux of the matter is that the Merchant Marine Act of 1920, in particular Article 9, was drafted using as framework the U.S.-Spanish Treaty of Peace (1898) and the logic of the decisions of U.S. Insular Cases, particularly by *Downes v. Bidwell* (1901). Considering the legal frame work of the time, the U.S. could impose the cabotage laws against P.R., because the island was a non-incorporated territory, which exists within the sovereign and inherent powers of the U.S. Congress.

P.R. was a traditional colonial territory, defined in Article IV, Section 3 of the U.S. Constitution. In this sense, because of the lack of any sovereign power P.R. must be treated "as equally as" the U.S. Congress defines; nonetheless, it is the Congress which decides how to treat P.R. and until 1920, it defined the island as an extension of the sovereign powers of the Congress. The "separated borders" make no illusion of sovereign powers for P.R. Moreover, after

the recent decisions of the U.S. Supreme Court on issues regarding P.R., there should be no doubt that P.R. is a self-ruled territory under the guidance and control of the U.S. Congress (*Commonwealth of Puerto Rico v. Sánchez Valle*, 2016).

The cabotage laws impose a terrible economical and financial burden on insular Puerto Ricans, which makes this law discriminatory. The cabotage laws used against the people of P.R. living in the Caribbean island are in violation of the U.S. international responsibilities to protect the human rights of its population (Canino Arroyo, 2015; Torruella, 2007).

In 1950, the U.S. enacted Public Law 600. Such law created a singular momentum in the U.S.-P.R. relation. The law defined a particular moment, by which the local population of P.R., were granted the right to legislate their own constitution. In the history of U.S. territories, this has been a unique circumstance. Neither Washington, D.C., Guam, the U.S. Virgin Islands, and other micro-territories have been granted the right to organize their own constitutional law. Only P.R., under the U.S. congressional authority, had been granted the authority to do so (*Commonwealth of Puerto Rico v. Sánchez Valle*, 2016; Neuman & Brown-Nagin, 2015).

Although there might be some differences or similarities with the Mariana Islands, the main distinction is that P.R. remained a non-incorporated territory since the Insular Cases of 1901. Meanwhile, the Mariana Islands moved to a different and unique status of some sort of free associated country. P.R. has remained within the U.S. federation, although with a particular type of status.[12]

The unique experience of 1950, also created the particularity of having to deal with a dual government for P.R. Beyond promoting the development of a local constitution, it also divided the government as a local and a federal one. The second part of Public Law 600 of 1950 redefines the Jones Act (1917) as the Federal Relations Act (1950).

[12] In this paper I will not address the issue of other U.S. territories or those with special status, such as Mariana Islands; for an interesting summary regarding that topic one should read U.S. Insular Areas: Application of the U.S. Constitution (Government Accounting Office, 1997).

Recently, via *Commonwealth of Puerto Rico v. Sánchez-Valle* (2016), we have been reminded that P.R. is just a U.S. territory administered by Congress. It is a colonial condition which the local population is subject to. Evidently, Puerto Ricans cannot question the cabotage laws, because they exist due to the will of the U.S. Congress that has plenary powers over P.R. and its people. The recent legislation Puerto Rico Oversight, Management, and Economic Stability Act (PROMESA), of 2016, is a clear demonstration and statement of the plenary powers in action. The dire effect of the plenary powers is the trade discriminatory practice against the Puerto Rican people, as well as a gross violation of human rights. This is the result of the lack of political sovereign powers, or political representation in the U.S. Congress, which violates the equal protection of the laws principle.

The Constitutional Legal Reforms of 1946-1952

The legal reforms that took place in P.R. last century originated between 1946 and 1952. In particular, the U.S. Congress began to adopt a series of measures, leading towards self-government for P.R. In terms of the measures adopted, a chronological list includes:

A. Law for the selection of a Puerto Rican-born governor of 1946.

B. Law for the election of the Puerto Rican governor by the local people of 1948.

C. Public Law 600 (1950) for the establishment of a constitutional assembly by the Puerto Rican people.

D. Public Law 600 (1950) for the modification of the Jones Act (1917) and the re-enactment of it under the Federal Relations Act (1950).

E. Public Law 447 (1952) recognizing the Puerto Rican constitution of 1952, as enacted and voted for by the Puerto Rican people.

Within the scope of the legislation passed in a period of six years, P.R. achieved some sort of self-government, under the sovereign and inherent powers of the U.S. Congress. The subject of self-government of P.R. has never been absolutely clear, of whether it entails sovereign powers; however, in that historical period, the U.S. government proclaimed to the world that P.R. had achieved local rule, with autonomy, and that the colonial relation had been modified (Torruella, 1985, 2007; Trías Monge, 1999).[13]

The above statement needs to be qualified. Within the recent decision of *Commonwealth of Puerto Rico v. Sánchez Valle* (2016), the U.S. Supreme Court has revisited the above-mentioned commentary. The court recognized the unique status of P.R. and its capacity to self-rule; nevertheless, the Court distanced itself from the issue of whether P.R. has become a sovereign state. Indeed, if it were a sovereign state, it would have meant that it had been "invaded" by the U.S., as a matter of political domination.

The representation to the United Nations in 1953 was that P.R. had adopted a level of self-rule, which had modified the colonial relation. In relation to the ending of the U.S. government over the non-self-governing territory of P.R., The United Nations General Assembly (1953), Resolution 748, Article 5, states:

> *Recognizes* that, in the framework of their Constitution and on the compact agreed upon with the U.S., the people of the Commonwealth of Puerto Rico have been invested with attributes of political sovereignty which clearly identify the status of attained of self-government by the Puerto Rican people as that of an autonomous political entity; (p. 26)

[13] It is important to note that in the Public Law 447 of 1952, the U.S. Congress always referred to P.R. as a territory that achieved self-rule, via the compact theory (a contract between the U.S. government and the Puerto Rican people). In the UN Resolution 743, the terms used are "self-rule" and "some sort of sovereign powers." In *Commonwealth of Puerto Rico v. Sánchez Valle* (2016), recently decided by the U.S. Supreme Court, the wording used is clear: "local self-rule for the Puerto Rican people."

The problem with this resolution of the United Nations is that it clearly plays with legal concepts, provoking or creating the false expectation that P.R., after the reforms of 1952, had achieved a level of limited sovereign powers. If P.R. has limited sovereign powers, does it constitute the same sovereign and inherent powers of the U.S. Congress? Are we talking of two different sovereignties, creating a strange political relationship between the U.S. and P.R.?

The response comes now in the case of *Commonwealth of Puerto Rico v. Sánchez-Valle* (2016). The precise answer to the above inquiry is in the negative. P.R. only gained self-rule with attributes of sovereignty, but that does not make P.R. a sovereign state in the traditional sense (*Commonwealth of Puerto Rico v. Sánchez-Valle*, 2016 slip opinion at page 13); notwithstanding, the legal, political and economic questioning remains the same: Can the U.S. apply a double legal standard to a colonial territory which has no adequate political representation in Congress? It is our contention, that this constitutes trade-discrimination based on the colonial status; it is a colonial barrier.

The WTO and the Legal Obligations of its Members

The WTO allows members to join the organization, on a voluntary basis. According to Article XII of the WTO Agreement: "Any state or customs territory having full autonomy in the conduct of its trade policies is eligible to accede to the WTO on terms agreed between it and WTO Members" (World Trade Organization, 1994, p. 20).

Using the above definition for admitting members to the WTO, one would like to explore whether or not, P.R. can be admitted as a state or custom territory member. Note that if P.R. was indeed admitted to have some sort of limited sovereign powers in 1953, then it should be recognized by the WTO, at least as an autonomous customs territory; furthermore, it should be allowed to participate in the maritime services trade with the U.S. without restrictions to the interaction of the commerce in the region.

After the recent legal decisions and reasoning about P.R. by the U.S. Supreme Court, the island cannot be admitted to the WTO,

nor can it be treated as a separate sovereign entity, within its current status. If the political status were to change to one similar to the Marshall Islands of the Mariana Islands, then P.R. could be treated differently and the cabotage laws, for the islander's sake, could be eliminated (World Trade Organization, 2011).

Under the present circumstances and within the current regulations of the WTO, the U.S. can keep the reserves on paragraph 3 of the General Agreement on Tariffs and Trade of 1994 and allow the cabotage laws to be effective over the island of P.R. Puerto Ricans without sovereign powers of political representation cannot do much; they are trapped by legal and political considerations.

P.R.'s inability to participate in the WTO eliminates the possibility of filing a complaint against the U.S. government for discriminatory trade practices or illegal protectionist barriers. This takes the Puerto Rican people to a legal practice that dates back to 1920, which is contrary to WTO's rules and to the international defense of human rights.

The consideration over the cabotage laws in the U.S. and how they apply to P.R. poses other international problems for manufacturing capital and for agricultural capital, which might be losing business inasmuch as the Puerto Rican people are no longer buying products from the U.S.; notwithstanding, the complaint today must be seen from the perspective of the disempowered Puerto Ricans, which under the current legal system do not have the international presence to participate in international forums and seek for equal rights. This includes the right to complain against discriminatory trade practices.

Conclusions

In the U.S., the processes of regulating the cabotage protective rules, regulation, and laws dates to the early days of independence (1789). Political developments in P.R., in the 1950's, forced both the government of the U.S. and the WTO to recognize that something happened in P.R., in terms of achieving some type of limited sovereign powers and self-rule; or to the contrary, that nothing hap-

pened and P.R. remained as a traditional colonial territory since 1898, despite the constitutional changes of 1950 to 1952.

Since the legal decision and reasoning in *Commonwealth of Puerto Rico v. Sánchez-Valle* (2016), the U.S. Supreme Court has cleared up and widened our understanding of what is P.R. and its relationship with the U.S. Within this legal framework, one needs to accept that P.R., although enjoying certain types of sovereign attributes, remains a territory under the control of the U.S. Congress. If that is the case, then the question that arises is whether Congress can exercise trade-discrimination against a colonial country and a colonized people, who have no equal representation in the public policy, and deliberating and voting process.

If P.R. has limited sovereign powers, could it become a member of the WTO, and as such file a claim against the U.S. questioning the cabotage laws as they stand today since they constitute a violation to the WTO Agreement? Without sovereign powers, can P.R. be admitted to the WTO? Are the human rights of the Puerto Rican people being violated? Moreover, as a colonial territory experiencing trade-discrimination, can something be done on its behalf? Apparently, at this historical juncture, the answer to all these question is in the negative.

It seems that today no solution exists for the colonial condition of P.R. and its effect on human rights violations and trade-discrimination practices; nonetheless, the continued exploration of the many angles surrounding the cabotage laws allows us to seek an eventual adequate solution for the people of P.R.

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El desempeño en los cursos cuantitativos como predictor de éxito en los estudios universitarios

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RESUMEN

Este estudio investiga las variables que pueden predecir el éxito universitario. Se utilizó una muestra de 202 alumnos que culminaron estudios en diciembre de 2013 y mayo de 2014. Se estudiaron las variables aprovechamiento y aptitud en matemática, género del estudiante, tipo de escuela, índice general de solicitud, índice de los cursos cuantitativos, promedio de grado y tiempo de estudio. Para analizar los datos se usó el *partial least squares path modeling* y el análisis de regresión logística. Se encontró que el desempeño de los estudiantes en los cursos cuantitativos es un buen predictor del éxito en sus estudios.

Palabras clave: educación superior, administración de empresas, cursos cuantitativos, aprovechamiento matemático, éxito estudiantil

ABSTRACT

This study investigates the variables that can predict university success. A sample of 202 students who completed studies in December 2013 and May 2014 was used. The variables achievement and aptitude in mathematics, student gender, type of school, general index of application, quantitative courses index, grade point average, and study time were studied. The data were analyzed using the partial least squares path modeling and logistic regression analysis. The results revealed that the performance of students in the quantitative courses is a good predictor of success in their studies.

Keywords: higher education, business administration, quantitative courses, math achievement, student success

Cada día es más importante que las universidades que preparan estudiantes de administración de empresas requieran que sus ingresados y egresados tengan competencias cuantitativas (Gordon, 2010). Es necesario que los alumnos tengan dominio de las destrezas cuantitativas para que puedan resolver problemas y tomar decisiones efectivas, tanto en sus estudios universitarios como en su desempeño laboral.

A pesar de que la mayoría de los programas subgraduados requieren la aprobación de cursos cuantitativos, la tasa de estudiantes que aprueban estos cursos es muy baja (Gupta, Harris, Carrier, & Caron, 2006; Larrazolo, Backhoff, & Tirado, 2013). Particularmente en la Universidad de Puerto Rico, Recinto de Río Piedras (UPRRP), se ha encontrado que existe un alto por ciento de fracasos de los estudiantes en los cursos cuantitativos, como lo son Precálculo y Cálculo.

El porcentaje de fracasos en el curso Métodos Cuantitativos para Administración de Empresas I (MECU 3031) que ofrece la Facultad de Administración de Empresas (FAE), de la UPRRP, durante los años académicos 2002-2003 al 2014-2015, se mantuvo en alrededor de un 50% durante el primer semestre y un 53% durante el segundo semestre. Este alto porcentaje de fracaso incide en que muchos de los estudiantes fracasen en cursos subsiguientes y, por ende, no pueden tener éxito en la culminación de su carrera universitaria en el tiempo esperado. Precisamente, el objetivo principal de este estudio es investigar las variables que pueden predecir el éxito en los estudios universitarios de los estudiantes en la FAE.

Revisión de literatura

Las universidades quisieran determinar parámetros para reconocer las destrezas que poseen los estudiantes de nuevo ingreso y cómo estas inciden en el éxito en sus estudios universitarios (Parker, 2005). Generalmente, el éxito universitario está asociado con las calificaciones que obtienen los estudiantes y el tiempo que les toma completar su grado. Investigaciones realizadas apuntan a que existen varios factores que inciden en el éxito en los estudios uni-

versitarios, tales como: aprovechamiento y aptitud en matemática, promedio de escuela superior, género del estudiante, escuela de procedencia, ingreso familiar, índice general de solicitud (IGS), calificaciones en cursos cuantitativos, promedio de grado, tiempo de estudio y factores socioeconómicos.

Investigaciones que incluyen las variables de aprovechamiento matemático e IGS

Parker (2005) realizó una investigación cuyo propósito principal fue explorar la relación entre la retención estudiantil en la Universidad de Clarion y el éxito de los alumnos en las matemáticas. Los hallazgos demostraron que los estudiantes que tenían más éxito en los cursos de matemáticas tenían mayor probabilidad de permanecer en la universidad y graduarse en cuatro años; esto implica que las matemáticas facilitan el éxito de los estudiantes en su carrera académica.

Lesik (2007) realizó un estudio en el cual participaron 1,276 estudiantes de nuevo ingreso de una universidad, que estudiaban a tiempo completo entre los años 2000 y 2002. Estos estaban matriculados en el curso de álgebra intermedia (matemática básica) o pasaron directamente a tomar los cursos de matemática del nivel universitario. Se encontró que aquellos que participaron en los cursos de matemática básica se mantuvieron más tiempo matriculados en sus estudios universitarios; es decir, que el riesgo de que aquellos estudiantes que tomaron los cursos de matemática básica abandonaran la universidad fue significativamente menor, al compararlos con aquellos que no los tomaron.

Vega Vilca y Agosto (2010) realizaron un estudio para predecir el aprovechamiento académico de los egresados del programa subgraduado de la FAE. Los autores definieron el concepto de "egresado de éxito académico" como un estudiante con promedio de graduación de al menos 3.33, que logró terminar su bachillerato en un promedio de cinco años o menos. En el estudio participaron 391 egresados subgraduados que culminaron estudios en diciembre de 2008, mayo de 2009 y verano de 2009. Los investigadores encontraron que el género del estudiante, así como el tipo de es-

cuela superior de procedencia (pública o privada) no son buenos predictores del éxito académico; sin embargo, el IGS constituye un buen predictor de éxito. Contrario a las conclusiones de Matos Díaz (2008), en este trabajo se concluye que el IGS puede ser un buen predictor del éxito del egresado, siempre que se tenga valores suficientemente altos de este índice. Cuando se comparan dos grupos de estudiantes con IGS diferenciado por 25 puntos, la posibilidad de encontrar un egresado de éxito es mayor en el grupo con IGS más alto (2.67 veces). También encontraron que el índice de los cursos de métodos cuantitativos (Imecu) es un índice nuevo, propuesto en este trabajo, que predice el éxito del futuro egresado. Cuando se comparan dos grupos de estudiantes con Imecu diferenciado por un punto, la posibilidad de encontrar un egresado de éxito es mayor en el grupo con Imecu más alto (3.09 veces).

Investigaciones que incluyen variables socioeconómicas

DeNicco, Harrington y Fogg (2015) estudiaron los factores de retención de estudiantes de primer año de un colegio comunitario. Estos consideraron los factores: género, raza, características de la escuela superior, puntaje en el examen de entrada, desempeño durante el primer año y cursos remediales durante el primer año. Los resultados indican que el desempeño en el primer año es el predictor más fuerte en la retención. El *grade point average* (GPA) y el número de créditos obtenidos en primer año son predictores estadísticamente significativos en la retención del estudiante. Se encontró que todas las demás variables no fueron significativas para explicar la retención de los estudiantes.

Coronado Ramírez y Sandoval Bravo (2012) realizaron una investigación para determinar si el género, los resultados de la sección de matemáticas de la prueba de aptitud académica y algunos factores demográficos (estado civil, situación laboral y tipo de institución de procedencia) inciden en el rendimiento en los cursos de matemáticas de los estudiantes de nuevo ingreso de la Universidad de Guadalajara, México. Los investigadores no encontraron variables que pudieran establecer una correlación en su rendimiento. Ellos concluyeron que existe otro tipo de variables socioeconómi-

cas o sociohistóricas que pudieran permitir determinar el rendimiento en matemáticas de los estudiantes.

Arias Ortiz y Dehon (2013) realizaron una investigación en la cual analizaron los factores que influenciaban en el abandono de los estudios universitarios por parte de los alumnos de la Université Libre de Bruxelles. Se encontró que a pesar de que muchos comenzaban sus estudios, muy pocos completaban sus grados. También descubrieron que los alumnos provenientes de clase socioeconómica baja eran más vulnerables a abandonar sus estudios y los factores económicos les impedían matricularse nuevamente. Por otro lado, encontraron que una proporción alta de alumnos que volvieron a estudiar en la Universidad, pero en un campo de estudio distinto al que estaban antes de abandonarla, culminaron sus estudios, en comparación a los que se matricularon nuevamente en el mismo campo de estudio en el que estaban originalmente. Indican que esto sugiere que las universidades deben reevaluar los mecanismos disponibles para trabajar con los fracasos y guiar a los estudiantes en la selección que estos realicen de las profesiones que desean estudiar.

Vázquez Calle y Cabrera Pérez (2004) realizaron un estudio cuyo objetivo principal fue identificar y evaluar la importancia relativa de las características académicas y no académicas, que explican el éxito o fracaso en completar el grado de bachillerato de los estudiantes de nuevo ingreso, de la Universidad de Puerto Rico en Cayey (UPRC) de los años académicos 1995 al 1998. Específicamente consideraron las siguientes variables independientes para estimar el modelo de regresión logística, mediante el cual se midió el efecto neto de cada predictor sobre la probabilidad de éxito en graduarse: variables académicas preuniversitarias (aptitud en matemática, aptitud verbal, aprovechamiento en matemáticas, español e inglés, índice académico de escuela superior); variables académicas universitarias (índice académico obtenido en su primer año de estudios, cumplimiento con el índice mínimo de 2.00 y el área académica de admisión); variables no académicas (género, escuela superior de procedencia, ingreso del hogar, educación del padre, educación de la madre y generación del estudiante).

Con relación a las variables académicas universitarias, los investigadores indicaron que de todos los estudiantes que obtuvieron un promedio académico menor de 2.00 en el primer año de estudios en la UPRC, el 88.7% no completó el bachillerato. Adicional a esto, los resultados indican que el desempeño académico de los estudiantes al finalizar el primer año de universidad determina significativamente el éxito o fracaso posterior en completar el grado académico.

Relacionado con el área académica en las que estaban matriculados los estudiantes de nuevo ingreso que participaron en la investigación, encontraron que las áreas de Ciencias Naturales y Administración de Empresas reflejaron una tasa de éxito en graduarse mayor, que los estudiantes de las áreas de Ciencias Sociales y Humanidades.

En relación con las variables no académicas, encontraron que las mujeres tuvieron una tasa ligeramente mayor de éxito en graduarse que los hombres. Además, no encontraron evidencia de que el tipo de escuela superior de procedencia tuviera un efecto significativo en la probabilidad de completar o no el grado de bachillerato. En particular, los investigadores encontraron que los estudiantes de escuela privada reflejaron una probabilidad de éxito tan solo 5% mayor que sus homólogos de escuela pública.

Metodología

La metodología utilizada en este estudio consistió en la recopilación y generación de una base de datos y el posterior análisis estadístico de los mismos usando las técnicas estadísticas *partial least squares path modeling* (PLSPM) y análisis de regresión logística (RL).

La base de datos utilizada fue proporcionada por la Oficina de Planificación Estratégica y Presupuesto de la UPRRP, y consta de la información de los egresados subgraduados de la FAE que culminaron estudios en diciembre de 2013 y mayo de 2014. Se analizaron los datos de 202 egresados cuya primera concentración fue Contabilidad (106), Economía (1), Finanzas (17), Gerencia de Mercadeo (40), Gerencia de Operaciones y Suministros (10), Gerencia

de Recursos Humanos (19) y Sistemas Computadorizados de Información (9). Se excluyeron a los estudiantes de la concentración de Administración de Sistemas de Oficina, ya que ellos no toman los cursos de naturaleza cuantitativa considerados en este estudio. También se excluyeron a los estudiantes de otras concentraciones, porque presentaban datos incompletos.

Se analizaron las variables: aprovechamiento y aptitud en matemática en la Prueba de Evaluación y Admisión Universitaria, género del estudiante, tipo de escuela (pública o privada), IGS, índice de notas de los cursos cuantitativos, promedio de graduación y tiempo de estudio (en años). Para realizar el análisis de los datos se consideraron las notas de los estudiantes en cursos medulares de naturaleza cuantitativa que ofrece la FAE; específicamente, se analizaron las notas de los siguientes cursos: Métodos Cuantitativos para Administración de Empresas I y II (MECU 3031), Métodos Cuantitativos para Administración de Empresas II (MECU 3032), Estadística para Administración de Empresas I (ESTA 3041), Estadística para Administración de Empresas II (ESTA 3042), Introducción a la Estadística para la Administración de Empresas (ESTA 3045), Introducción a los Fundamentos de Contabilidad I (CONT 3105), Introducción a los Fundamentos de Contabilidad II (CONT 3106), Mercados e Instituciones Financieras (FINA 3107), Gerencia Financiera (FINA 3106), Introducción a la Gerencia de Operaciones y Suministros (GEOP 4315) y Gerencia Estratégica (ADMI 4007).

Para un mejor análisis del desempeño de los estudiantes en los cursos cuantitativos analizados, se transformaron las notas obtenidas en índices de notas de los cursos. Estos índices valoran la ejecutoria del estudiante en cada uno de los cursos analizados y para ser calculado fue necesario asignar puntaje a los diferentes calificativos, así: A = 4, B = 3, C = 2, D = 1 y F = 0. Si un estudiante aprobó el curso en la tercera oportunidad con calificativo B, pero en las dos veces anteriores obtuvo F y D, su índice fue $(0 + 1 + 3)/3 = 1.33$.

En el estudio participaron 118 estudiantes del género femenino y 84 estudiantes del género masculino. Del total de estudiantes, 135 provenían de escuelas privadas y 67 de escuelas públicas, como lo ilustra la Tabla 1.

Tabla 1

Datos cualitativos

Variable	Frecuencias
Género del estudiante	Femenino = 118 (58.4%) Masculino = 84 (41.6%)
Tipo de escuela superior	Privada = 135 (66.8%) Pública = 67 (33.2%)

Fuente: Elaboración propia.

La Tabla 2 presenta una descripción de los datos cuantitativos para cada una de las variables estudiadas. Los estadísticos calculados fueron: valor mínimo (Mín.), primer cuartil (Q1), mediana, promedio, tercer cuartil (Q3) y valor máximo (Máx.).

Tabla 2

Datos cuantitativos

Variable	Mín.	Q1	Mediana	Promedio	Q3	Máx.
Tiempo de estudio (años)	4.0	5.0	5.0	5.5	6.0	20.0
Índice general de solicitud (IGS)	187.0	300.0	316.0	315.5	333.0	362.0
Aprovechamiento matemático	413.0	579.2	629.0	620.6	671.0	788.0
Aptitud matemática	382.0	578.5	638.0	631.8	695.2	766.0
Promedio de graduación	2.55	3.04	3.29	3.30	3.56	4.00
Índice de MECU 3031	0.20	1.50	2.00	2.30	3.00	4.00
Índice de MECU 3032	0.50	2.00	2.00	2.38	3.00	4.00
Índice de CONT 3105	0.50	2.00	3.00	2.89	4.00	4.00
Índice de CONT 3106	0.50	3.00	3.00	3.02	4.00	4.00
Índice de ESTA 3041-3042-3045	0.50	2.00	2.75	2.71	3.50	4.00
Índice de ADMI 4007	1.00	3.00	4.00	3.43	4.00	4.00
Índice de GEOP 4315	1.00	2.00	3.00	2.90	4.00	4.00
Índice de FINA 3106	0.30	3.00	3.00	3.18	4.00	4.00
Índice de FINA 3107	0.30	2.12	3.00	2.99	4.00	4.00

Fuente: Elaboración propia.

Análisis de los datos y resultados

La base de datos fue analizada usando dos técnicas estadísticas; estas son:

1. PLSPM: Después de hacer grupos de variables que se relacionan entre sí, este análisis determina la existencia de relaciones entre los bloques de variables, también llamados constructos o variables latentes. Se estudió la relación entre cuatro constructos y se cuantificaron las conexiones del modelo propuesto, el cual define el desempeño general del egresado de la FAE; esto es, desempeño en la escuela superior, los cursos introductorios, los cursos intermedios y avanzados, y general (éxito).
2. RL: Determina la relación funcional entre una variable dependiente cualitativa (dos o más categorías) y una o más variables explicativas independientes o covariables, ya sean cualitativas o cuantitativas. En este trabajo se estudió la relación entre la variable dependiente éxito académico del estudiante, que se definió como aquel estudiante que finalizó su bachillerato en cinco años o menos con promedio de graduación de, por lo menos, tres puntos; y las variables independientes: género del estudiante, escuela de procedencia, IGS y los índices de los cursos cuantitativos en estudio. Los conceptos de *odds* y *odds ratio* (OR) son muy importantes para comparar la ejecutoria estudiantil en dos categorías de las variables del estudio.

PLSPM

Se agruparon las variables que se relacionan entre sí con la finalidad de generar constructos, los cuales se visualizan como nuevas variables que no son observables directamente, sino a partir de las variables observables asociadas a dicho constructo. Se estudió la relación entre cuatro constructos que relacionan el desempeño del estudiante egresado de la FAE. La Tabla 3 muestra los constructos y las variables observadas asociadas a cada uno de ellos.

Tabla 3

Constructos y sus variables asociadas del modelo en estudio

Constructo C1: Desempeño en la escuela superior	
IGS	Índice General de Solicitud
APRM	Aprovechamiento Matemático
APTM	Aptitud Matemática
Constructo C2: Desempeño en los cursos introductorios	
CONT 3105	Introducción a los Fundamentos de Contabilidad I
CONT 3106	Introducción a los Fundamentos de Contabilidad II
MECU 3031	Métodos Cuantitativos para Administración de Empresas I
MECU 3032	Métodos Cuantitativos para Administración de Empresas II
ESTA	Estadística: ESTA 3041, ESTA 3042, ESTA 3045
Constructo C3: Desempeño en los cursos intermedios y avanzados	
FINA 3106	Gerencia Financiera
FINA 3107	Mercados e Instituciones Financieras
ADMI 4007	Gerencia Estratégica
GEOP 4315	Introducción a la Gerencia de Operaciones y Suministros
Constructo C4: Desempeño general (éxito)	
PRGR	Promedio de graduación
TIEMPO	Tiempo de estudios

Fuente: Elaboración propia.

El modelo que se utiliza en el estudio es un sistema de relaciones lineales entre cuatro bloques de variables (constructos), tal como ilustra la Figura 1. Estas relaciones lineales involucran cuatro hipótesis sobre desempeño de los estudiantes de la FAE:

> *H1: C1→ C2, el desempeño en la escuela superior influye positivamente en el desempeño de los cursos introductorios universitarios.*
> *H2: C2 → C3, el desempeño en los cursos introductorios universitarios influye positivamente en el desempeño de los cursos intermedios y avanzados universitarios.*
> *H3: C2 → C4, el desempeño en los cursos introductorios universitarios influye positivamente en el desempeño general (éxito)*
> *H4: C3 → C4, el desempeño en los cursos intermedios y avanzados universitarios influye positivamente en el desempeño general (éxito)*

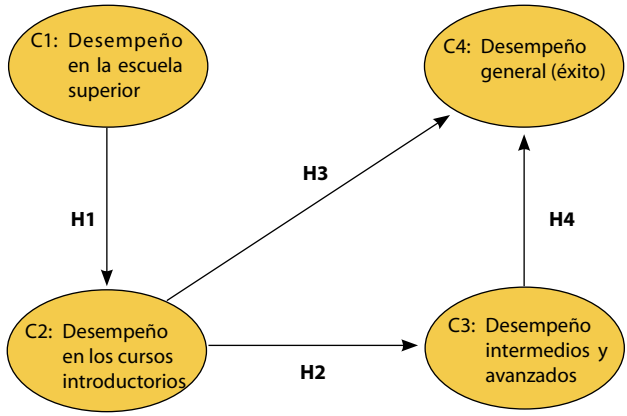

Figura 1. Diagrama del modelo en estudio. Fuente: Elaboración propia.

La metodología PLSPM trabaja básicamente en tres pasos. Primero, se calculan ponderaciones (*weights*) en cada constructo, para combinarse linealmente con las variables asociadas a cada constructo y originar valores (*scores*) representativos. Segundo, se calculan las correlaciones (*loadings*) entre los *scores* y las variables asociadas a cada constructo. Tercero, se calculan los coeficientes del sistema de relaciones lineales de la Figura 1. La Tabla 4 presenta los cálculos mencionados en los dos primeros pasos, además presenta el cálculo de *communality* para cada variable asociada a su constructo. Se observa que el valor más bajo es para la variable ADMI 4007, la cual aporta solo el 15.3% de su variabilidad al constructo C3. Esta variabilidad es mucho menor que el 45% que sugieren los autores de este trabajo, a pesar de que Sánchez (2013) sugiere una variabilidad de 50%. Este resultado motivó el retiro de dicha variable y el reprocesamiento de los datos, con una variable menos asociada al constructo C3.

Tabla 4

Ponderaciones de las variables de cada constructo

Variable	Constructo	Weight	Loading	Communality
IGS	C1	0.389	0.821	0.675
APRM	C1	0.425	0.891	0.794
APTM	C1	0.337	0.896	0.802
MECU 3031	C2	0.287	0.713	0.508
MECU 3032	C2	0.262	0.679	0.461
CONT 3105	C2	0.258	0.684	0.468
CONT 3106	C2	0.285	0.718	0.515
ESTA	C2	0.323	0.731	0.535
ADMI 4007	C3	0.209	0.391	0.153
GEOP 4315	C3	0.389	0.735	0.540
FINA 3106	C3	0.417	0.781	0.610
FINA 3107	C3	0.418	0.734	0.538
PRGR	C4	0.829	0.933	0.871
Tiempo	C4	0.374	0.605	0.366

Fuente: Elaboración propia.

Para medir la consistencia interna de cada constructo, se determinó el alpha de Cronbach y una mejor medida de consistencia interna basada en los *loadings* llamada rho de Dillon y Goldstein (DG. rho); en todos los casos son mayores de 0.7; además, los primeros autovalores (*eigen*) de la matriz de correlaciones de las variables asociadas al constructo son mayores de 1, tal como muestra la Tabla 5; y ratifican la consistencia interna en cada constructo.

Tabla 5

Medidas de consistencia interna de cada constructo

Constructo	Número de variables	Cronbach	DG.rho	Eigen 1	Eigen 2
C1	3	0.839	0.904	2.275	0.494
C2	5	0.748	0.832	2.490	0.850
C3	3	0.648	0.810	1.762	0.675
C4	2	0.436	0.780	1.279	0.721

Fuente: Elaboración propia.

La Tabla 6 muestra los coeficientes positivos del sistema de relaciones lineales entre constructos representados en el modelo propuesto de la Figura 2, donde se muestran además las variables asociadas a cada constructo.

Tabla 6

Coeficientes significativos entre los constructos

Relación de Constructos	Coeficiente	Error estándar	Tvalue	Pvalue
C1→ C2	0.3533	0.0662	5.3402	0.0000
C2 →C3	0.6482	0.0538	12.0396	0.0000
C2→ C4	0.5638	0.0489	11.5373	0.0000
C3 → C4	0.3694	0.0489	7.5598	0.0000

Fuente: Elaboración propia.

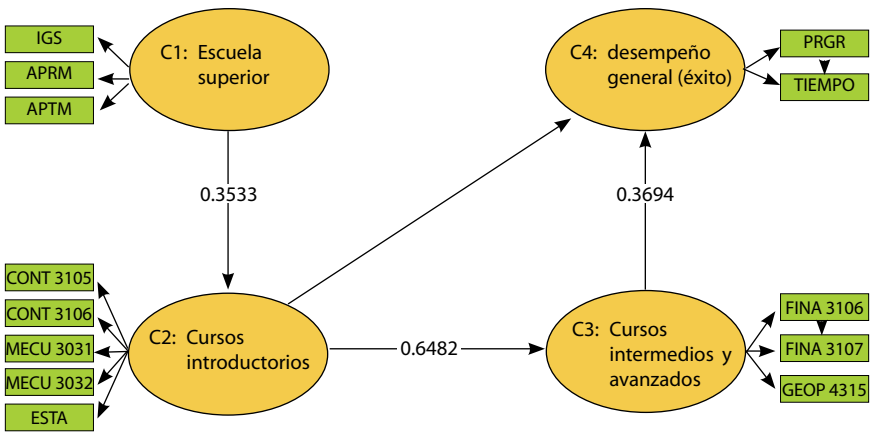

Figura 2. Relación significativa entre los constructos.
Fuente: Elaboración propia.

La prueba de coeficientes resultó altamente significativa en los cuatro casos; por lo tanto, se concluye que las cuatro hipótesis formuladas fueron validadas, es decir:

1. El desempeño en la escuela superior influye positivamente en el desempeño en los cursos introductorios universitarios.
2. El desempeño en los cursos introductorios universitarios influye positivamente en el desempeño en los cursos intermedios y avanzados universitarios.
3. El desempeño en los cursos introductorios universitarios influye positivamente en el desempeño general (éxito).
4. El desempeño en los cursos intermedios y avanzados universitarios influye positivamente en el desempeño general (éxito).

RL

Para el análisis de los datos bajo estudio, mediante regresión logística, se definió una nueva variable llamada éxito. La nueva variable se refiere al éxito académico del estudiante y se definió como aquel alumno que culminó su bachillerato en cinco años o menos y obtuvo un promedio de graduación de tres puntos o más. De esta manera se encontraron 102 estudiantes de éxito académico, de un total de 202 estudiantes. Además, se promediaron las notas de los cursos que se ofrecen en dos partes, como son los cursos de contabilidad CONT 3105 y CONT 3106, los cursos de métodos cuantitativos MECU 3031 y MECU 3032, y los cursos de finanzas FINA 3106 y FINA 3107. En este caso, los promedios obtenidos definen nuevas variables; estas son: índice de los cursos de contabilidad (Icont), índice de los cursos de métodos cuantitativos (Imecu) e índice de los cursos de finanzas (Ifina).

El modelo de regresión logística propuesto establece que el éxito académico de un estudiante de la FAE depende de la influencia de las siguientes variables: género del estudiante, tipo de escuela, IGS, Icont, Imecu, Ifina, índice de los cursos de estadística (Iesta), índice del curso Gerencia Estratégica (Iadmi) e índice del curso Gerencia de Operaciones (Igeop).

La Tabla 7 muestra la evaluación del modelo de regresión logística propuesto. Se observa que cuatro variables no son significativas (n.s.); estas son: género del estudiante, Icont, Iadmi e Igeop; por lo tanto, hay cinco variables significativas que sí influyen en el

éxito académico del estudiante: tipo de escuela, IGS, Imecu, Ifina e Iesta.

Tabla 7

Resultados del modelo de regresión logística propuesto

	Coeficiente	Error estándar	Zvalue	pvalue	
Intercept	-16.116	3.1659	-5.09	<0.0001	
Género	0.4252	0.3993	1.06	0.2869	(n.s.)
Escuela	1.7836	0.4408	4.05	<0.0001	
IGS	0.0221	0.0089	2.48	0.0131	
Imecu	0.6124	0.2988	2.05	0.0404	
Icont	-0.0481	0.3074	-0.16	0.8757	(n.s.)
Ifina	1.1964	0.4101	2.92	0.0035	
Iesta	0.7192	0.2702	2.66	0.0078	
Iadmi	0.2018	0.2742	0.74	0.4617	(n.s.)
Igeop	0.0371	0.2478	0.15	0.8810	(n.s.)

Fuente: Elaboración propia.

Se construyó un modelo de regresión logística para el éxito académico considerando las variables que resultaron significativas en el modelo que se ilustra en la Tabla 7. Se calcularon los OR y un intervalo del 95% de confianza para los mismos. Los resultados se muestran en la Tabla 8.

Tabla 8

Cálculo del OR de las variables significativas

	OR	Intervalo de confianza (95%)	
		Inferior	Superior
Escuela	5.802	2.56	14.12
IGS	1.022	1.01	1.04
Imecu	1.895	1.09	3.38
Ifina	3.185	1.55	7.07
Iesta	2.139	1.32	3.59

Fuente: Elaboración propia.

De los resultados que muestra la Tabla 8 se puede concluir lo siguiente:

1. $OR_{Escuela}$=5.802; si se comparan los estudiantes que provienen de escuelas públicas y privadas, la posibilidad de encontrar un estudiante de éxito académico entre los que provienen de escuela privada es casi seis veces la posibilidad de encontrarlo entre los que provienen de escuela pública.
2. OR_{IGS}=1.022; si se comparan dos grupos de estudiantes diferenciados por 50 puntos de IGS; la posibilidad de encontrar un estudiante de éxito en el grupo de estudiantes con IGS mayor será casi tres veces (1.02250=2.97) la posibilidad de encontrarlo entre los estudiantes de IGS menor; es decir, a mayor IGS, mayor la posibilidad de encontrar un estudiante de éxito.
3. OR_{Imecu}=1.895; si se comparan dos grupos de estudiantes diferenciados por un punto, en la escala de cero a cuatro, en la nota de los cursos de métodos cuantitativos, la posibilidad de encontrar un estudiante de éxito académico en el grupo de mayor nota será casi dos veces la posibilidad de encontrarlo entre los estudiantes con menor nota.
4. OR_{Ifina}=3.185; si se comparan dos grupos de estudiantes diferenciados por un punto, en la escala de cero a cuatro, en la nota de los cursos finanzas, la posibilidad de encontrar un estudiante de éxito académico en el grupo de mayor nota será algo más de tres veces la posibilidad de encontrarlo entre los estudiantes con menor nota.
5. OR_{Iesta}=2.139; si se comparan dos grupos de estudiantes diferenciados por un punto en la nota de los cursos de estadística, en la escala de cero a cuatro, la posibilidad de encontrar un estudiante de éxito académico en el grupo de mayor nota será el doble de la posibilidad de encontrarlo entre los estudiantes con menor nota.

Conclusiones

A la luz de los resultados obtenidos en la investigación, se concluye lo siguiente:

1. En el análisis de datos mediante PLSPM, se observa que el índice de notas del curso ADMI 4007 fue excluido del modelo propuesto, ya que solo aporta el 15.3% (y debe ser más del 45%) de su variabilidad al constructo C3: desempeño en los cursos intermedios y avanzados; por lo tanto, tampoco influye en el constructo C4: desempeño general del estudiante.
2. El desempeño en la escuela superior (definido como la puntuación en el IGS, el aprovechamiento y la aptitud matemática) influye positivamente en el desempeño en los cursos introductorios: CONT 3105 y 3106, MECU 3031 y 3032, y ESTA 3041 y 3042 (o su equivalente ESTA 3045).
3. El desempeño en los cursos universitarios introductorios influye positivamente en el desempeño de los cursos intermedios y avanzados universitarios; es decir: FINA 3107 y 3106 y GEOP 4315.
4. El desempeño en los cursos universitarios introductorios, intermedios y avanzados influye positivamente en el desempeño general (promedio de graduación y tiempo de estudios).
5. En el análisis de datos mediante RL, se observa que estas cuatro variables no fueron significativas: género del estudiante e índice de notas de los cursos de contabilidad, gerencia estratégica y gerencia de operaciones. Hay cinco variables significativas que sí influyen en el éxito académico del estudiante; estas son: tipo de escuela, IGS y los índices de notas de los cursos de métodos cuantitativos, finanzas y estadística.
6. Se encontró que hay diferencias significativas en el tipo de escuela de la que proviene el estudiante; específicamente,

se halló que la posibilidad de encontrar un estudiante de éxito académico entre los que provienen de escuela privada es casi seis veces la posibilidad de encontrarlo entre los que provienen de escuela pública.

7. Se encontró que si se comparan dos grupos de estudiantes diferenciados por 50 puntos de IGS, la posibilidad de encontrar un estudiante de éxito en el grupo de estudiantes con IGS mayor será casi tres veces la posibilidad de encontrarlo entre los estudiantes de IGS menor; es decir, a mayor IGS, mayor la posibilidad de encontrar un estudiante de éxito.
8. Al comparar el índice de los cursos de métodos cuantitativos en grupos diferenciados por un punto, se encontró que la posibilidad de hallar un estudiante de éxito académico en el grupo de mayor nota es casi dos veces la posibilidad de encontrarlo entre los estudiantes con menor nota.
9. Al comparar el índice de los cursos de finanzas en dos grupos de estudiantes diferenciados por un punto, se encontró que la posibilidad de hallar un estudiante de éxito académico en el grupo de mayor nota es algo más de tres veces la posibilidad de encontrarlo entre los estudiantes con menor nota.
10. Al comparar el índice de los cursos de estadística en dos grupos de estudiantes diferenciados por un punto, se encontró que la posibilidad de hallar un estudiante de éxito académico en el grupo de mayor nota es el doble de la posibilidad de encontrarlo entre los estudiantes con menor nota.

Recomendaciones

Los hallazgos de la investigación apuntan a las siguientes recomendaciones:

1. Motivar a los estudiantes a tomar los cursos en el orden establecido, según las secuencias curriculares de sus programas

académicos, para que tengan una mayor posibilidad de tener éxito en la culminación de sus estudios universitarios. Las instituciones educativas deben tener un mayor acercamiento a sus estudiantes proveyendo orientación y asesoría académica durante su formación profesional, además de implantar actividades que los ayuden a determinar sus metas profesionales (Goncalves y Trunk, 2014).

2. Las universidades deben proveer programas de tutorías y laboratorios a los estudiantes que lo necesiten, ya que se ha comprobado que estos tienen una influencia positiva en la retención y el promedio general de los alumnos (Croft, Harrison, & Robinson, 2009; Laskey & Hetzel, 2011; Velázquez Rosado, Villafañe Cepeda, & Vega Vilca, 2015).
3. Se deben estudiar otras variables que inciden en el éxito de los estudiantes en la culminación de sus estudios universitarios, tales como: sicológicas, sociales y económicas (Coronado Ramírez, Sandoval Bravo, & Torres Mata, 2012). También se deben investigar las estrategias de aprendizaje de los estudiantes universitarios y su rendimiento académico (Martín, García, Torbay, & Rodríguez, 2008); esto es así, pues se ha encontrado que los estudiantes universitarios de éxito son aquellos que utilizan estrategias motivacionales, autorregulan su estudio y revisan todo el proceso que realizan.

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